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In and Outside the Square:
The Sky and the Power of Belief in Ancient China
and the World, c. 4500 BC – AD 200

Volume I:
The Ancient Eurasian World and the Celestial Pivot

by
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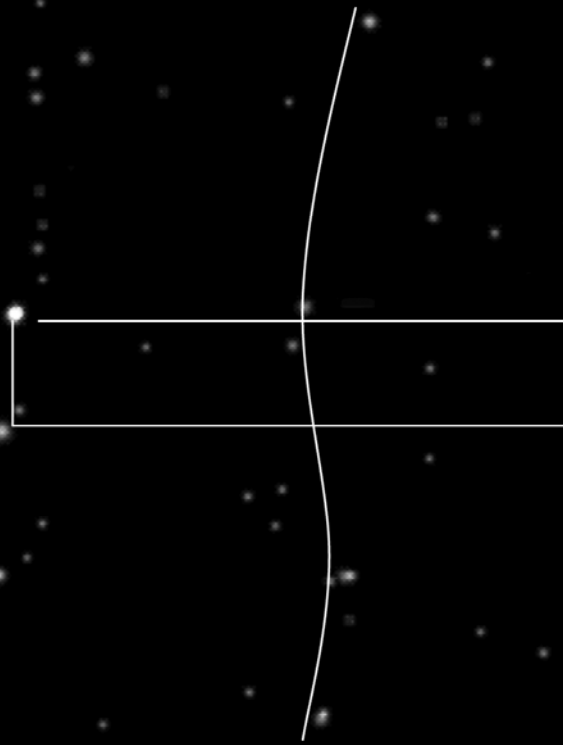
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In and Outside the Square:
The Sky and the Power of Belief in Ancient China and the World,
c. 4500 BC – AD 200

For Gustav and Jacques

JOHN C. DIDIER

IN AND OUTSIDE
THE SQUARE



VOLUME I
THE ANCIENT EURASIAN WORLD
AND THE CELESTIAL PIVOT

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Foreword
by
Victor H. Mair
University of Pennsylvania

In and Outside the Square is one of the most remarkable achievements of Sinological research that I have ever encountered. The ample subtitle, “The Sky and the Power of Belief in Ancient China and the World, c. 4500 B.C–A.D. 200,” gives an indication of the broad and inclusive aims of this three-volume work. Yet neither the title nor the subtitle can adequately encompass the rich assemblage of themes that are woven together in this outstanding scholarly treatise. To be sure, what we have in John Didier's magnificent magnum opus is the first and only investigation into all significant aspects of the rise of civilization in the East Asian Heartland (EAH) from its beginnings to the establishment of a bureaucratic system that persisted (albeit with numerous changes of dynasty and modifications in details of structure and operation) until 1912.

In this unique product of one man's tireless quest, we learn not just about the astronomical basis of the ideology of the Chinese state, but also about the foundations and early evolution of technology, cosmology, religion, myth, rulership, divination, literacy, and much else beside. Even more striking is the fact that all of this splendid exposition of the development of ancient civilization in the EAH is presented not merely as a coherent narrative of its own, but within the context of events and ideas in the whole of Eurasia. For someone with a more limited vision than John Didier, there would be no need to include the entire first volume of this book. But it is precisely in volume one that we discover the Neolithic and Bronze Age roots of Sinitic civilization, roots that cannot be restricted to the EAH alone.

How was John Didier able to accomplish this brilliant feat of integration? First, and above all else, is his ability to think outside of the box. Although “thinking outside of the box” is often invoked as a criterion for genuine creativity, few people are actually able to do it, inasmuch as they are fearful of venturing beyond what is comfortable and familiar. In the present instance, “thinking outside of the box” is uncannily apt for John Didier's *modus cogitandi*, since his

monumental realization of the centrality of a celestial quadrangle lies at the heart of *In and Outside the Square*.

That, however, is not the end of it. John Didier would never have been able to write this spectacular book relying solely on his insight and intelligence. Beyond these essential requirements for making a major scholarly breakthrough, producing a massive, meticulously documented work like *In and Outside the Square* requires enormous reserves of fortitude and endurance. I have watched this book grow over the years from the germ of a revelatory concept to a full-blown scholarly edifice constructed of countless, carefully crafted blocks of data and evidence that have been laboriously acquired by tracking down any and all meaningful leads that the author came across.

Finally, it is my duty to point out that John Didier has done all of this despite great odds against his ever being able to bring to fruition a project of such overwhelming proportions. During the past two decades, not only has John Didier had to cope with the sheer magnitude of the task that he set himself, he has also had to face the disheartening prospect of witnessing key components of his research being appropriated by others before — for reasons completely beyond his own control — he was able to publish them himself. This would have been enough to leave a man of lesser character bitter and broken, but John Didier has continued to carry out his investigations without flagging.

To be sure, just as he has confronted grizzly bears and mountain lions in the mountains of Wyoming and Colorado, John Didier has faced academic adversity bravely and squarely. Consequently, I consider it a great honor to be able to publish in *Sino-Platonic Papers* his pathbreaking *In and Outside the Square*. Not only am I certain that this grand synthesis of diverse disciplines will stimulate lively, fruitful debate among Sinologists and Eurasianists alike, I am also confident that the appearance of this pioneering book will encourage John Didier to publish the other important treasures of intellectual history writ large that now exist only as manuscripts in varying degrees of completion. In the meantime, however, the present bountiful offering gives us plenty to feast upon.

Preface

Research for this book began in the summer of 2001. By March 2002 I had developed already the basic ideas set forth in these three volumes, which at that time I publicized in a lecture that I delivered in Chinese in Chengdu, China to an audience composed of faculty and students of Sichuan University.¹ In December 2003 I completed a rough draft of the manuscript, in one volume.² In January 2004, through the kind assistance of the Editor in Chief of the then-intended press, the University of Hawaii Press, either a very detailed Table of Contents or the completed manuscript was sent out to more than ten potential reviewers. By coincidence, in April of 2004 I also applied for tenure in the Department of History at Colorado State University, and the manuscript or its detailed Table of Contents therefore was sent to an additional estimated twenty potential reviewers, seven of whom kindly agreed to review my file that included the first draft of the manuscript of December 2003. By early August 2004 the reviews for the University of Hawaii Press were in, Hawaii had accepted the manuscript for publication, and I began my revisions.

At the same time, in late July of 2004, having been thoughtfully informed by one of the reviewers for the University of Hawaii Press that I should contact Professor David Pankenier because, the reviewer reported, his contemporary research on the gods Di and Taiyi paralleled my own, I wrote to Professor Pankenier, and in early August 2004 we exchanged manuscripts, his a seventeen-page article and mine the complete 2003 draft of the book manuscript. In an email communication, Professor Pankenier mentioned that he had already seen the Table of Contents of my manuscript.³ Professor Pankenier's paper, entitled "A Brief History of *Beiji* 北極

¹ "Chinese Celestial Polar Cosmology and the Development of Socio-Political Unity, c. 4500–100 BC," delivered in Mandarin Chinese on March 17, 2002 at Sichuan University, Chengdu, Sichuan, P.R.C., as an installment of Sichuan University's invited lecturer series "The Sinologist as Technologist in the 21st Century: Repercussions in the Study of Chinese History."

² John C. Didier, *In and Outside the Square: The Sky and the Power of Belief in Ancient China and the World, c. 4500–100 BC*. Copyright © 2003. Unpublished manuscript distributed widely for review.

³ Email communication from David Pankenier, July 24, 2004.

(Northern Culmen), with an Excursus on the Origin of the Character *di* 帝," was published the following year, in the fall of 2005, in the *Journal of the American Oriental Society*.⁴

As it turned out, Professor Pankenier and I were working on much the same general topic, employing many of the same sources, and in certain matters reaching virtually the same conclusions, though while Professor Pankenier focused on Di and Taiyi in the context of specifically Shang and Warring States religion, respectively, I had in my manuscript tied in these gods with all of Neolithic, Warring States, and Han developments, covering the period c. 4500–100 BC, to demonstrate the persistence of godheads of the northern celestial pole across not only the developing Chinese cultures and civilization but also those in Mesopotamia, India, Egypt, and Europe throughout this period. I had also developed a thesis identifying in a new way the nature and composition of the godhead Di and, as a part of that thesis, had projected not only the godhead / graph of the high power Di onto the stars of the Neolithic-early Bronze northern celestial pole (NCP) but also that of a Shang high power virtually unmentioned in modern works treating Shang religion, what I have considered to be the true corporate high god of Shang religion that helps to constitute the greater Di, which is Ding 日.

What is most striking is that in our work of 2003 and 2004 Professor Pankenier and I made several of the same mistakes, which errors, with the additional years since 2004, I have been fortunate enough to locate and correct. One such mistake that quite extraordinarily we made in common was the very specific misreading of a single phrase in *Shiji* 27⁵ wherein we both ignored a single character, *chang* 常 ("constant"; "constancy"), thus causing us identically to misread an entire early-imperial cosmogonic and cosmographic construct involving Taiyi (for this passage, see below, Volume I, Chapter 3). In other areas there were similar topical identities: the citation of Eliade's and Wheatley's work on the *axis mundi* or urban *omphalos*; the identification of Di and Taiyi as identical Chinese polar gods in the Han period, and, in the case of Di, a recognition of the likely astronomical significance of instances when that character

⁴ *Journal of the American Oriental Society* 124.2 (2004): 211–236; this issue was printed and mailed Autumn 2005.

⁵ Sima Qian 司馬遷, *Shiji* 史記 ("Historical Records," c. 100 BC), Chapter 27.

appeared inverted on Oracle Bone Inscriptions (OBIs); a discussion of the eclectic nature of Shang religion and culture in light of a shift that occurred from earlier times in the Shang's recognition of the northern celestial pole's location relative the earth observer; a mistaken identification of Taiyi, "Great One," with *yi*, "One"; and the projection of the graph for the Shang god Di onto the stellar patterns of the pole of the 2nd millennium BC (even though our projections onto specific patterns of polar stars differed — and still do — considerably; mine have not changed since I first alighted on them in 2001). Even our breezily offered conclusion that the Warring States concepts of *xu* 虛 and *wu* 無, or vacuity and nothing, had derived from a now-vacant celestial pole, was the same. In the years since then, while researching much more carefully the socio-political, economic, artistic, ritual, and intellectual history of the Zhou period (1045–249 BC), I have discovered that this particular projection or conclusion was hurriedly and superficially conceived and therefore quite far off the mark.

Although apparently my earlier manuscript remains uncited, Professor Pankenier's work now continues with his recent delivery of a paper on what in both my earlier and present manuscripts I have identified to be the highest, and celestial polar, power of Shang religion, Ding 𠂔. His papers of 2004 and 2009⁶ offer strong support for my own distinct projection of Di and Ding onto polar stellar patterns, though in a work of this size naturally my overall observations, projections, and conclusions go far beyond where Professor Pankenier has tread in his short papers.

The support that Professor Pankenier's papers lend to my work is helpful particularly in light of the apparent difficulty that a small minority of observers and advance readers of both my March 2002 lecture in Sichuan and my 2003 draft of the manuscript experienced in accepting that ancient religion and political legitimation and power could have originated in and been

⁶ I have not seen David Pankenier's article of February 2009 that now treats the matter of Ding, having learned of it only through descriptions of it by those in attendance when the paper was delivered and by references to and citations from it in a paper written by Jonathan Smith, a graduate student at the University of Pennsylvania who generously sent me his paper just as I was completing final revisions to the current manuscript. For my critical review of the essential thrusts of Professor Pankenier's paper of February 2009, see below, Volume II, Chapter V, "Appendix: The Polar Projection of Di and the Astronomical Projection of Ding."

maintained through the human projection of divinity onto the stellar canopy and, in particular, the northern celestial pole. One reader rejected outright the idea that ancient folk anywhere projected constellationary pictures onto the stars, seemingly suspecting that I intended to promulgate some hip voodoo religion disguised as respectable scholarship.

Less suspicious and more openly curious, an audience member attending my March 2002 lecture at Sichuan University asked very sincerely during the question-and-answer session following the lecture proper how the Shang and Zhou graphs for the high gods Di, Ding, Taiyi, and Tian (as well as other related graphs) could be traced in the patterns of stars found at the northern celestial pole of the time when in fact the stars were and are not visible. For a moment I stood stunned in silence — it had never occurred to me that anyone might question the visibility of the stars. But for the inhabitants of Chengdu, China in the 1990s and 2000s, as well as all modern urban inhabitants across the globe, indeed the stars do not appear in the sky: they are obstructed from view by a thick layer of smog, dust, and light pollution. When two years hence the suspicious scholarly reader of the first draft of the manuscript rejected the very idea that ancient peoples anywhere in the world projected constellationary pictures onto stellar patterns, I realized that I needed to prepare a better groundwork on which to lay out my own reconstructions of the celestial polar constellations that I propose ancient Chinese and other Eurasian folk projected onto the stars to constitute their imagined godheads.

Another advance reader's helpful suggestion that, in assuming and lightly demonstrating a trans-Eurasian cultural and technological interflux during the Neolithic and Bronze periods, I may have fallen prey to previous generations' folly by promoting a kind of "Pan-Babylonism," caused me to reconsider carefully the basis for my suggestion that the projection of godheads onto polar stellar formations may have transited to East Asia from Southwest Asia. After subsequent considerable study of the matters of the development and spread across Eurasia of ancient technological advances and various Indo-European-speaking peoples, I found only greater support for the thesis advancing such a Neolithic and Bronze transfer.

These questions and criticisms that I received from early observers and readers of my work spurred me to conduct research that led to the development of Chapters 1 and 2 and the thorough rethinking and revising, and considerable expansion, of Chapters 3 and 4 of Volume I.

In these chapters I offer a fairly detailed outline of all known or suspected Eurasian bilateral east-west cultural and technological transfers that occurred during the Neolithic and Bronze periods, the evolution of astronomy and astrology in major ancient Eurasian civilizations between c. 3000 and 500 BC, and specifically stellar polar projections traceable to both Chinese and other Eurasian and world civilizations during roughly the same periods, all in the hope that with a wide and deep accounting of the evidence showing clearly the great significance to developing religions and polities of the ancient world of constellationary and divine projections onto the stars, readers will find less to doubt while witnessing how my projections of Chinese divinities' names and symbolic representations onto the stars follow naturally from not only internal Chinese evidence but also similar tendencies found among other civilizations across Eurasia and the world. While in the original manuscript of 2003 I had reviewed these matters in a single brief introductory chapter, my coverage was perfunctory and superficial, owing to my naïve assumption that understanding among a contemporary readership of both the extensive Neolithic cross-Eurasian contacts and the central politico-religious role that stellar projections of divinities played among developing ancient civilizations was widespread.

In the final stage of my revision process, in 2008, I focused on Zhou-period China, during which process I was able to overturn my earlier understandings of Zhou and early-imperial transformations of inherited Chinese religious — and particularly cosmogonic and cosmographic — dimensions such that I saw rather than a continuation of essential cosmographic projections a fundamental change in symbolic assignment and interpretation that occurred sometime between c. 200 and 700 AD. In recognizing this change my interpretations of the pole and its influence on Chinese thought and religion after c. 1000 BC have come to differ immensely from the interpretation offered by both David Pankenier and, earlier, me. The result of this research is the lion's share of Volume III, which treats both the significant but not revolutionary changes in religious outlook achieved during the Zhou and a substantial shift in heavenly and earthly symbolism that occurred in China sometime during and/or after the Latter Han period (23–220 AD).

One thesis that now finds its place encapsulated within Volume III and which survived the revisions of 2004–2009 is my observation that from Neolithic times and throughout

subsequent Chinese intellectual history one can perceive to be present and at work a basic structural paradigm of Chinese religion, what I have termed the center-plus-agency structure, that the ancient proto-Chinese and Chinese may have inherited from a transmitted Sumerian / Babylonian religion that is apparent in Sumer / Babylon from the 3rd millennium BC and forward. Another thesis found in the 2003 manuscript that I maintain and develop significantly in the current Volume III is the postulation that one can observe in particularly Shang and Zhou, and probably also Neolithic, proto-Chinese and Chinese cosmographic and cosmogonic speculations the projection of the cosmos to mimic the shape of the inverted tortoise, thus overturning the more than millennium-old and currently universally believed thesis that the proto-Chinese and Chinese have always believed the earth, after the squarish plastron of the tortoise, to be square and the dome of the heavens to resemble the roundish carapace of a turtle. In fact, as I demonstrate, through the Han period (202 BC – AD 220) the Chinese viewed the *heavens* to be both square and round and the earth to be, following the shape of the heavens as they appear at the horizon, circular.

Another thesis having appeared in my original 2003 manuscript and that survived the revisions of the past six years is my identification of the Warring States and later high god Taiyi 太一 / Dayi 大一 with the Shang founding ancestor Dayi 大乙, thus explaining the polar origins and placement of the later god Taiyi / Dayi. It was and continues to be my documented opinion that the name of Taiyi 太一, which I trace to a prior usage Dayi 大一 dating to the Warring States period, appears to have originated in the temple name of Dayi 大乙 when, during the latter half of the 16th century BC, that Shang founder expired and was apotheosized to reside at the northern celestial pole. Mentioned briefly in the current Volume I, Chapter 3, this thesis finds its full development now in Volume III, Chapter 6.

In the continuing process of discovery in which I have engaged since 2004, the manuscript of 2003 has expanded threefold, from one to three volumes. By and large the sections of the book treating mostly ancient (pre-Zhou, or pre-1045 BC) China in particular, including Chapters 3 and 4 of Volume I and all of the chapters of Volume II, have been updated and expanded but otherwise have changed little since December 2003, since my research into ancient Southwest and South Asian religious and astronomical traditions served to strengthen my earlier

interpretations of the origins of the ancient proto-Chinese and early Chinese godhead(s). Volume III developed from inchoate ideas presented in the final chapters of the 2003 manuscript, but many of the ideas and much of the research now included in Volume III represent new discoveries dating to these past five years of intensive work on the matter of Zhou-Han religion and intellectual changes. Thus, the most significant changes that have been effected since 2003 have occurred with the development of most of Volumes I and III.

Acknowledgements

I am grateful to the Graduate School, the College of Liberal Arts, and the Department of History of Colorado State University for supporting my two-month-long stay in Princeton during the summer of 2001, during which research sojourn the ideas upon which these volumes are based were first developed. The University and College also generously supported my continuing work on the project by granting me a sabbatical leave in 2005–2006 and further providing summer support in 2006. Without the assistance of these offices of Colorado State University this project simply would never have even begun.

My Ph.D. dissertation advisor, Professor Ying-shih Yu, is largely responsible for having instilled in me both a powerful motivation to understand the development of Chinese civilization and, as an integral element of that evolution, the origins of Chinese thinking. Professor Yu is also responsible for having trained me not only in the basics of research into early Chinese civilization but also to study and ruminate on seminal historical problems and questions thoroughly and carefully. Through countless conversations Professor Yu caused me to question myself and my judgments repeatedly and unflinchingly. In addition, Professor Yu's life, character, and work have always been and continue to be for me sources of immense inspiration. To Professor Yu I owe a lifelong debt that could not possibly be repaid.

I am also indebted to Professor Andrew Plaks for having taken the time and effort early on in the development of this project, in 2001–2002, to discuss with me patiently the basic ideas now expressed in particularly Volume II of the manuscript. His enthusiastic encouragement and

advice were critical in propelling me to formulate these ideas more carefully and thoroughly. Long before this, in 1990–1991, Professor Plaks also very generously sat with me individually through a year's independent study to read with me the classical literature of the Chinese Tang-Song periods, through which intensive interaction he imparted to me his deep appreciation for and unequalled understanding of all classical Chinese literature. The deeply affective influences of this study with him remain with me always.

The immensely positive influence that the late great Denis Twitchett exerted over me and all of my work, from my Ph.D. dissertation and forward, cannot be overstated. Through several long telephone conversations with him and his reading and criticizing of my first attempts at writing down my ideas presented now mostly in Volume II, Professor Twitchett helped invaluable to focus my efforts and channel them into productive avenues of research. I regret with immense sadness only that I cannot continue to discuss ideas of mutual interest with him and present him with the completed manuscript over which he exerted so much constructive influence.

The equally great late Frederick W. Mote generously criticized the draft manuscript of 2003 and thereby in countless cases influenced deeply my thinking and expression. The value of his energetic support and meticulous critique of my work is immeasurable. I was fortunate in the half a decade prior to Professor Mote's passing to have lived near his home in retirement and thus enjoyed an ever-uplifting friendship and scholarly communication with him, his companion and wife Hsiao-lan Chen Mote, and his brother, the inimicable Professor Max Mote. Their warmly extended friendship, encouragement, and critical commentary have remained vital to me throughout these years of incessant revising.

I am deeply indebted as well to Professor Hai-t'ao T'ang of Princeton University. Professor T'ang, among the most inspired and inspiring individuals whom I have had the pleasure to meet, very gently, wisely, and generously taught me to read the classical Chinese language and its literature. Ever gracious, kind, and patient, the wise and knowledgeable Professor T'ang remains for me the model of the accomplished scholar whose admirable life reflects thoroughly the fine quality of his work. Professor T'ang's teachings and influence lie at the very foundation of this study.

Recalling with great fondness my undergraduate advisors and professors at first Montana State University and later the University of Minnesota, I offer my deep gratitude also to Professor Norman Marshall, then of Montana State University, and Professors Edward Farmer, Romeyn Taylor, Pauline Yu, Theodore Hutters, and Byron Marshall of the University of Minnesota, for their having inspired deeply a wide-eyed curious lad. Their expert guidance of my early forays into the depths of historical East Asian civilizations inspired a life of study that otherwise surely would have foundered for lack of direction. In particular, it was Professor Norman Marshall who, through not only the expert instruction that he offered in his "Oriental Philosophy" course at Montana State (the only Asia-related offering at that institution at that time) but also the sheer power of his own transcendent synthesis of historical Asian thought, first instilled in me a desire to undertake the serious study of Asian languages, philosophies, literatures, and histories.

Long before I had the pleasure of meeting him in 2001 in Laramie, Wyoming, Professor Victor Mair had been for me a source of immense inspiration and thus exerted from afar an enormous influence on my development as a scholar. Since that fortuitous meeting in Laramie, Professor Mair has continued to inspire me deeply, and he has also actively supported my work on this particular project by reading and critiquing carefully the 2003 manuscript, inquiring over my progress toward completion of and engaging me in thoughtful discussions over the revisions, and sending me many scholarly articles, including very recently his own, that he sensed would deepen, expand, or simply improve the quality of my work. Most recently Professor Mair has engaged me in a careful discussion over the matter of the timing and location of the domestication and biting of the horse, with the intent of ensuring that I was both aware of all relevant literature and certain of my responses to that literature. When, in 2008, the manuscript had become too lengthy to be published either within a reasonable time frame or affordably by an academic print publisher (it had grown to some 1,000 pages in standard manuscript formatting), Professor Mair asked me to submit the manuscript to *Sino-Platonic Papers* so that it might be reviewed and considered for online publication therein. My indebtedness to Professor Mair, for all he has done to encourage, assist, and inspire me, from the time long before I had met him to the very present, is simply immeasurable.

I am further indebted to the anonymous reviewers for *Sino-Platonic Papers*, who forthrightly and unflinchingly criticized the April 2009 draft of this manuscript and thereby caused its considerable improvement. The enormous generosity of these reviewers, whose only goal in reading carefully through these lengthy three volumes seems to have been to help to augment the strength of the arguments forwarded therein, is inspiring and deserving of a sincere and deeply felt gratitude.

I would also like to thank Professor Ann Gill, Dean of the College of Liberal Arts of Colorado State University, for her energetic support of my work and for her inexhaustible patience with me as I insisted on revising and tripling my original manuscript to the point of my own satisfaction. Former Chair of the Department of History at CSU, Professor Ruth Alexander, has been, throughout the development of this work, also a constant source of encouragement. In addition, the immediately past Chair of the History Department at CSU, Professor Doug Yarrington, has been instrumental to the completion of this work through his strong support of my revising and expanding of the original manuscript according to my own vision of what it could and should be. Furthermore, the support of the current Chair of the History Department at CSU, Professor Diane Margolf, has been critical as well to the successful completion of this manuscript.

In the final process of preparing the manuscript for publication I have also benefited from many enjoyable and enlightening conversations with my knowledgeable friend and colleague, Professor Chris Fisher of the Anthropology Department at CSU. His generous sharing of his deep and extensive understanding of Palaeolithic, Mesolithic, Neolithic, and Bronze world archaeology and anthropology has helped me considerably as I have formulated my opinions regarding individual artifacts and larger trends across cultures / civilizations that date from these periods. Professor Fisher has also assisted me no small amount by advising me over the technical preparation of the illustrations found in these volumes.

I have also been the fortunate recipient of the kind and expert technical assistance of my friends and colleagues in the College of Liberal Arts Dean's Office at Colorado State University. In particular, College Information Technology Manager Mr. Chris Ketterman; IT Technician and Liberal Arts Instructor Mr. Kevin Foskin; and Web Designer for the College, Mr. Andrew Nolte,

all guided me expertly in both discovering an appropriate method of creating for and inputting in the text Sinitic⁷ characters and preparing the illustrations that accompany the text. I am grateful for their generous offering of their valuable time and expertise to assist me. Mr. Foskin has additionally proofread lengthy sections of this manuscript and engaged me in involved philosophical conversations about such sections and the ideas purveyed throughout the manuscript, thus helping me significantly to sharpen my understandings of greater human historical processes and improve my written expression and its technical consistency.

Ms. Xiaroan Wang, an advanced graduate student in the Department of History at Colorado State University, selflessly took the time and effort to apply her considerable expertise to review and criticize the pivotal Chapter 5 of Volume III of this manuscript. I wish to thank Ms. Wang for her perspicacious criticism of, and correction of certain errors originally present in, that critical chapter.

I further would like to thank especially Ms. Paula Roberts, assistant director of the Center for East Asian Studies at the University of Pennsylvania and Associate Editor of *Sino-Platonic Papers*, and Mr. Mark Swofford, Technology Editor for *Sino-Platonic Papers*, for their expert editorial and technical assistance in preparing the volumes of this manuscript for publication in *Sino-Platonic Papers*. Paula's perspicacious eye caught many an error and stylistic inconsistency, and Mark's wizardly understanding of and control over the fundamental electronic elements of manuscript preparation enabled him to both evince and correct technical problems that otherwise would have plagued the text and graphics. Both Paula and Mark helped to improve the textual, pictorial, and overall visual elements of the work enormously, and I remain deeply indebted to them.

Despite the expert, gracious, and generous assistance that all of these fine people have so kindly offered me, of course any and all errors in or omissions from the manuscript remain solely my responsibility.

⁷ By "Sinitic" I refer to the pre- or proto-Chinese script found in Shang (c. 1545–1045 BC) Oracle Bone Inscriptions (OBIs) dating from approximately 1200 BC and the Shang and early-Zhou (c. 1045–249 BC) bronze script, from both of which the Chinese script largely developed during the Zhou period.

Finally, I owe my greatest debt of thanks and deepest appreciation to my family. My parents, Calvin W. and Arlene B. Didier, for years have enthusiastically encouraged and patiently awaited the completion of this work. Most significantly, throughout the more than eight years during which this project has consumed me, and long before that, my companion and wife, Heidi, has shared and supported my life and work. The development and completion of the manuscript would have been impossible without either her constant companionship or her unflagging and patient encouragement and support. I wish to thank as well my dear little sons, Gustav and Jacques, for so maturely understanding the need for their father to work through nights and weekends over so many years when only rightly he should have been playing with them. These little boys have also both reminded me incessantly of what is among the most crucial elements of a happy life and ensured that I engaged it, insouciant silliness. Without the understanding, patience, and constant rallying that my family has graciously offered me, I simply would not have completed this work.

Introduction: Resource Management, Unity, and the Cosmos

The many questions involving the concept and actuality of political unity in a civilization fascinate as much as they elude. Where does unity begin, for instance? On a purely local level, we can understand that people achieve a sense of unity among diverse parts when a group as small as two people agree, tacitly or explicitly, on a social ordering among them. The family is the most basic form of a relatively stable unity. But where does anyone get the idea that s/he should unify people outside of the family? Many social scientists and humanists agree that this occurs through the need to manage scarce resources for communal survival — labor, raw material, product, land, water, and so on. The concept of unity, then, at least at so narrow a scope, obviously is very ancient, part and parcel of advancement into, through, and beyond the Neolithic stage of civilizational development.

But wherefrom and when did someone get the idea that s/he wished or needed to unify with those outside the immediate community? Likely this was based on a need for collaborative protection or use of resources. But on what basis was an ordering, be it social, political, and/or economic, among communities achieved? We know that the violence of conquest and its threat of continued use cannot convince a subjugated people to continue in its forced obedience. Civil or negotiated rule always has had to accompany the threat of violence in maintaining a unity of diverse communities. But what is the basis of this civility that can be so convincing to the unified? First, of course, successful civility consists in efficient and, perhaps, profitable use of resources such that the unified enjoy a stable livelihood. In addition, in both the past and often in the present successful civility has required that the unifier control access to powers that the unified (and usually the unifier) believe are more powerful than the powers that humans could muster from themselves; that is, it has required the support of a superhuman agent: a god, gods, spirits, and/or demonic beings. Only if one could wrest control of this access, or the human subjects' belief in the ability to access, this power could one then recreate and maintain unity beneath or beyond the core group of his or her home community.

To a certain degree, then, propaganda, or the promulgation of a belief system, whether sincerely believed or not, has been important in attaining and maintaining political power. At the foundation of such a formula is the belief, often propagated or strengthened by the use of usually sincerely promulgated propaganda, that the superhuman agent makes a difference. That is, all in

the socio-political and economic ordering must share a vision of the cosmos, how it was created, and how it works. This would account for the superhuman power's (or powers') perceived might.

Now, what if a contender for control of the unity suddenly claimed to possess either alternative access to the high power or exclusive access to an alternative and even greater power than the one that the current unifier claimed? In such a case, then the level of propaganda would have to elevate in both quantity and quality, until the best propagandist could convince enough people to support her/his program sufficiently to vanquish the competitor. Issuing propaganda does not mean that its purveyors are insincere in their beliefs. Indeed, often the most momentous propaganda have emitted from the most powerful and sincere — even if sometimes scurrilous — belief.

The question remains, what is this superhuman power, or powers, on which the unifier depends to achieve unity? What is its nature? And, in a related vein, what differentiable capabilities or hierarchies of effectiveness exist within this power, and what purposes to the human unifier do the various capabilities or hierarchies serve? How does one control access to such power(s) so that it or they remain(s) an exclusive possession?

In the three volumes of this study I offer evidence and theoretical frameworks for understanding how to approach answering these questions. Most fundamentally, I point to the center of the nocturnal sky, the northern celestial pole and the circumpolar region of the sky, to help to explain godheads not only in ancient China but also across Eurasia and the world.

Surely Neolithic, Mesolithic, and Palaeolithic people would have searched the sky to help satisfy various elemental psychological needs. When skywatching began is anyone's guess, since preliterate artifacts do not speak, and a given interpretation of preliterate people's etched, drawn, or painted pictures, designs, and symbols cannot disqualify other, disparate, interpretations. Furthermore, no one can be certain that hominids who left no records of their skywatching were not in fact skywatching.

Despite such opaqueness in the artifactual record, Alexander Marshack's decades-long study and interpretation of a large assemblage of Ice Age symbols in cave art and recovered artifacts that represents such artifacts and art to be astronomically based calendrical records is compelling and convincing. He dates the knowable origins of the recording of astronomical events to mark the passage of time, that is, the creation of a symbolic calendar, to no later than

around 28,000 BC. Such calendars would have served to signal to the record-keepers when earth-centered events crucial to their survival, such as the spring thaw or the return or departure of flocks of migrant animals, were to take place.¹

But skywatching likely served from very early on not only human practical (external) but also psychological (internal) needs. Pre-urban Lithic peoples, with little rational understanding of or control over why and how their environments operated as they did, must have remained in awe of their surroundings. Awe is a complex emotionally charged mental state that, though theorized to consist of the emotions of love and fear,² certainly involves internal psychological processes more labyrinthine than words can describe. Nonetheless, at the very least we can postulate safely that the power to awe the human psyche has always had a fearsome element to it. It seems that most fundamental to people's belief in and respect of divinity is the human fear of inviting on oneself undesired (or feared) consequences through his or her own heedless behavior or thoughts (intentions) relevant to a greater power.³

Because of its perceived greater power, a divinity is different from one's own familiar experience. From the perspective of the human believer, in turn the divinity's perceived difference constitutes in it an alien and thus potentially dangerous, or feared, element. With appropriate propitiation, however, the divinity can be perceived to respond to human needs in a predictable, and thus knowable, and therefore less feared, manner. To ancient peoples, amid a physical world that beyond the horizon would have been largely unknown, this powerful and

¹ Alexander Marshack, *The Roots of Civilization, Revised and Expanded. The Cognitive Beginnings of Man's First Art, Symbol, and Notation* (Mount Kisco, NY: Moyer Bell Limited, 1991): passim.

² Vassili Kryukov, "Symbols of Power and Communication in Pre-Confucian China (On the Anthropology of *De*), Preliminary Assumptions," in *Bulletin of the School of Oriental and African Studies* LVIII: 2 (1995): 319–320.

³ Consider, for instance, the generally jealous, wrathful, and vengeful god of various names of the Pentateuch, whose perceived threats and punishments, more than anything else, accounted for its continued recognition in the ancient period by the people of Israel as the high god. One commentator has suggested that the classical Greek pantheon represents an exception to the thesis that human fear underlies belief in divinities, but one needs only mention simply that in Greek myth and active propitiation of the Olympian and other gods a deep level of human fear of the gods does indeed motivate human behavior. This is so from as early as Hesiod and Homer and continues through the later myths codified late in the classical Greek and throughout the Hellenistic periods.

feared but now partially tamed (or bribed) ally would have served as perhaps the only conceivable protective buffer against the unknown, unpredictable, and thus naturally feared world that lay outside their own experience.

We may posit, then, that Palaeolithic, Mesolithic, and Neolithic peoples would have required such a protector against all that was unknown beyond the horizon — the horizon of both the physical and psychological realms. And this horizon dividing the controllable known from the uncontrollable and fear-inspiring unknown would have been far closer to home — again both physically and psychologically — at night, since, without sight, humans with normally good vision are virtually defenseless and thus vulnerable, and, therefore, also psychologically insecure. Thus, we may conjecture, the presence of the most awe-inspiring, fearsome, and vengeful superhuman power would have been required at night so that it could provide protection against the vast unknown. And as points of the same light that as the sun, during the day, brought security and solace, collectively the stars of the night sky would have been the obvious object of the pre-urbanizing and early-urbanizing human's projection of its need for a nocturnal agent of security. Through such a process some form of cosmology would have evolved. Indeed, in the words of J. McKim Malville and Claudia Putnam, archaeoastronomers of the prehistoric American Southwest,

Ever mysterious in her cycles of life and death, in her power to provide life and then take it away, Mother Nature is an inscrutable benefactress: not always benign nor fully predictable. To the Anasazi [Puebloan Native Americans] living along the northern frontier, the world must have often been threatening and dangerous.... With a dome (the sky) overhead, aligned to the four cardinal points of space, the microcosm of the *kiva* (a round astronomical observation and ritual pit; see **Figure 1**) may have been a place to achieve harmony with the larger world. The *kiva*... provides both a cosmology and a cosmogony.⁴

⁴ J. McKim Malville and Claudia Putnam, *Prehistoric Astronomy in the Southwest* (Boulder: Johnson Publishing Co., 1989): 6. Parenthetical and bracketed emendations, as well as italics, my own.

To this we might add Thomas Kuhn's observation that,

Fragments of cosmologies similar to the Egyptian can be found in all those ancient civilizations, like India and Babylonia, of which we have records... Apparently all such sketches of the structure of the universe fulfill a basic psychological need: they provide a stage for man's daily activities and the activities of his gods. By explaining the physical relation between man's habitat and the rest of nature, they integrate the universe for man and make him feel at home in it.... [A] cosmology can provide him with a world-view which permeates and gives meaning to his every action, practical and spiritual.⁵



Figure 1. Kiva, Casa Rinconada. From Fagan (2005): Color Plate 5.

In the unpredictable and unfriendly night the apparently unswerving center of the heavens, the polar region, which but for its regular revolutions was unwavering and stable through night, week, month, year, and decade, would have served as a reassuring and dependable — if untouchable, distant, and awe-inspiring — gnomon (on stellar movement and stasis, see

⁵ Thomas S. Kuhn, *The Copernican Revolution. Planetary Astronomy in the Development of Western Thought* (Cambridge, MA: Harvard UP, 1957): 6.

below). Thus we should not be surprised if the pinnacle of metaphysical power on which a Neolithic or other ancient people depended for security and the creation and maintenance of a socio-political unity was a high power of the night sky. Indeed, in ancient cosmologies often the diurnal light-giver, the sun, played a secondary role to greater creative and sustaining forces of the night sky.

In this book I endeavor to demonstrate the crucial role that the night sky, and particularly its polar center, played in ancient, early civilizing humans' establishment and preservation of political unity on earth. Not in every case did the high gods of the polar center sustain their most exalted position in the pantheon, and often they seem eventually to have been forgotten. In the case of China, until c. 800 BC human beings appear to have directed much of their ritual — and thus also political — attention toward the high god of the night sky, a god who was and rested at the northern celestial pole. But as the sky changed so also needed the gods. Consequently, in the Zhou period in China (c. 1045–249 BC) new conceptions of old gods and reconfigured affirmations of faith were required in order to rally or justify people's continued commitment to organizing the human community. While of course other significant factors developing on the ground in Zhou China between about 1000 and 400 BC⁶ stimulated many changes that occurred in the intellectual realm of classical China (c. 5th–2nd centuries BC), particularly dramatic natural changes that occurred in the pole between about 2800 and 500 BC seem to have helped to cause by the latter year a developing crisis in the intellectual circle. The pressure that this crisis brought to bear was in part responsible for the great creativity of the classical period, when blossomed the "Hundred Schools of Thought" and developed classical Chinese metaphysics and political theory.

Over the past five or so decades many scholars have attempted unsuccessfully to link the precession of the equinoxes — which results in a continuous shift in the stellar occupants of the

⁶ Such factors include the dissemination of bronze technology through a greater swath of society; introduction of iron technology; development of agricultural technologies such as water control / irrigation and the use of night soil to fertilize crops; development of market economies, market towns and urban centers; innovations in warfare, including the development of new, more lethal, weaponry and the use of infantry in massive warfare; social and political disintegration of the Zhou elite; the growth of local product specialties and thus interstate or interregional trade; and social leveling and increased dissemination of education after a period of market development; and so on. See below, Volume III, Chapters 1–3.

pole — with positive religious changes in human societies. In Volume I, Chapter 2 we will review several such attempts that have failed to convince most readers. One recent such attempt has proffered that the results of precession on the stellar population of the pole exerted, throughout some 1500 years between c. 2000 and 500 BC, a continuous primary and central influence on the development of the classical Chinese concepts of *xu*, emptiness, and *wu*, nothing. According to this thesis, the pole, interpreted to be starless from c. 2000 BC and on, provided the model of *xuwu* from which the Daoist idea, represented by the words of the *Laozi*, evolved.⁷ Like all other precession-centered theses of religious change that I have reviewed, this overly simplifies the complex histories of this period of sustained urbanization. Social, political, economic, technological, military, and other factors, transforming rapidly and prodigiously between c. 3500 BC and 200 AD, together and even singly exerted far greater and more immediate influences on the development of new religious and philosophical ideas in China during the Zhou period than did a very slowly changing stellar population of the pole. In this particular case, as well, the complex history of the development of religious ideas and activities has been ignored in favor of an easy and superficial explanation. In fact, while precession did effect changes in Chinese religious ideas, this effect was negative, not positive. That is, it removed something, but it added nothing. The positive changes through which mid- to late-Zhou thinkers and practitioners created a new system of thought emerged through fresh, abstract considerations of age-old habits and beliefs amid a stellar world that offered possible answers that differed from those that it seems to have presented to these thinkers' ancient intellectual ancestors. These new elite considerations had literally nothing to do with the pole, even while, in other, more popular, traditions keeping pace with the new developments, the old polar gods maintained themselves in a combination of slightly altered stellar locations, significance, definitions, and roles. Reviewing carefully all such matters is the task of Volume III of this study.

Before directing our attention in Volume II almost exclusively toward religious constructs of Neolithic-Bronze (c. 4500–1000 BC) China and in Volume III to the transformations of these earlier traditions during the Zhou (c. 1045–249 BC) and early-imperial

⁷ David Pankenier, "A Brief History of Beiji 北極 (Northern Culmen), With an Excursus on the Origin of the Character *di* 帝," in *Journal of the American Oriental Society* 124.2 (2004): 211–236.

periods (c. 221 BC – AD 200) in China, it will be necessary to demonstrate how apparently central to ancient peoples across Eurasia and the world were the sky, the northern celestial pole (NCP), and the gods that inhabited the sky and pole. In turn, in order to appreciate the broad interconnected cultural context in which this awareness and observation of the NCP occurred, we need to review all of the development of (1) cultural, technological, and linguistic interchange occurring among Mesolithic, Neolithic, Bronze, and early Iron civilizations of Central, South, Southwest, and Eastern Asia; Egypt; and the northern Mediterranean, and (2) recorded astronomical observation and developing science from many of the Bronze cultures and civilizations of those same areas. Therefore, Volume I, Chapter 1 paints a broad overview of a large Eurasian sphere of human interactions and civilizational development in order to prepare for a more narrow focus in Chapters 2 through 4 on evidence that compels us to recognize the apparent supreme importance of the pole in ancient human religio-political belief and organization. It will become evident that of Eurasian religious developments occurring between c. 3500 BC and 200 AD, a critical question that we must pose is, how extensive and penetrating were the influences of non-Chinese Eurasian religious ideas, habits, constructs, and traditions on the creation and transformation of Chinese religious constructs? Of particular interest in this regard is the common occurrence in religious contexts across Neolithic-Bronze Eurasia — and indeed in many parts of the world — of the religiously potent designs of circles and squares. Were such developments individually autochthonous, or did they result across so widespread a distribution in Eurasia from a primary dissemination from one original geo-cultural source? While Volume I provides the evidential backdrop from which throughout the remainder of this study we may consider these questions, Volumes II and III focus more concertedly on understanding not only the facts of the persistence of certain Chinese religious concepts and practices amid transforming influences, but also, and more complexly, precisely how and why such concepts and practices changed dramatically through the millennia while simultaneously forever retaining a critical core of traditions, traditions that may or may not have been truly Chinese either from their very inception perhaps as early as the Palaeolithic or throughout their later evolution in Mesolithic, Neolithic, Bronze, classical, and early imperial times.

Synoptic Introduction to Volumes I, II, and III

I have devised this manuscript to stand as three independent but intimately related volumes in order to enable readers to choose to read what is relevant to their interests, needs, and backgrounds. The final purpose of this manuscript is to define more precisely than previously has been offered in the scholarly literature the nature of the essential Chinese intellectual constructs of particularly the Shang through Han periods, or circa 1200 BC – AD 200, though in Chapters 1 and 2 of Volume II I show how patterns found in Chinese Neolithic and early-Bronze art and architecture probably can be understood to adumbrate developments that mature in the Shang and later periods. The greatest weight of this manuscript, its deepest cut, thus lies in Volumes II and III, in which volumes I develop my specific theses regarding Shang-Han intellectual history.

It is therefore also in Volumes II and III that, I well understand, my most persuasive evidence regarding the centrality to particularly the ancient Chinese of what I call the celestial polar quadrilateral, occurs. In Volume II this evidence pertains most pointedly to the Sinitic character *ding* 鼎, which, on the basis of Shang oracle bone inscriptions (OBIs) and bronze inscriptions, I argue served the Shang as the high cabinet of metahuman power, one that was conceived as an exclusive cabinet of the most exalted Shang royal ancestors.

In Volume III I demonstrate clearly with textual and artifactual evidence that the traditional and currently accepted interpretation of ancient Chinese cosmology, whereby the earth was conceived to be a square set amid a round heaven, is patently incorrect. In fact, as I show, prior to circa the 2nd century AD the square-earth thesis did not exist; rather, it was the heavens that were, for astrological measurement purposes, conceived to be square, while they were encompassed circumferentially by a heavenly dome that was of course horizontally round. I show how the clearly evident ancient, classical, and early-imperial square-heaven thesis derived ultimately from the Shang (and, I argue, earlier) apotheosis of the polar quadrilateral to supreme superhuman power. Gradually, through the Zhou period, the symbolic representation of the polar quadrilateral was extruded to encompass not only the polar center but also, within the circumference of the horizontal circle, greater heaven itself. By the time of the late-Warring States and early-imperial periods, the square had come to represent a measurement grid for use in mapping the astrologically significant patterns of stellar (including planetary) movement.

While Volumes II and III delve deeply into philological, iconographic, philosophical, and historical studies of mostly the Shang and later periods, the purpose of Volume I is to develop for the discussions in the subsequent volumes the patterned backdrop of evidence drawn from a larger ancient Eurasian (and, in fact, global) context that causes my interpretations of Shang-Han intellectual developments to appear to reflect not simply proto-Chinese and Chinese, but also more broadly ancient human, responses to the natural and changing socio-political-economic environments of the ancient urbanizing world. In addition, Volume I provides ample and specific evidence to demonstrate that many of these human responses likely occurred not at all in isolation from one another across the Eurasian continent. While in many specific instances of suspected cultural or technological transfer across Eurasia we cannot determine categorically that multipodal similarities resulted from the dissemination of a single-source cultural tool kit, the clearly recognizable pattern of multiple similarities that occurs among human responses to the external environment across the continent over several thousand years' time forces us to allow in virtually any such coincidence of shared response that a transfer may have occurred. The most important example of the opacity of the origins of ideas and their symbolic representations occurs in what I purport to be people's common recognition of and imputation of high divinity to certain stellar patterns appearing at the northern celestial pole of the 5th / 4th-2nd millennia BC. The fact that the northern celestial pole appeared in the night sky above all people in the northern hemisphere of the earth causes us to allow for the widespread localized invention of polar godheads and the artistic and architectural patterns that, modeling the contemporary polar asterisms, people created to represent or define both the polar gods and these gods' dedicated ritual spaces on earth.

Volume I, *The Ancient Eurasian World and the Celestial Pivot*

Those already confident in their understanding of the specifics of all of the ancient Eurasian transfer, the development of astronomical knowledge in the ancient world, world archaeoastronomy, and Chinese astrological beliefs and practices of the early-imperial period may wish to skim or skip the majority of Volume I, though I would suggest that my specific development of evidence and the syntheses offered are unique and fresh. In one sense all of these

chapters are intended for sinologists who may not be aware of the vast extent of linguistic, cultural, and technological sharing that occurred across Eurasia in the prehistoric / preliterate and early-historic / -literate periods and other civilizations of Eurasia, but these chapters are also intended equally for an eclectic audience of Europeanists, Asianists, historians and anthropologists / archaeologists studying ancient human civilizations of Northern, Western and Southern Eurasia (Mesopotamia, the Levant, Greece, Persia, India, Egypt, Central / Inner Asia, Siberia, Southern Russia, the Ukraine, and the Caucasus), as well as world or Eurasian archaeoastronomers, who may benefit from a new synthesis that justifies Chinese with non-Chinese Eurasian (and American) Neolithic-Bronze cultural / religious and archaeoastronomical developments. Those who feel confident already in their grasp of these matters may of course skip this volume, though I would like to indicate that not only are the collection of evidence and syntheses drawn from it in Volume I unique, but also much of Volumes II and III depend specifically on the elements of the Eurasian backdrop that Volume I establishes. Skipping Volume I may therefore reduce for a given reader the clarity and thus efficacy of the scholarship found in subsequent volumes of this study and may require of her or him a continuous referencing of points made in the four chapters of Volume I on which matters undertaken in subsequent volumes depend for their development.

The four chapters of Volume I demonstrate that in both China and other Neolithic and Bronze civilizations of the world, including those in the Americas, Europe, Anatolia, Mesopotamia, Persia, India, and China, many pre-urban and early-urbanizing religions can be understood to have been celestial-pole centered, the high gods having been represented in and by the stars of the heavenly pole until, it seems, either socio-political developments endemic to an increasingly sophisticated urban environment *or* precessional changes in the northern celestial pole, or both, caused most civilizations to abandon a polar stellar-populated high godhead and move instead toward the creation of abstract, ethically oriented, and world-immanent gods or metaphysical ideals.

Volume I, Chapter 1 begins with a dedicated review of the scholarship treating the various facets of Eurasian east-west contact and interaction circa 9000–1000 BC. In this chapter I attempt to offer a viable comprehensive overview of the ways in which many of the unresolved issues related to the matter of Eurasian interaction might be settled, if not categorically then at least plausibly. Necessary to developing such a believable synopsis is the careful investigation of

several somewhat involved detours into relevant scholarly discussions that individually and together bear on one's overall understanding of the nature and timing of the Eurasian interactions through millennial time. One such issue is the still unresolved question of the location in space and time of the hypothetical homelands of the speakers of Proto-Indo-European (PIE) and Indo-European (IE) languages and the timing and dispersal patterns of their usually gradual but at times apparently relatively rapid dissemination across Eurasia sometime between circa 9000 and 1000 BC. I support an Anatolian PIE homeland circa 9000–6500 BC and a Balkan IE homeland circa 6500–3000 BC. I do not pretend to believe that my review resolves this complex and probably forever-problematic issue of PIE / IE origins and dispersals, but I do believe that I offer a plausible explanation of most of the significantly relevant factors bearing on the question of PIE / IE linguistic and cultural origins and disseminations.

Among the first controversial matters that Chapter 1 engages is that of the timing and location of the domestication and riding of the horse (*Equus caballus*). Despite a recent barrage of quality literature on the subject that concludes that the horse was domesticated in the Pontic-Caspian steppe by Indo-European-speaking peoples sometime during the 5th or 4th millennium BC, in light of conflicting and / or usually interpretatively ambiguous or unconvincing archaeological evidence I remain unconvinced of the applicability and verity of the arguments for such an early domestication and riding of the horse. Consequently, I find no plausibility at all in the commonly forwarded thesis that the PIE / IE homeland can be pinpointed to the Pontic-Caspian steppe in the 5th–4th millennia BC, wherefrom, many have argued, PIE / IE-speaking people, as a cavalry and / or atop war wagons or chariots, invaded and conquered Europe, for none of the technological advances represented by the expertly ridden domesticated war horse, the war wagon, and the war chariot can be, nor are they ever likely to be, demonstrated to have existed yet in the 4th millennium BC (though heavy and slow-moving oxen-drawn wagons are known to have been developed by circa 3500–3000 BC). While the beginnings of the domestication of the true horse may well have (and likely did to a small degree and in a very gradual, pensive way) occurred in the Pontic-Caspian steppe in the 4th millennium BC, and those responsible for this development likely would have been Indo-Iranian-speaking peoples, the consistent and large-scale domestication of the horse likely occurred, after only a long process of experimentation and adjustment, sometime in the 3rd millennium BC. The riding of the domesticated horse, while probably having been attempted during the latter centuries of the 3rd

millennium BC, did not occur on a large scale until sometime during the late 2nd millennium BC, and the idea for and practice of cavalry certainly did not occur until either very late in the 2nd millennium BC or early in the 1st millennium BC.

This more conservative view of the development of technologies of comparatively rapid transportation affects the way in which we might understand the dissemination of language and culture across Eurasia. Essentially, according to this view, communication across Eurasia advanced during the 4th millennium BC but accelerated dramatically during the 3rd and 2nd millennia BC as the newly developed technologies of the oxen-drawn cart and, eventually, during the middle and later 2nd millennium BC, the light horse-drawn spoke-wheeled chariot, enabled swift movement across the Russian and Central / Inner Asian steppe. Consequently, it is in the 3rd through 1st millennia BC that we witness both the far-flung dispersals of Indo-Iranian and the most active — and consequential — influences on Chinese civilization by West (and South) Eurasian cultures. Of course, in many instances we cannot determine with absolute certainty that a given South / Southwest / West Eurasian cultural tool kit influenced the developing Chinese civilization on the other end of the continent, but the overall weight of the evidence forces us to conclude that in many cases such transfers did occur consistently from the 4th through 1st millennia BC.

Much of Chapter 1 follows sundry threads of scholarship and reasoning that attempt to establish for purposes that arise later in this study the origins and developments of various Eurasian civilizations and cultures. While one might, while reading in Chapter 1 of the origins of, for example, Greek or Harappan / Rg Vedic Indian civilizations, question what relevance to the investigation of ancient Chinese civilizations these sub-studies might have, they are in fact highly relevant, in that (1) all such civilizations betray a clear interconnectedness, and, more specifically, (2) in all cases they seem to have shared certain religious paradigms, myths, or symbols. It will be shown through the remainder of the volumes of this study that clarifying the origins and developments of these civilizations is critical to the fair presentation of a new approach to ancient Chinese religions.

Chapter 2 constitutes a similarly necessary study of ancient Eurasian religions, particularly as they appear to have involved the sky and, especially, the stars of the nocturnal sky. Relying on the findings demonstrated in Chapter 1, of rather intensive and consistent interactions having occurred between micro-regions of Eurasia during particularly the Eneolithic

through the Bronze periods (or c. 3500–1000 BC), Chapter 2 traces the accretion in Mesopotamia of both objective astronomical knowledge between circa 2500 and 500 BC, which enabled the creation of fairly accurate calendars there by 1200–500 BC, and mythic astrological traditions of the same period, which in some instances seem indubitably to have traversed Eurasia from Mesopotamia to alight in either or both of India and China. From the evidence presented in this chapter that otherwise documents the accumulation of astronomical knowledge and the creation of astrological traditions in major Eurasian civilizations, we can discern that early Chinese advancements in calendrical and zodiacal (ecliptic) asterismic astronomy, following a pattern apparent in both Egypt and India, relied significantly on prior Southwest Asian advances.

Through analysis of both contemporary text and iconography, Chapter 2 further locates in Mesopotamian, Egyptian, and Indian civilizations of the 4th–3rd millennia through circa 500 BC the high gods and cosmogonically creative impulses of these civilizations in the northern celestial pole. It may be that such a central and fundamental religious characteristic that surfaces so broadly in Neolithic-Bronze Eurasia originated in a common source in either Southwest or, less likely, East Eurasia, and spread to its dipolar counterpart toward the opposite end of the continent. On the other hand, considering that the northern celestial pole, and its momentary inhabitant stellar patterns, were visible to all across the entire northern hemisphere simultaneously, then one must concede that, similar or not, the possibility that Eurasian civilizations developed their individuated religious constructs on the basis of local observations of the pole and other stellar patterns of the Neolithic-Bronze night sky must be allowed. The only exceptions to this possibility of individual development of astronomical understanding appear to be the deci-sexagesimal calendar common in both Babylon and China and the seventeen-cum-twenty-eight celestial (ecliptic) stellar / lunar stations (or lodges) that appear in all of Babylonian, Indian, and Chinese traditions in a temporal sequence that beggars explanations other than that of direct transmittal from Babylon, through Persia and then India, and finally to China.

Combined with the introductory passages of Chapter 3, Chapter 2 also shows how the trans-Eurasian and, really, intercontinental drift of North Eurasian myth from the Palaeolithic and on informed the development of stellar myth in all of Mesopotamia, India, Greece, China, Siberia, and the Americas. From the combined import of Chapters 1, 2, and 3, then, it appears

that there may not have occurred any sustained period since the end of the last deep ice age c. 18,000 BC when transfers across Eurasia did not occur. Trans-Eurasian interaction thus should begin to be considered the norm rather than the exception.

Chapter 3 subsequently turns attention concertededly on mostly imperial-period (221 BC and later) evidence attesting to the polar nature of the Chinese godheads Di and Taiyi in imperial times, arguing that the historically well documented location of these high gods in the northern celestial polar region, if not necessarily any longer at the precise astronomical pole itself, in this later period justifies our investigation into earlier, Neolithic through Zhou, evidence that appears to indicate that throughout pre-imperial proto-Chinese and early-Chinese history peoples of various cultures of what was to become China consistently projected their highest superhuman powers onto the polar heavens. In the case of particularly Taiyi, this polar stellar high god appears to have originated in Neolithic China circa 3000 BC (or conceivably quite a bit earlier) and only later, c. 1500 BC, likely was identified as Taiyi, or, really, Dayi.

In Chapter 3 I also uncover the Chinese penchant to disregard in the significant inherited religious tradition of the polar high god the astronomical fact of precession, such that the Chinese of the early-imperial period quite apparently ignored, for astrological purposes, the effects of the precession of the equinoxes that caused the astrological Chinese pole to diverge from the obviously recognized astronomical pole. This they did even as, we know from advances in the calendar having been implemented in the late 3rd and 2nd centuries and again in the 1st century BC, the early-imperial courts clearly recognized an astronomical pole that their astronomers employed to measure fairly accurately astronomical phenomena for calendrical purposes.

In Chapter 3 I further review the prevalent shamanic and sun-centered interpretations of early Chinese religious practices, finding that neither thesis enjoys any actual merit when considered for the period preceding circa 600–400 BC. Indeed, while what we might call shamanic practices had developed in Zhou China by approximately this time, it is not apparent that a prominent sun-centered worship of a high power ever developed in China at all.

The Appendix to Chapter 3 investigates the probable stellar identities / locations and origins of the late-Zhou and early-imperial (c. 400–100 BC) gods Taiyi / Dayi and Tianyi / Taiyin / Yinde, who played prominent roles during particularly the late-Warring States through Han periods in establishing a commonly understood organization of the hemerological meanings of movements of stars, including the five naked-eye-visible planets, across the nocturnal

heavenly canopy. In this section I am able to clarify, both philosophically and astrologically, the relative identities of the gods whose most common names are Taiyi and Tianyi.

In Chapters 2 and 3 having established the pole-centered worship of high celestial powers in Neolithic-Bronze Southwest and South Eurasian and early-imperial Chinese civilizations, in Chapter 4 I pinpoint what I believe to have been the phenomenal stimulus for the Neolithic-Bronze pole's deep and thus lasting recognition by people of various civilizations across Eurasia (and, in temporally later Neolithic and pre-urban / early-urbanizing times, the Americas) to be the high power. The stimulus, as I argue, was the quadrilaterally shaped asterism hovering near or at the pole from c. 5000 to c. 1000 BC, with one star appearing along one of its lengths, Thuban (11 Draconis), resting dead center on the northern celestial pole circa 2800 BC. This star, which on later Chinese star charts of the 1st and 2nd millennia AD often is identified as the star / god Taiyi (Dayi), I argue had served for much of the Neolithic and Bronze periods in developing Chinese civilizations as the absolute pinnacle of superhuman power, and, I contend, it is this fact that accounts for the later, imperial-period, recognition of the astrological, not astronomical, pole to have been religiously significant. While by the Qin and early-Han periods, or the 3rd and 2nd centuries BC, the locus of attention paid the astrological pole had shifted from Thuban to the star Alioth on the Big Dipper's handle, it likely was the high visibility of the Dipper, and its usefulness in astrological traditions of the Warring States period as the heavenly pointer and the polar god's war chariot, that had caused by the 3rd century BC the shift of the astrological pole from Thuban to Alioth.

In Chapter 4, after having developed the psychological impetus for projecting pictures onto the stellar-populated nocturnal canvas, I draw together from Eurasian and American civilizations evidence of the significance of quadrilateral and quadrilateral-in-circle designs to substantiate my claim that it was the celestial polar rectangle, often described within an apparently horizontal circle, that attracted so much attention and reverence in the Neolithic-Bronze world in Southwest Asia, Europe, and North America, as well as the world of early-imperial China. Artifacts uncovered and architecture known from mostly Bronze but also Neolithic Mesopotamian, Egyptian, Indian, Anatolian, early-Brittonic, American, and Chinese civilizations all point to the square and square-in-circle designs as having represented in these civilizations something supremely sacred, and the squares virtually invariably point to a

quadrilateral that (either clearly or) most probably can be identified with or as the symbolic representation of the nocturnal northern celestial pole.

To help to launch the remainder of this study that in Volumes II and III focuses concertedly on ancient China, by way of concluding Chapter 4 and Volume I I draw attention to artifacts originating in early-imperial China that, like those adduced for other Eurasian and American civilizations, demonstrate that in imperial China, too, the square and square-in-circle (heaven's quadrilaterally shaped center amid the greater circle of heaven's horizontal extent) designs were prominent symbols of a superhuman potency that can be interpreted to represent or focus attention on the power projected to be inherent in the northern celestial pole. This, I suggest, warrants in the subsequent volumes of this study a closer look at artifacts and text produced in Neolithic-Bronze Chinese civilizations that appear to mimic and / or describe asterisms of the celestial pole of the Neolithic and early-Bronze periods and constitute a central element of those civilizations' religious beliefs and practices.

In sum, in Volume I I offer the plausibility of both a polar-centered religion occurring across mostly Eurasia in Neolithic-Bronze, or early-urban, times, and I provide sustainable evidence that supports such a contention. While at present we cannot ascertain with certainty that all of the postulations that I forward in these three volumes for a pole-centered and –developed religious orientation in ancient civilizations can be sustained through continued research, there is ample cause to consider seriously the systematic development of my thesis and evidence that pertains to and draws from across Eurasia, and also worldwide, a thesis and evidence that seem to indicate both the central importance in ancient societies of the polar quadrangle and the probable mutual influence enjoyed at both ends of the Eurasian continent of developing civilizations east and west. While I recognize that of course my selection of evidence favors my hypothesis and that other evidence has and can continue to be adduced to demonstrate other trends in ancient religious thinking and symbolic representation, it is simply my hope that through these three volumes I might stimulate scholarly discussion and further research that could shed a more refulgent light on this still relatively obscure period of human history.

Volume II, *Representations and Identities of High Powers in Neolithic and Bronze China*

With a view to my final purpose in these volumes to establish the centrality in early Chinese religious and philosophical thinking of a quadrilaterally shaped asterism that appeared directly at or very near the northern celestial pole circa 5000–1000 BC, Volume II develops, through consideration and analysis of Chinese artifacts dating from the 5th millennium BC and Chinese texts dating to the period of circa 1200–1045 BC, a momentum that allows us to redefine the complex nature of the high superhuman power of the first Chinese civilization whose religious beliefs can be understood with any level of sophistication, that of the Shang (c. 1545–1045 BC).

Chapters 1 and 2 present artistic and architectural evidence that, considered together, suggests that pole-centered religious observances prevailed in many interactive ancient Chinese civilizations from Neolithic times through the Shang. Proceeding in rough chronological order, Chapter 1 treats artifacts created in such civilizations by artisans who worked in the media of cowrie shell (in graves), ceramic, bone, and stone, as well as in architecture, that appear to suggest mostly polar symbolism or, in some cases, pole-based astronomical / astrological observance.

Chapter 2 turns attention to jade- and bronze-working cultures of the ancient Chinese civilizational sphere, noting sophisticated designs produced on and through these media that, like their counterparts reviewed in both Volume I and Chapter 1 of Volume II, when considered together appear to reproduce symbolic religious interpretations of asterisms found at the pole of the time. In most cases through Chapters 1 and 2 we observe that the designs that I suggest symbolize a contemporary polar architecture involve the centrality and potency of a square, or squares. The focus in the latter section of Chapter 2 turns to square symbolism that was cast on Shang ritual bronze vessels.

Overall Chapter 2 presents art produced in the media of shell, painted pottery, bone, jade, and bronze, as well as temple / ritual, city, and tomb architecture, that evinces that many objects' varied designs appear to have been modeled on the stellar patterns hovering at the northern celestial pole of this Neolithic-Bronze period. These civilizations include various local incarnations of the Yangshao, Maqiao, and Qijia cultures of the old Northwest, and the Daxi, Dawenkou-Qingliangang, Longshan, Hanshan, Songze, Bei Yinyangying, and Xuejiagang










Jing'an complexes of the Huai / Yangzi watershed and coastal effluvial plains of East / Northeast of China. The designs adduced to indicate a perhaps celestial polar orientation of local religions include various square and square-in-circle motifs. In many of these cultures a common "eight-point star," or what I prefer to call a double-trapezoid hexagon, motif appears commonly on pottery and bronze mirrors, in a configuration that is too purposefully applied across many cultures to have represented a mere coincidence of expression. I contend that the central square created by the intersection of the two hexagons represents a conscious mimicry of the stellar polar quadrilateral hovering at the contemporary northern celestial pole. Other cultures' pottery painting suggests a distinct northern stellar polar motif, that of a square topped by ungulate horns (Yangshao), and yet other cultures reveal in the archaeological record of their existence what appear to be square-and-circle astronomical platforms (Liangzhu and Hongshan).

Many artifacts recovered from remains of the jade-working Liangzhu culture of the Shanghai region depict a carved motif that, varying across artifacts and even within a single jade medium, depicts overall a composite anthropomorphic-zoomorphic facial design, with the anthropomorphic element clearly enjoying the position of superior authority over the zoomorph. This "AZ motif" occurs across various shapes and types of jade media, with the most common and compelling version appearing on large ritual jades of an overall square or squarish shape with a circular tube or hole ground through the center, or what are known as *cong* 琮.

The Liangzhu having been yet an illiterate culture, leaving behind no textual evidence from which we might attempt to corroborate our interpretations of its pictorial creations, we cannot be certain of any of our understandings of the AZ motif or the *cong* themselves. Still, several factors might point to a stellar polar interpretation of the meaning of the AZ motif and the square *cong* jades. First, the recurrence of the square in the overall shape of the *cong* might indicate that the target of ritual attention was the stellar quadrilateral at the contemporary pole. Considering the ritual burial application of the *cong*, its central circular tube might have constituted, like the NCP-pointing shaft of the tomb of the Egyptian pharaoh Cheops, an aiming device intended to send the dead ancestor, in whose tomb the *cong* was burned and placed at burial, to the quadrilateral situated at the apex of the heavens. The further facts that (1) the AZ motif was constituted from the essential shapes of the square and circle, the circles seemingly having represented both individual stars and a circular arrangement of individual stars that surrounded the quadrilateral at the contemporary pole, and (2) the eyes of the AZ motif's faces

resemble depictions of stars whose light has been distorted by the earth's interfering atmosphere, cause us to consider seriously the possibility that the AZ motif symbolized a godhead imagined to reside at the Neolithic stellar pole at whose center was a quadrilateral that was surrounded by a circular stellar umbra.

Very much like the AZ motif appearing on Liangzhu jades, the so-called Taotie facial motif cast onto ritually significant Shang bronzes, the latter motif very apparently having derived at least in part from the former, invites a superhuman religious interpretation. Occupying a clearly delineated rectangular space on the sides of the ritual bronzes, the Taotie visage, in its persistently inconsistent variations, appears then to represent ritually recipient (ancestral) spirits resident within the high celestial locus of the quadrilaterally shaped northern celestial pole who were important in the imagined elevated spiritual structure of Shang power. Indeed, it is possible to trace the most critical elements of the Taotie motif, including the eyes, nose, lower jaw / cheek and/or nasal termini, and horns, to the patterns of stars that helped to comprise the celestial polar quadrilateral. Ultimately, at the center, all is square. I propose that this square-encompassed and –comprising facial motif represented the high ancestral consular godhead of the Shang court religion.

I proffer that this high power was what the Shang Chinese called Ding, whose written graph in Oracle Bone Inscriptions (OBIs) was a simple quadrilateral,  or . According to my thesis, Ding served as the central high council of the greater generic godhead of the pole, Di. The Sinitic graph for Di, written in a great variety of configurations but most often in these forms,  and  centers on the quadrilateral graph for Ding, , or what I consider to be the quadrilateral's shortened form, . While Di's greater constitution embraced ancestral spirits of not only the Shang royal lineage but also those of other, competing, both local and more distant, peoples, as well as nature spirits and the spirits of cultural heroes, Ding comprised only the spirits of the highest Shang ancestors, those whose temple / ritual names included the stem suffixes of *ding* , *jia* , and *yi* . Ding, whose constituent spirits resided in the quadrilateral at the northern celestial pole, was surrounded both physically at the pole and in its potential for influence over affairs on earth by the greater godhead Di. The varying graphs for Di can also thus be traced in the stellar patterns appearing at the northern celestial pole of circa 4000–1000 BC. Then for the Shang, Ding and Di constituted at the pole both a domicile for the spirits of

deceased high ancestors of the Shang and neighboring people's royal / elite families (and ranking spirits of human cultural heroes and natural phenomena) and, consequently, also the font from which these same ancestors could effect their influence over the affairs of their descendents and their environs on earth.

Volume III, *Terrestrial and Celestial Transformations in Zhou and Early-Imperial China*

The chapters of Volume III demonstrate the continued prevalence of the polar quadrilateral in shaping Chinese religious and philosophical thinking through the Zhou (c. 1045–249 BC) and Han (202 BC – 220 AD) periods, even while the symbolic square figure, after the 10th century BC, appears to have lost for several centuries its mooring as the stellar quadrilateral moved inexorably away from its erstwhile station at the astronomical pole. Under the Zhou regime in China the quadrilateral became associated with the Zhou high power Tian, "Heaven," which, like the Shang's Di, seems to have denoted initially the broadly inclusive ancestral power situated at the same celestial polar asterisms as in the case of Di. The early graph for Tian, one variant of which displays a quadrilateral at its crown, 天, appears to have been modeled on the same polar asterisms as had been Di. While equating Tian with Di, the Zhou regime also appears to have followed the Shang in identifying the high central council of Tian with the polar quadrilateral, which, borrowing an occasional usage that the Shang employed to identify their own high superhuman council, Ding, they named Shangdi, or High Di.

As complex changes in the Zhou power matrix emerged in the first centuries of Zhou authority, the Zhou court's political and religious influence waned and with it also the dominance of the Zhou ancestors in the perceived power of Tian. At the same time, the quadrilateral and surrounding asterisms that once had sat squarely at the pole had by the early centuries of Zhou leadership drifted far enough from the pole that, with the loss of Zhou political, economic, and military centrality, the quadrilateral and its contextual Tian / Di asterisms ceased to hold the attention of the landed elite powers on whose continued allegiance the Zhou had depended for its real dominance in the lands of the "Heaven-under," the earth. Consequently, by the 6th century BC, while the term and graph "Tian" continued in Chinese

society to denote the high superhuman power, its meaning and referent had become opaque, open to theorizing by sundry individuals on a variety of levels.

First, while Zhou court ritual attendance on Tian — and, presumably, its central quadrilateral in which, as I argue, the Zhou ancestral spirits were thought to reside — of course continued, the influence of the Zhou court to cause its erstwhile allied and continued nominally subservient landed powers to offer ritual attention to Zhou ancestors diminished. Among these landed powers, or what had now become de facto independent states, the practice of modeling sacred objects, such as the city, temple, altar, tomb, and the ritual space that was embodied on or by ritual bronze vessels, on the old sacred quadrilateral shape continued, but the use and therefore apparently the meaning of that quadrilateral space altered along with the diffusion of the meaning of Tian. The quadrilateral now came to represent both personal and political ambitions, as contenders for real economic, political, and military might applied the quadrilateral in both older and newer ritual forms to represent direct access to the authority and powers of Tian. The most intensive investment in ritual apparatus among the Zhou states moved from the quadrilateral's application embodied in the old ancestral temple and its ritual bronzes that represented adherence to the old Zhou ritual regime to state rulers' individual tombs and public ceremonial platforms in the states' capital cities. This change signaled a shift from a dedicated concern with the secretive ritual regimen that had served to cohere the courts of the old elite lineages' estates-cum-states in the Zhou court-centered political regime to the landed elites' preoccupation each with its own lineage's aggrandizement and accumulation of real political, military, and economic power. Tian and its authority no longer remained the exclusive provenance of the Zhou royalty but rather were up for grabs. Tian had diffused from the polar center to become a vague but still very real power accessible to those who possessed the wealth to purchase influence with it, whether that meant that one could buy either Tian's support in military campaigns against an enemy by investing in grandiose public ritual platforms and apparatus or a place in Tian in the afterlife by establishing an enormous and well appointed tomb. In all cases, the essential quadrilateral shape persevered in the architecture of all such sacred sites and artifacts.

Likewise, what we might identify as "wild" (i.e., *ye* 野, or "outside of the official regime") traditions developed outside of the now-waning Zhou ritual regime as attempts to access the will of a Tian that had become diffuse and, with the Zhou court's increasing

irrelevance to real matters on the ground of the earth, incommunicate through the official channel of Zhou ritual propitiation. These traditions included those of the *jiuye* 九野, or "nine-field," astrology, the *Yi Jing* 易經 (*Book of Change*) trigrammatic and hexagrammatic divination system, and plastrimancy. These systems, which seemingly in all cases were founded yet on a square understanding of Tian's power but one that now encompassed not only the old quadrilaterally shaped pole but the entire star-populated sky, sought to circumscribe the central Zhou ritual communication with heaven by divining Tian's will through literally peripheral, i.e., non-polar and non-Zhou-ritual, means.

At the same time, some became dissatisfied with the idea that one could buy influence either with Tian while among the living on earth or, in the afterlife, into Tian itself. If we take the Confucian *Analects* to represent the man Confucius' teachings, then we can recognize that Confucius objected to this economically driven access to Tian. Confucius promoted rather an impalpable but ethically oriented power of Tian immanent in the universe that responded positively to humaneness and rightness, decency and altruism, and, particularly, one who embodied these qualities and thus could return the world to a stable regime that respected people's need to sustain a peaceful livelihood amid a socio-political harmony. Like many others of his time and the preceding centuries of the Zhou, Confucius sought to access the power of Tian through the ritual practices attendant on Tian, but he stressed not so much the ritual itself as he did the calm mental / emotional / spiritual state into which one entered while preparing for and engaging in the ritual. Startling is his own and others' association of his teachings with the shape of the square. In this we understand that Confucius apparently sought to return humanity to the ancient court ritual attendance, and especially its fundamental psychology of reverence, paid the old ancestral polar quadrilateral that had served the Shang and Zhou courts as the high corporate superhuman godhead.

Warring States philosophers both "inside the square" (ritual-centered) and "outside the square" (ritually non-aligned) developed a Classical Metaphysics modeled on Confucius' teachings as we find the latter recorded in the *Analects*. In their equation of a mental *and actual* state of spiritual / mental vacuity and quiescence (*xujing* 虛靜) with an abstract Tian or One (*yi* 一), which for them constituted an individual's Tian-bestowed nature and from which issued the

enormous power to rule one's own life and / or the world, essentially they followed Confucius in his promotion of the reverent state of mind possessed of one preparing for and engaging in somber ritual at the ancestral temple. Beyond Confucius, however, they proposed a unity of issuance and return, of cosmogony / cosmology and meditative reattainment of the cosmogonic source, thus developing for Chinese intellectual history thereafter a simple and powerful approach to individual mystical — and thus also collective political — attainment.

That by the 6th–4th centuries BC Tian had diffused from the old polar quadrangle to represent now either an abstract immanent power or the entire physical sky is apparent in Warring States and Han text and iconography representing traditions differing — but not necessarily entirely divorced — from the Warring States-Han tradition of the Classical Metaphysics that clearly associates the physical heavens with the power of Tian. In particularly iconography dating to the 3rd century BC and later, but also in earlier illustrations that seem to depict a square heaven, it becomes apparent that the square had, through likely the Warring States centuries, been thoroughly extruded from its earlier polar locus to represent now, as a measurement grid, the entire heavens. Hemerological artifacts dating to this period show clearly how a cross-hatched square thus was employed to literally map astral phenomena. Given the obvious horizontal circularity of the heavenly canopy, this could have developed only from the dissemination of the square tradition of the polar heavens, and it seems to have been adumbrated by the divinatory traditions of *jiuye* field astrological, trigrammatic / hexagrammatic, and plastrimantic hemerology that had developed by the 7th–6th centuries BC.

Despite Chinese tradition since circa 200–700 AD and Western sinological scholarship since 1600 AD virtually universally having promoted or acquiesced to the thesis that the Chinese from ancient times and forward have conceived of the world to be a flat square, in fact the textual and iconic traditions dating to before 100 / 200 AD that have been interpreted to represent this tradition do not in any way identify the earth to be flat or square. As I demonstrate in Chapters 4 and 5 of Volume III, in fact, until circa 100 / 200 AD the Chinese believed, rationally, on the basis of simple observation, the heavens and earth both to be round. At the same time, they generally chose, as I described above, to measure stellar movements occurring in the domical heavens using a nine-square square grid.

The final chapter of Volume III proper, Chapter 6, identifies the phonetic / graphic origins of the Warring States, Han, and later polar godhead Taiyi / Dayi 太乙 in the Shang

apotheosis of its highest dynastic founding ancestor, first dynastic ancestor Dayi, also known as Tang. Relying on an earlier involved discussion in Volume I, Chapter 3, of Chinese polar godheads of the later, imperial, era, in this chapter I further argue that this godhead, despite the Shang royal house's having christened it Dayi probably in the 16th century BC, likely originated as a polar godhead long prior to the Shang, in the Chinese Neolithic of circa 3000 BC or before, when the star Thuban, the centerpiece of the graphs for all of *da* 大 and *yi* 乙 (comprising the name of Dayi), Di, Tian, and Ding, sat very near or directly at the astronomical celestial pole.

Chapter 6 also demonstrates how Qin-Han developments in Warring States and early-imperial universal cosmology seem to have unified by the late 2nd century BC in one religio-political cosmological thesis of imperial rule the old Shang (and, even earlier, the Neolithic) god Dayi with the newer philosophical abstract of Yi 一, "One," the latter of which had developed as the centerpiece of the Warring States Classical Metaphysics. Through this unification of inherited religious and philosophical impulses, the Qin-Han courts seem to have resolved a centuries-old disparity that had developed during the Warring States between hemerological / astrological and other, non-astronomical, religious belief and purely abstract cosmogonic / cosmological and epistemological / teleological philosophy. Through the unification of these concepts, one ancient and the other far more recent, the Qin and, especially, the Han imperial cosmogony / cosmology / cosmography was able to promote a newly universalistic philosophy and religion that sought to gather all under heaven, on earth, within its syncretic ideological aegis of rule.

At the same time, during the Han period the thesis of Tian's squareness began to break down. By circa 100 / 200 AD the quadrilateral that had until very recently been tethered securely with the heavens began to be associated rather with the thaumaturgical power of the earth. While later interpreters then unreflexively interpreted the square to always have represented in Chinese thinking the earth, and they have interpolated into every kind of text and icon such an interpretation, in fact the "square power" of earth still was, during the process of transference of the square's symbolic meaning from Tian to earth, fully representative of Tian's, or heaven's, power. It is only that, in the typical Han-period and later emphasis on the critical role of the human being on earth in literally completing the great cosmogonic / cosmological trinity of Tian-Earth-Humanity, post-Han interpreters of the classical and early-imperial traditions lost sight of

the immanent power of Tian in earth and humanity, i.e., the power of heavenly Tian that Han philosophers had seen working through earth and humanity to complete the construct of *yuzhou* (space and time), thereby freeing them to assign carelessly to the earth the power of the square which had, prior to and through most of the Han, always symbolized the power of Tian and the astral entities that inhabited and moved through it.

Chapter 7 offers a review of many of the more broadly pertinent theses forwarded in all three volumes of this study, and it further attempts in conclusion to extend our understandings of both (1) the depth and extent of the ancient Eurasian transfers of technologies, languages, and religious ideas, and (2) the consequent shared nature and characteristics of the transformations of religions that occurred in both Southwest and East Asia during particularly the 1st millennium BC that resulted from all of urbanization, the Eurasian transfer, and the precession of the equinoxes.

List of Abbreviations

10D	10 Draconis (in stellar illustrations)
11D	11 Draconis, or Thuban
A	Alioth (in stellar illustrations)
AAC	<i>Archaeology of Ancient China</i>
AZ	Anthropo-zoomorphic
BMAC	Bactria-Margiana Archaeological Complex
BSOAS	<i>Bulletin of the School of Oriental and African Studies</i>
CSM	Chu Silk Manuscript
c.	(1) century; (2) circa
D	Dubhe (in stellar illustrations)
DFWM	<i>Dongfang wenming zhi guang: Liangzhu wenhua yuqi</i>
DNA	deoxyribonucleic acid
EAE	<i>Enūma Anu Enlil</i>
E	East/east
ed.	edited / editor
edn.	edition
EE	<i>Enuma elis</i>
EVJS	<i>Electronic Journal of Vedic Studies</i>
HJ	<i>Jiaguwen heji</i>
HJAS	<i>Harvard Journal of Asiatic Studies</i>
HNZ	<i>Huainanzi</i>
IA	Indo-Aryan
IE	Indo-European
II	Indo-Iranian
JAOS	<i>Journal of the American Oriental Society</i>
JIES	<i>Journal of Indo-European Studies</i>
K	1. Kochab (in stellar illustrations); 2. King (in Shang king identifications)

<i>Kenkyû</i>	<i>Inkyo bokuji kenkyû</i> (Shima Kunio)
<i>KGXB</i>	<i>Kaogu xuebao</i>
<i>LSCQ</i>	<i>Lüshi chunqiu</i>
<i>LZ</i>	<i>Yinxu jiagu keci leizuan</i>
<i>LZWHYQ</i>	<i>Liangzhu wenhua yuqi</i>
<i>M</i>	Megrez (in stellar illustrations)
<i>mtDNA</i>	mitochondrial deoxyribonucleic acid
<i>N</i>	North/north
<i>NCP</i>	Northern Celestial Pole
<i>NE</i>	Northeast/northeast
<i>NW</i>	Northwest/northwest
<i>OBI</i>	Oracle Bone Inscription
<i>OCM</i>	Minimal Old Chinese
<i>P</i>	Pherkad (in stellar illustrations)
<i>PAA</i>	Proto-Austroasiatic
<i>PA / PIE</i>	Proto-Anatolian / Proto-Indo-European
<i>PC</i>	Pontic-Caspian
<i>PD</i>	Proto-Dravidian
<i>PED</i>	Proto-Elamo-Dravidian
<i>PIE</i>	Proto-Indo-European
<i>PIE/IE</i>	Proto-Indo-European / Indo-European
<i>QZD</i>	<i>Qian Zuo Du</i>
<i>RV</i>	<i>Rg Veda</i>
<i>RV IA</i>	<i>Rg Vedic</i> Indo-Aryan
<i>S</i>	South/south
<i>SE</i>	Southeast/southeast
<i>SJ</i>	<i>Shiji</i>
<i>Sôruï</i>	<i>Inkyô bokuji sôruï</i> (Shima Kunio)
<i>SSJZS</i>	<i>Shisanjing zhushu</i>

SW	Southwest/southwest
T	Thuban (i.e. 11 Draconis, in stellar illustrations)
TLV	Western appellation of bronze mirrors of Warring States – Han dynasty vintage on whose backs are drawn designs that resemble English Ts, Ls, and Vs; in Chinese the TLV mirrors are now most commonly identified as <i>bojujing</i> 博局鏡
<i>TXJ</i>	<i>Taixuan Jing</i>
Tr.	Translation / Translated
V-O	verb-object
TRB	Tricherrandbecher or Trichterbecher (Funnel Beaker) Culture
W	West/west
<i>ZBSJ</i>	<i>Zhou Bisuan Jing</i>

*In and Outside the Square: The Sky and the Power of Belief
in Ancient China and the World, c. 4500 BC – AD 200*

Volume I

The Ancient Eurasian World and the Celestial Pivot

Chapter 1: The Interactive Eurasian World, c. 9000–500 BC

Central to any discussion of Eurasian cultural and civilizational development of the Neolithic and Bronze periods is the spread from a Proto-Indo-European (PIE) root dialect continuum of Indo-European (IE) languages, cultures, and peoples across the better part of Eurasia between roughly 9000 and 500 BC. The debate over the time frame and location of the PIE homeland and the dispersal of IE languages from it remains presently as lively as it was 150 years ago, even though scholars have made great progress during this time in reducing the viable possibilities to a few scenarios. Those most critical to the debate are linguists, archaeologists, archaeogeneticists, anthropologists, and historians. Historically scholars of each field typically have supported a model for PIE-IE origins and dispersals reflective of the tools that their particular field could muster and apply to certain evidence at a given time, and the disciplinary models have tended to mutually conflict. Wishing to avoid subscribing to any particular disciplinary model, since no single discipline's evidence and approach can make thorough sense of the entire frame of the PIE-IE problem, my intent here is to provide a plausible interdisciplinary overview of the connections and influences occurring across Eurasia that were established by PIE- and IE-speaking peoples prior to and through the period of early civilizational development in and around the Fertile Crescent when, c. 3500 and 3000 BC, began developing (1) rapid, large-scale urbanization and state-building, (2) the use of wheeled transport, and (3) writing and (4) bronze-making technologies. Of course, I am fully cognizant that what I write will be contentious, but in this field one has no choice but to be contentious if s/he is to say anything at all.

Recent research into the genetic composition of European populations places the last sizable (about 20%) influx of human genetic material to Europe, from the Near East, during the Neolithic, or c. 9000 to 3000 BC.¹ This finding is consistent with the results of earlier

¹ Guido Barbujani and Louise Chikhi, "Genetic Population Structure of Europeans inferred from Nuclear and Mitochondrial DNA Polymorphisms," in Colin Renfrew and Katie Boyle, eds., *Archaeogenetics: DNA and the population prehistory of Europe* (Cambridge, England: McDonald Institute for Archaeological Research, 2000): 119–129. See also Lucia Simoni, Francesc Calafell, Jaume Bertranpetit, and Guido Barbujani, "Spatial Variation of

archaeogenetic research.² Such a genetic influx into Europe correlates temporally with the spread from eastern Anatolia, the Zagros, Levant, and Syria to Europe of agricultural practices, technologies, and flora and fauna, and, probably with them, a pre-PIE dialect continuum and the people who spoke its evolving dialects.

In 1988 Colin Renfrew published his important study that correlated the introduction of agriculture with the spread of IE languages to Europe. Renfrew consciously avoided applying the then-unpopular mass migratory model to explain extensive changes that occurred during the Neolithic in the socio-economic foundation and apparent linguistic constitution of Europe. He proposed rather a "wave of advance" model whereby the technologies and techniques of agriculture and associated advances, along with agricultural flora, domesticated fauna, and the PIE root dialect and IE language groups, spread from Anatolia, through the Balkans, and throughout Europe over thousands of years at an average rate of about 1 kilometer per year.³ Renfrew argued that IE languages colonized Europe through an "elite dominance" model of infiltration. According to this model a small but economically and militarily powerful elite core of IE-speaking intruders practicing agricultural techniques carried the IE root languages into Europe, and it was the economic success and consequent social and military power associated

mtDNA Hypervariable Region I Among European Populations," in idem: 131–149.

² See the pioneering archaeogenetic work of L. Luca Cavalli-Sforza, Paolo Menozzi, and Alberto Piazza in their *The History and Geography of Human Genes, Abridged Paperback Edition* (Princeton: Princeton UP, 1994): 88–111, 252–266, 299–301. See also Bryan Sykes, "The Molecular Genetics of European Ancestry," *Philosophical Transactions of the Royal Society of London B* (1999) 354: 131–139. For a highly readable account of the human genetic dispersal from Africa beginning c. 100,000–80,000 YBP, see Stephen Oppenheimer, *The Real Eve. Modern Man's Journey Out of Africa* (NY: Carroll and Graf, 2004).

³ Colin Renfrew, *Archaeology and Language. The Puzzle of Indo-European Origins* (Cambridge, England: Cambridge UP, 1988). Renfrew theorized at the time that agricultural technologies and practices, and with them IE languages but not necessarily IE-speaking human migrants, spread to Europe from Anatolia c. 7000–3000 BC. The study of archaeogenetics, a science born after Renfrew's study was published, has supported his thesis that the spread of IE languages and Neolithic agriculture were intimately associated. Archaeogenetics has, however, solved a riddle that at that time Renfrew could not, which is that human IE-speaking migrants accompanied the spread of their languages and cultures.

with the IE speakers and their spoken language that stimulated adoption of such languages by non-IE-speaking native European populations.

Since Renfrew published his thesis, archaeogenetic evidence supportive of a straightforward migratory model of IE-speaking people's having entered Europe gradually but *en masse* sometime during the Neolithic has accrued sufficiently to enable us to accept the gradual but mass migratory model momentarily as a base from which to work. That is, there exists ample support for the proposal that fairly sizable populations of IE-speaking peoples entered Europe from Anatolia, through the Balkans, and that they brought with them the agricultural and related technologies that drove the expansion of their cultural and linguistic frontier during the Neolithic millennia. Archaeogenetics has also confirmed the domestication in and spread, beginning in the Upper Palaeolithic, from the Karacadag mountains of southeastern Anatolia to Europe of agricultural flora, thus further confirming the coterminous movement from the Anatolian and Near Eastern region to Europe of both human and floral migrants.⁴

Below we will review the linguistic, archaeological, textual, historical, and anthropological evidence that lends additional credence to Renfrew's basic argument. Part of this process involves combing through currently relevant competing theories of PIE/IE origins and dispersals and the critical evidence cited to support them. To move the discussion forward it will be necessary periodically to introduce elements of the PIE/IE debate whose resolution is fairly certain and usually agreed upon.

The first stage of dispersal of IE languages from a PIE continuum (or perhaps either an Archaic IE or pre-PIE continuum) involved the hiving off of three related IE sub-phyla: first the Anatolian, then the Tocharian, and finally, some time later, the Celtic.⁵ These three early sub-

⁴ See, for instance, M. Heun, R. Schäfer-Pregel, D. Klawan, R. Castagna, M. Accerbi, B. Borghi, and F. Salamini, "Site of einkorn wheat domestication identified by DNA fingerprinting," in *Science* 278 (1997): 1312–14.

⁵ On these early dispersals see Werner Winter, "Lexical Archaisms in the Tocharian Languages," in Victor H. Mair, ed., *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia* (Washington, D.C.: The Institute for the Study of Man; Philadelphia: The University of Pennsylvania Museums Publications, 1998): 347–357; and Eric P. Hamp, "Whose Were the Tocharians? Linguistic Subgrouping and Diagnostic Ideosyncrasy," in Mair (1998): 307–346. According to comparisons of phonetic isoglosses and analyses of morphological shifts, Anatolian,

phyla might have dispersed from a PIE-speaking community from anywhere between Syria/eastern Anatolia and the Balkans c. 9000–5000 BC but most probably from somewhere in the Western Anatolian and/or Balkans-Carpathian regions after 6500 BC.

Lolita Nikolova has, independent of both Renfrew's agricultural model and the more recent archaeogenetic discoveries, offered archaeological support for a 6th–5th millennia BC PIE homeland in the Balkans. Nikolova has concluded through her analysis of material remains that PIE was situated in the Balkans long before the 4th millennium BC and that demic diffusion of pre-PIE-speakers into the Balkans could have occurred only in the early Neolithic.⁶

A PIE homeland in the Balkans-Carpathian region during the 6th–5th millennia BC finds particularly strong and convincing linguistic support in the systemic analysis of PIE-IE phonetics performed by the late Russian historical linguist Igor D'iakanov. Other than to nod his head in the direction of agriculture's dispersal, D'iakanov did not speculate on the reasons for the movements of PIE/IE languages and language groups, but he expertly deciphered particularly the phonetic isoglosses and evolving morphology that identify a certain historical progression in the development of the IE languages and groups. He theorized only so far as to suggest (1) a Balkan-Carpathian PIE homeland dating to roughly the 6th–5th millennia BC and (2) the possibility of an earlier, pre-PIE, homeland in eastern Anatolia but which was beyond the scope of his — or, seemingly, anyone's — linguistic ken.⁷ D'iakanov's work has recently found substantial linguistic support in the work of Russell Gray and Quentin Atkinson, who, on the basis of cladistic-linguistic models, have dated the earliest dispersal, that of Pre-Anatolian (or, as others

Tocharian, and Celtic were the earliest language phyla to have diverged from PIE.

⁶ Lolita Nikolova, "The Balkan Proto-Indo-Europeans in the 4th and 3rd Millennia BC," in *Journal of Indo-European Studies (JIES)* 28.1–2 (Spring/Summer 2002): 197–220, esp. p. 218–19.

⁷ Igor D'iakanov, "On the Original Home of the Speakers of Indo-European," tr. Olga Kipnis, *Soviet Anthropology and Archaeology* 23.2 (Fall 1984): 5–77; idem, "Review of *Annual of Armenian Linguistics*, ed. Colin Renfrew," *Current Anthropology* 9 (1988): 79–87; and idem, "External Connections of the Sumerian Language," *Mother Tongue* 3 (1997): 54–62.

have called it, Proto-Anatolian — see below), to c. 6700 BC, with a final significant hiving off of root dialects from PIE having occurred c. 4900 BC.⁸

Robert Drews seems to have followed Renfrew and D'iakanov by promoting a western Anatolian Proto-Anatolian/Proto-Indo-European (PA/PIE) homeland dating to the 8th–7th millennia BC.⁹ Compare and contrast this conclusion with that reached by Thomas Gamkrelidze and Vyachislav Ivanov, who proposed an Armenian (Lower Caucasus) PIE homeland in the 4th millennium BC by proffering an unlikely genetic PIE-Semitic relationship and tortuous dispersal routes of IE languages from their Armenian PIE homeland.¹⁰ On linguistic grounds D'iakanov disproved Gamkrelidze and Ivanov's thesis rather convincingly. Perhaps D'iakanov's simplest and yet most significant point is that PIE cannot be misunderstood to have been a static root language but should be viewed rather as a dynamic continuum of root dialects. Thus, he proposed, PIE's predecessorial dialectical continuum may well, as Gamkrelidze and Ivanov suggested, have originated somewhere near Armenia, and this earlier Armenian/eastern Anatolian PIE homeland could explain the genetic similarities known to exist between the early IE language of Anatolian (Hittite-Luwian) and the Kartvelian language group of the Lower Caucasus (and he allowed for the possibility that it was at this early time that Gamkrelidze and Ivanov's proposed Semitic link with the PIE [what D'iakanov insists must have been the pre-PIE] continuum might have occurred), but PIE itself could not.¹¹

Drews's argument for an Anatolian origin for PIE and IE languages deserves a closer look. On the basis of claims made by several linguists since the 1950s, Drews proposed that an early PIE substrate dialect can be detected among toponyms occurring throughout territories of

⁸ Russell Gray and Quentin Atkinson, "Language-Tree Divergence Times Support the Anatolian Theory of Indo-European Origin," in *Nature* 426 (6965; 2003): 435–9.

⁹ Robert Drews, "PIE Speakers and PA Speakers," in *JIES* 25.1–2 (Spring-Summer 1997): 153–177.

¹⁰ Thomas Gamkrelidze and Vyachislav Ivanov, *Indo-European and the Indo-Europeans: A Reconstruction and Historical Analysis of a Proto-Language and a Proto-Culture*, 2 vols., tr. from the Russian edition of 1985 by Johanna Nichols (Berlin and NY: Walter de Gruyter, 1995).

¹¹ D'iakanov (1984): 63.

the Aegean region. In that toponyms are usually highly conservative and resistant to change in a given locale, this would mean that the earliest settlers in the Aegean region spoke a PIE dialect. Drews thus argued very strenuously that not only did PIE originate in Anatolia but that an even earlier substrate of the PIE continuum, what he called the Proto-Anatolian / Proto-Indo-European (PA/PIE), developed there. Drews contended that both a Proto-Anatolian and a Proto-Indo-European lineage derived from this PA/PIE root continuum. Like Colin Renfrew, who revived in the late 20th century the locating of the PIE homeland in Anatolia,¹² Drews suggested that the dispersal of IE languages (not the PA/PIE continuum) began from western Anatolia with sea voyages across the Aegean Sea as early as the 8th and 7th millennia BC to reach Crete, Thessaly, Macedon, and Greece.

But beyond this Drews disagreed with Renfrew, arguing that this early Proto-Anatolian-derived family of dialects that the surviving ancient toponyms evince evolved in one instance into a language that came in the 2nd millennium BC to be written as Minoan Linear A on Crete. As is well known, the Linear A script later was displaced on Crete and in Greece by its own descendant Mycenaean Linear B script that developed in Mycenae on the Greek mainland. The latter is well documented to have been the first Greek script and the ancestor to Classical Greek. Drews theorized that the proto-Greek language written as Linear B derived not from the early Aegean PIE/PA diaspora, and thus not directly from the language written as Linear A, but from the dialects spoken by later-dispersing PIE-speaking colonists who sailed during the 7th–4th millennia BC from the Bosphorous in northwest Anatolia across the Black Sea to both (1) the Danube, Dniester, and Bug valley region in the northwest of the Black Sea, and (2) the Rion Valley in the upper Caucasus. Drews proposed that the language of the former group spread during the 5th–4th millennia BC south into Thessaly, Macedon, and Greece to displace the earlier PA/PIE-derived substrate of the Aegean that had arrived millennia before directly from Anatolia, and there it evolved into Mycenaean Greek among what surely would have been earlier, now-lost, PA/PIE-derived dialects and languages. Speakers of the latter group of PIE dialects, i.e.,

¹² In the 1920s Archibald Henry Sayce, largely on the basis of simple linguistic geography, was the first to make a serious argument proposing that Anatolia was the PIE-speakers' homeland. See J. P. Mallory, "A Short History of the Indo-European Problem," in *Journal of Indo-European Studies* I (1973): 45 (21–65).

those having arrived in the northern Caucasus as early as the 7th millennium BC, Drews considered to have been the original Neolithic settlers of the Kuro-Araxes culture complex, which long has been tied into the Pontic-Caspian complex of cultures developing in the 4th and 3rd millennia BC from which many scholars derive European and Asian IE languages.¹³

Drews's thesis ties in neatly with all of Renfrew's, D'iakanov's, and Gamilkredze and Ivanov's proposals regarding an Anatolian origin for PIE and IE. He also ingeniously found a means of reconciling (1) conflicting arguments regarding the origins of the Greek language in Greece and the timing of the arrival of the Greeks in Greece (as we have seen, he opted for two waves, one early by sea from Anatolia and one later by land from the Balkans, via separate diaspora from the original PA/PIE dialectical continuum originating in Anatolia) and, most significantly, (2) disagreements over PIE origins in time and space by allowing for the spread of PIE from Anatolia into the Pontic-Caspian steppe and the upper Caucasus, an area that most scholars agree served at the time, the 4th-3rd millennia BC, at the very least as the staging ground for the spread of Indo-Iranian IE languages into Asia, if not also Celtic, Germanic, and Balto-Slavic European IE languages into Europe.¹⁴ Be that as it may, Drews's multi-stage, mixed sea-land IE dispersals from PIE (or PA/PIE) over the course of some seven millennia are difficult to accept. The strength of his model seems to be in its ability to offer a new and thought-provoking, even if stretched, synthetic resolution of the PIE/IE problem.

An older and among non-specialists still the most widely accepted thesis purporting to identify the PIE-IE homeland and dispersals in space and time originated with V. Gordon Childe

¹³ In the middle of the 4th millennium BC *kurgan* (mound) burial mounds prevalent in the PC steppe also were present in the Kuro-Araxes of the Upper Caucasus. Archaeologist Marija Gimbutas argued that the use of *kurgan* burial mounds entered the Kuro-Araxes from the PC steppe through a violent intrusion by mounted IE-speaking horse-mounted warriors who practiced *kurgan* burials. However, evidence also points to an emergence of cultural influence *out from* the Kuro-Araxes into the PC steppe during this period, including the practice of *kurgan* burials, which reversal of understanding of evidence is the basis of Drews's argument. On the Kuro-Araxes culture see J. P. Mallory (1989): 232-233. On the *kurgan* thesis as proposed by Gimbutas and others, see immediately below, this discussion.

¹⁴ Drews (1997): 153-177.

in the 1920s¹⁵ but was developed from the 1950s particularly vociferously by archaeologist Marija Gimbutas. Childe believed that IE-speaking people derived from a pastoralist people of the Pontic-Caspian (PC) steppe who often buried their dead under *kurgans* (mounds). He proposed that these horse-mounted warriors, identified archaeologically also by their use of a "battle-axe," cord-marked pottery, and the four-wheeled wagon, swept into and across Europe, the Caucasus, Anatolia, and Central Asia during the late Bronze period (late 3rd and 2nd millennia BC). Gimbutas developed her own from Childe's thesis, positing a successful 5th–3rd millennia BC three-wave invasion of Europe by horse-mounted and later chariot-driving IE-speaking warriors from the PC steppe who, as we learned from Childe, buried their dead under *kurgans*. Gimbutas postulated that these supposedly patriarchal steppe marauders "kurganized" Europe as they swept horseback in three waves across the Balkans into and across Europe between c. 4500 and 2200 BC, in the process brutally destroying a prior European gynocentric, matriarchal, and peaceful and artistically oriented utopian civilization.¹⁶

¹⁵ V. Gordon Childe, *The Aryans, A Study of Indo-European Origins* (London: Kegan Paul, Trench and Trubner, 1926). See also Childe's later *Prehistoric Migrations in Europe* (Oslo: Aschehoug, 1950).

¹⁶ See, for instance, Marija Gimbutas, "Proto-Indo-European Culture: The Kurgan Culture of the Fifth, Fourth, and Third Millennia BC," in George Cardona, Henry Hoenigswald, and Alfred Senn, eds., *Indo-European and Indo-Europeans* (Philadelphia: University of Pennsylvania Press, 1966): 155–197; idem, "The Three Waves of the Kurgan People into Old Europe, 4500–2500 BC," in *Archives suisses d'anthropologie générale* 43 (1979): 113–137; idem, *The Kurgan Culture and the Indo-Europeanization of Europe*, ed. Miriam Dexter and Karlene Jones-Bley (Washington, D. C.: The Institute for the Study of Man, 1997); and, in a pithy restatement of most of her arguments, idem, review of Colin Renfrew's *Archaeology and Language*, in *Current Anthropology* 29:3 (June 1988): 456.

The Childe-Gimbutas *kurgan* thesis has been taken up and forwarded in varying degrees by many scholars, among them David Anthony (e.g. "The 'Kurgan Culture,' Indo-European origins, and the domestication of the horse: A reconsideration," in *Current Anthropology* 27.4 [1986]: 291–313); in modified form by J. P. Mallory (*In Search of the Indo-Europeans: Language, archaeology, and myth* [London: Thames and Hudson, 1989]); quite faithfully by V. Dergachev, "The Migration Theory of Marija Gimbutas," in *JIES* 28: 3–4 (Fall/Winter 2000): 257–339; and also by Asko Parpola ("Aryan Languages, Archaeological Cultures, and Sinkiang: Where Did Proto-Iranian Come into Being, and How Did It Spread?" in Mair (1998): 114–147). Others continuing to support this thesis will be identified throughout the remainder of this chapter as the specific facets of the PIE-IE issue with which they have grappled are treated individually. In no case have I found the more recent argumentation in support of the

But this thesis is quite problematic. First, the argument that the people of the steppe were a patriarchal marauding horde is based purely on fanciful interpretation. Artifacts recovered from sites associated with the *kurgan*-burying steppe peoples that have been considered to betray that theirs was a male-dominated, militaristic, invading mounted warrior society simply do not need to be interpreted in this way at all. Such artifacts include the so-called "battle-axe" and "horse-head scepter," horse bones, the wagon, corded ware, and bronze weapons. These items could be interpreted together or separately in any number of ways. For instance, the "battle-axe" may have been simply a chopping tool, though of course it could have and probably did double and triple as both a ritual appurtenance and a weapon. Furthermore, the much-vaunted "horse-head scepter" found in burials of males from the Volga to the Lower Danube need be understood as neither horse-headed (the shape of the crown of such objects is in most cases globularly amorphous, and only in some cases, in those found west of the Dnieper, do they mildly represent the shape of a horse's head)¹⁷ nor a scepter. Perhaps it was a clan-owned ritual object or a proudly possessed exoticum. Their being carved from exotic stone, the objects might otherwise have been fancy ritual artifacts or cudgels.

Moreover, the four-wheeled wagon appears late in the European-Near Eastern archaeological sequence, in the middle to late 4th millennium BC, long after the invasions were said to have begun c. 4500 BC (on the development and distribution of wheeled transport, see further below, this chapter). In addition, the presence of bronze weapons in the upper (later, i.e., 3rd millennium BC) strata associated with these peoples is hardly surprising in a period of human

kurgan thesis any more convincing than that offered by Childe or Gimbutas. It is instructive that in recent writings on the PIE/IE issue the very learned and authoritative Mallory has gradually backed away from promoting any position specifically. For what seems to be the beginning of his reconsideration of his earlier position, see J. P. Mallory, "Indo-Europeans and the Steppelands: The Model of Language Shift," in *Proceedings of the Thirteenth Annual UCLA Indo-European Conference, Los Angeles, 2001* (*Journal of Indo-European Studies Monograph Series No. 44*; Washington, D.C.: Institute for the Study of Man, 2002): 1–28. For a more thoroughly open-ended treatment of the PIE/IE problem, see J. P. Mallory and D. Q. Adams, *The Oxford Introduction to Proto-Indo-European and the Proto-Indo-European World* (Oxford and New York: Oxford University Press, 2006): 442–463.

¹⁷ Marsha A. Levine, "Domestication and early history of the horse," in D.S. Mills and S. M. McDonnell, eds., *The Domestic Horse: The Origins, Development, and Management of its Behavior* (Cambridge, England: Cambridge UP, 2005): 7–9.

population expansion and increasing production of wealth and interregional trade, accelerated movement or spread of various peoples, and the diffusion of bronze technology. While surely the bronze weapons could have been and were used for offensive attack, there is no reason to believe that they were not employed just as commonly for defense, to demonstrate status and wealth, and to carry out ritual.

In addition, it is more likely that the corded ware drifted out from Europe into the steppe, not from the steppe into Europe.¹⁸ It is certainly true that while archaeologically recovered evidence does support some population mixing, as well as cultural interaction, having occurred among eastern-European and European-steppe peoples from the 5th–4th millennia BC and on, and certainly drift and exchange of material cultural artifacts occurred between western/northern-European, eastern-European, and European-steppe cultures during and after the same period, this simply cannot be extended to propose that a massive violent invasion from the steppe transformed and repopulated Europe during the 5th through 3rd millennia BC.¹⁹ In fact, a fresh look at both older and more recently uncovered archaeological evidence from cultures of southeastern Europe and the PC steppe shows both an active cultural exchange in exotica²⁰ and a clear movement of cultural influence during the 5th–3rd millennia from the Cucuteni-Tripolye cultural complex of the Balkans-Carpathians out into the PC steppe and to Asia beyond, not the

¹⁸ Yuri Rassamakin, "Aspects of Pontic Steppe Development (4550–3000 BC) in the Light of the New Cultural-chronological Model," in Katie Boyle et al., eds., *Ancient Interactions: East and West in Eurasia* (Cambridge, England: McDonald Institute for Archaeological Research, 2002): 50.

¹⁹ Most scholars reflecting objectively on the issue indeed recognize that no evidence supports the postulation that a massive, rapid, and violent migration of steppe people into Europe occurred between specifically 4500 and 2200 BC. For a measured and careful objection to such a postulation by a scholar otherwise, at the time, largely supportive of Gimbutas's thesis, see Mallory (1989): 233–257. As Mallory's review makes clear, that cultural/technological drift and interaction occurred between European and steppe cultures is not in question, though no *direct invasive* communication, i.e., rapid intrusion from the steppe into Europe or Europe to the steppe, likely occurred.

²⁰ John Chapman, "Domesticating the Exotic: the Context of the Cucuteni-Tripolye Exchange with Steppe and Forest-steppe Communities," in Boyle (2002): 75–91.

other way around as Gimbutas argued.²¹ Moreover, the genetic data adduced above that supports a long, gradual migration of a significant stock of human genetic material into Europe between c. 9000 and 3000 BC virtually extinguishes the possibility of a relatively rapid and violent migration of PIE/IE-speakers into Europe during the late-Neolithic and Bronze periods.

Second, Gimbutas' speculation that in Europe an invading patriarchal and violent horse-mounted PIE/IE-speaking steppe people destroyed and displaced a heretofore matriarchal, peace-loving, Mother Goddess-worshipping civilization is just that, speculation, based in the first place on the misplacement of horse-mounted cavalries backward from the 1st to the 5th-4th millennia BC. Otherwise her theory follows from her tendentious interpretation of an increase in late-Neolithic and Bronze European fortification of settlements to be a certain sign of invasion of mounted nomadic steppe warriors. However, this change can be explained more sensibly as an autochthonous consequence of the accumulation of wealth by surplus-producing agriculture-practicing economies: as centers of wealth developed so did the tendency for local outsiders to raid them, and thus the settlements erected defensive fortifications to repel attacks. Invasions would have come from groups or tribes residing in the immediate surroundings of the fortified settlements that did not participate in the wealth-producing agricultural economy. Such groups might have included representatives of other nearby settlements or neighboring forest-based bands or tribes and need not have and surely did not travel thousands of miles from outside of Europe itself to confiscate the wealth of these settlements. The accumulation of wealth explains not only changes in such inter-settlement (or urban-rural) relations but also transformations in the social orientation and structure of European Neolithic and Bronze societies: as a consequence of and in tandem with the development of the need for defense evolved an increasing reliance on the leadership role of the male and thus a male-dominated and patriarchal society. In light of such considerations there thus is no need to invent hordes of steppe invaders to explain transformations in Neolithic and Bronze European societies. This is so particularly in consideration of the fact that while the practice of burying the dead under *kurgan* mounds occurred in Eastern Europe sporadically during the 4th-3rd millennia BC, the *kurgans* only appear

²¹ Rassamakin (2002): 49-73.

as far west as the Tisza River in Hungary,²² and the architecture employed to build the earliest *kurgan* mound burials, which were in fact stone-structured cairns and cists, appears to have been imported originally from Southeastern Europe into the steppe c. 4500–4000 BC.²³ There is no archaeological evidence whatsoever to support the claim that destructive steppe hordes ever entered Europe at any time prior to the 1st millennium AD, and the violent “kurganization” of Europe has been simply created in literature of the 20th century.

Furthermore, with reference to the idea that the warriors imagined to have invaded Europe c. 4500–2200 BC did so astride war horses or atop war wagons or war chariots, no concrete and incontrovertible evidence exists to bolster the claim that the horse (*Equus caballus*) was even domesticated prior to sometime during the 3rd millennium BC.²⁴ In addition, the heavy war wagon did not come into its very limited use until the 3rd millennium BC, and then only in the Near East and drawn not by horses but by oxen, and the chariot was not invented until c. 2000 BC. Moreover, the large-scale military use of the light, spoke-wheeled war chariot pulled by horses was unknown before the 16th century BC.

In addition, no incontrovertible evidence supports the claim often made in literature on PIE/IE origins and dispersals that PIE/IE-speaking people were responsible for or in any way associated with the actual domestication of the horse, even though according to presently known evidence the residents of the 4th millennium BC Pontic-Caspian steppe, who probably were Indo-Iranian speakers, appear to have been the first to have captured and herded the wild horse and consume it as a foodstuff in large numbers.

Many scholars have argued that full population-scale horse domestication and equid riding occurred first in the 5th and 4th millennia BC (c. 4500–3100 BC) in (1) the Dereivka, Ukraine settlement that most often has been identified with the Sredny Stog culture, and/or (2)

²² Mallory (2002): 14.

²³ Rassamakin (2002): 60–66.

²⁴ Levine (2005): 5–22; and idem, “The Origins of Horse Husbandry on the Eurasian Steppe,” in Marsha Levine et al., eds., *Late prehistoric exploitation of the Eurasian steppe* (Cambridge: McDonald Institute for Archaeological Research: 1999): 5–58.

kurgan settlements centered at Botai in the Middle Volga-northern Kazakhstan region. This region is precisely when and where many specialists have placed the PIE, or otherwise the Indo-Iranian IE, homeland, and consequently PIE/IE-speaking cultures and horse domestication have been linked in much of the pertinent literature of the past fifty years.²⁵

However, no one can be certain that it was indeed speakers of IE dialects who first domesticated the horse, even though the inhabitants of Botai and other 4th millennium BC sites bearing the remains of early *herded* horse populations seem most likely to have been speakers of Indo-Iranian dialects (see further below, this chapter). Nor can it be known that the horse and the other supposedly horse-associated artifactual remains found at Dereivka, Botai, and other Southeastern European and Pontic-Caspian steppe sites dating to the 5th or 4th millennia BC represent the presence of truly domesticated horse populations or domesticated-horse-oriented human cultures. In fact, palaeozoologists reviewing (1) the remains of *Equus caballus* at Dereivka and Botai, and (2) the roughly contemporaneous artifacts supposedly demonstrating a domesticated-horse-oriented cultural complex, such as perforated antler pieces often theorized to have served as bridle cheek-pieces and the aforementioned "horse-head scepters" thought to reflect a concept of kingship that associated PIE/IE-specific kingly power with the domesticated horse,²⁶ have discounted the claims that these recoveries identify Dereivka or Botai remains, or those of any Sredny Stog or other PC steppe cultures, with the earliest domesticated horse populations.

In a number of highly technical and scientifically well-founded articles indeed Marsha A. Levine has demonstrated through DNA population analysis of the Dereivka and Botai horse remains that these populations certainly were wild, not domestic, and that they represent the remains of hunted animals.²⁷ Probably these horses were not hunted in the sense of their having

²⁵ For all such claims reiterated by Marija Gimbutas, see her pithy rebuttal of Renfrew's *Archaeology and Language* in *Current Anthropology* 29:3 (June 1988): 456.

²⁶ Gimbutas (1988): 455.

²⁷ The horse remains at Dereivka represent a population of mostly males aged five to eight years; those at Botai were mostly three to eight. Neither such population could possibly have been domesticated. They were, rather,

been killed on site in the field; rather, these horses were most probably captured live and thus corralled before being slaughtered to supply their captors with food and other products. While these were corralled and not domesticated horses, it is not improbable that domestication of horses had its earliest beginnings in the tending of such populations in the PC steppe, for one can imagine that captured mares would have foaled while in captivity, providing their human handlers with an opportunity to familiarize such foals with human presence and humans with the behavior and psychology of captured horses, leading eventually someone to realize the hidden potential of managing the entire life of the horse, including the process and results of horse procreation. But when this realization might have occurred is entirely unclear, except that it likely had happened by sometime no later than during the 3rd millennium BC — it is during the latter half of this millennium that the first tentative attempts at equid riding surface in the material record, as we shall review further below in this chapter.

No primary evidence clearly shows that any horses of these populations were ever ridden. One body of evidence entirely lacking is that related to horse morphology, which should have changed with intensive riding; I have not seen reported any evidence of such changes represented in the bones recovered from the pits of any of the settlements under study. Another, and very significant, problem is that a critical horse head found at Dereivka, one of whose molars was argued decades ago to show bit wear and thus that horses were ridden using bitted bridles as early as 4200 BC, has been revealed through C¹⁴ analysis to date to much later, c. 800–200 BC. The horse owning this tooth was ridden by not a Sredny Stog horseman but rather likely a Skythian.²⁸

David Anthony has, since the Dereivka molar was shown to be an artifact of the 1st millennium BC, promoted several worn horse molars recovered from Botai, Tersek sites, and other Sredny Stog communities as proof that these people were bit-bridling and therefore riding horses — and thus also that they had necessarily fully domesticated horse populations — as early

captured animals. See Levine (1999): 27–44.

²⁸ David W. Anthony, *The Horse, the Wheel, and Language: How Bronze Age Riders from the Eurasian Steppes Shaped the Modern World* (Princeton: Princeton University Press, 2007): 206–215. See also E. E. Kuzmina, *The Prehistory of the Silk Road*, ed. by Victor H. Mair (Philadelphia: University of Pennsylvania Press, 2008): 26.

as 3700 BC, but the same argument originally made against the later-disproven Dereivka molar may be made against these: for all we know, the wear resulted not from the friction of the molar against a bit of a bridle but rather against opposing molars as a consequence of abnormal and poor occlusion.²⁹ No hard (metal) bits have been found that date prior to c. 1450 BC, and the evidence indicating that a soft-bit material such as bone, leather, twisted horse-hair, or braided fiber bit could have so worn a very hard horse molar is spotty and inconclusive; soft bits are very unlikely to have caused the wear on horses' teeth that has been promoted as representing bit wear.³⁰ Furthermore, of any specimen molar (typically a P₂S molar) presented to indicate bit wear, before accepting it as such, one must demand that its mate P₂s premolar extracted from the opposing jaw of the same horse be shown to exhibit identical or near-identical wear — any bit wears essentially equally on both P₂s premolars of the two opposing sides of the jaw bone.

Neither is there any indication that a metal bit was ever employed prior to the 2nd millennium BC, either in the PC steppe or anywhere else. Presently known evidence indicates that the metal bit was not even invented until approximately 1450 BC.³¹ Recovered pictorial artifacts from the Near East dating to the late 3rd millennium BC show horses still being controlled by a single rope or rein attached to a ring in the nose of the horse, not a bit; thus the bit seems not to have been invented even as late as c. 2100 BC. If during the 3rd millennium BC soft bits made from easily shredded and broken materials were known and used, then why did not the people of these Bronze cultures of this period, who were in constant contact with steppe horse populations, make a bronze bit? After all, other tools fabricated originally from easily broken materials, including nose-piercing control mechanisms such as nose rings, were readily

²⁹ Levine (1999): 11, commenting at the time on the Dereivka tooth prior to its having been redated to the 1st millennium BC.

³⁰ Levine (1999): 11–12. See Anthony's report of soft-bit molar wear, which seems not to be able to account clearly for the very slight wear on the Botai-Terseck horse molars that he presents pictorially (2007: 206–220).

³¹ M. A. Littauer & J. H. Crouwel, *Wheeled Vehicles and Ridden Animals in the Ancient Near East* (Leiden/Köln: E. J. Brill, 1979): 70.

adapted to manufacture in bronze. Why, if it existed, was not the all-important bit also adapted to bronze manufacture?

Finally with regard to the Botai horse molars, while it is difficult to know the circumstances under which the newly offered molars were recovered from the earth, it is possible that the dates for these, as well, someday will be revised downward.

Aside from the newly presented Botai-Tersek P₂S premolars, David Anthony's other currently proffered evidence for horse domestication is secondary or interpreted, and thus soft. In his recent book he argues that the horse populations whose remains are found at the various steppe sites dating to the 4th millennium BC could not have been herded by humans on foot but only humans mounted on horses. This is not necessarily so: horses, as any animal, can be baited and trapped. To attract either a stallion and his mares or a band of bachelor stallions one needs just one mare to serve as bait in a trap. Once the desired prey had entered a suitably engineered trap, a group of humans on foot easily could close the trap.

Another very real possibility is that the humans employed packs of domesticated dogs to herd wild horses toward capture. Horses fear and shy and run from large (and noisy) dogs, and a group of large and well-trained dogs easily could have helped considerably to steer wild steppe horse bands toward desired targets (e.g. a waiting pen). And that the inhabitants of the PC steppe during the 4th millennium BC had domesticated dogs is known.

Anthony also has invoked recovered evidence of layers of matted horse dung to claim that only stabled and thus domesticated horses could have left behind such evidence. But the fact that horses were apparently corralled in no way necessitates that they represent fully domesticated herds or were ridden. Wild horses can be corralled and held until their slaughter for food is desired.

Responding to evidence raised in earlier argumentation to support the contention that horses were domesticated in the PC steppe of the 5th–4th millennia BC, Marsha Levine clarified that aside from molar wear the most commonly raised evidence, i.e., the discovery of "cheek pieces" and "horse-head sceptres" at such sites, constitutes secondary, or interpreted, evidence, and that thus all such artifacts can be conceived to have served any number of purposes or to

have expressed various meanings.³² We may add to this list of interpreted artifacts David Anthony's recently offered evidence, including the layered dung and the idea that herding horses necessitated the prior invention of riding a domesticated horse. Even the worn molars, as we have seen, are subject to interpretation (and mistaken dating) and thus also constitute soft or secondary evidence. Since the contemporary circumstantial causes leading to the accretion of horse dung, and the uses of the "soft" artifacts, are unknown, then the meaning of these types of artifacts is ambiguous. Without supportive hard or primary evidence, such as an actual bridle with a bit recovered securely from a site dated equally securely to the 4th (or 5th) millennium BC, these artifacts cannot demonstrate that the captors of the populations of wild horse in question were riding the domesticated horse — perhaps the steppe human populations were able to tame any number of horses and thus begin the process of domestication, as we noted above regarding foals born in captivity, but even the presence of these activities, if indeed they were present, does not in any way necessitate that these people were riding such horses.

Thus, on the basis of traditional evidence, as far as we can determine with certainty at present, in the 4th millennium BC the people of the Pontic-Caspian steppe knew the hunted, captured, and herded horse, but this does not imply either that these horses were truly domesticated or at all that they were ridden, and the archaeological record otherwise disproves that they were. The earliest hard evidence for the riding of *Equus caballus* dates only to the late-

³² In her recent book, Elena Kuzmina (2008: 25–32) has cited considerable evidence newly recovered from steppe sites (e.g. horse bones, horse-head sceptres, etc.) for which she offers mostly Neolithic dates, but, like the evidence cited from the 1960s through the century's end to "prove" a 5th-millennium BC date for horse domestication at Dereivka, this evidence also must be subjected to careful scrutiny by many scholars before it can be accepted. As we have seen in the text above, the Dereivka (and Botai) bones were found to be those of wild horse populations, and the date of the horse's head from which the bit-worn Dereivka molar was extracted was subsequently revised to the 1st millennium BC. The lesson from Dereivka should cause us very serious pause. As an example of a report that one needs to investigate further before accepting it, Kuzmina (2008, p. 27) cites various scholars' having determined that at this or that steppe site the horse bones recovered are domestic, but she does not identify or explain the process according to which this judgment was determined. Was DNA testing completed? What population analysis was performed, using what procedure? Are vertebral pathologies apparent that would suggest true domestication and habitual human mounting? We are not told. More testing, research, and careful reportage are needed.

3rd millennium BC in the Near East,³³ long after the significant early IE dispersals from the PIE continuum had to have occurred, and this allows for an estimate of the beginning of horse domestication of only c. 3000 BC, if even that early.³⁴ As far as we can know, these steppe people may have begun to domesticate some number of their herded and tamed horses, though that anyone would have thought to jump on such a horse and ride it is very doubtful. This position approaches that taken recently by Robert Drews, though Drews allows for a greater degree of domestication in the 4th millennium BC than I would support.³⁵ My more cautious position regarding domestication reflects the considerations of not only (1) the utter paucity of any truly hard evidence for broad and deep horse domestication in the Eneolithic and (2) the simultaneous presence of Levine's population evidence that contravenes such an argument, but also (3) that it would have taken centuries, if not perhaps millennia, for people to have become accustomed sufficiently to the psychology of the horse in its newly corralled existence to think of riding such a creature — we must maintain cognizance of the fact that these people had no precedent or model from which to conceive of such an idea. Riding a horse, a volatile, powerful, and unpredictable animal, whether it was wild, tamed, or domesticated, would not have been an obvious proposition to one who has not before seen another ride such an animal, and the complex psychology of the horse, requiring of its handler or master not most importantly the power to handle it but rather foremost the grace and finesse to convince the horse to obey him or

³³ Littauer and Crouwel (1979): 45–6.

³⁴ On horse populations and domestications, see again Levine (2005): 5–22; Levine (1999): 5–58; for the evidence demonstrating the civil-oriented beginnings of riding without saddle in the later-3rd millennium BC and for a discussion of the very late military use of horse-riding, see Littauer and Crouwel (1979): 45–6, 65–7, 133–5.

³⁵ Robert Drews, *Early Riders: The Beginnings of Mounted Warfare in Asia and Europe* (New York: Routledge, Taylor, and Francis Group, 2004): 11–18. On the advent of riding, Drews essentially maintains his very well researched position that he developed in his earlier publication (1988). Pita Kelekna, in her two 2009 publications that treat the issues of early horse domestication and riding, being *The Horse in Human History* (Cambridge: Cambridge UP, 2009; hereafter 2009a) and "The Political-Economic Impact of the Horse on the Old World Cultures" (*Sino-Platonic Papers* 190, June 2009; hereafter 2009b), relies significantly on Drews (and Levine) to counter pensively the arguments made particularly by Anthony, but Kelekna leaves the question of the timing of domestication and riding rather open (2009a: p. 21–44; 2009b: p. 5–7).

her, would have caused a long, long span of time to elapse between the time of first domestication and the first attempts at riding. However, even if such an unlikely and isolated occurrence of riding were to have transpired, this never would have constituted the horse-riding culture that the Gimbutas thesis has proposed. Thus, quite obviously, human populations of the PC steppe did not raid Europe from the backs of horses at any time during the 5th, 4th, 3rd, or even the 2nd millennia BC.

The most recent evidence that has been raised to support the claim for horse domestication at Botai, and thus also generally for PC steppe cultures of the 4th millennium BC, offers a new twist. Natalie Stear has found carbon isotopes of equine fats on some 50 pot shards recovered from Botai. With the intent to distinguish equine milk from meat lipids, with Richard Evershed and Alan Outram's assistance she devised a method that she believes may identify the equine milk from meat fats: apparently assuming that the modern variation in precipitation between summer and winter in midcontinental regions is consistent with precipitation patterns in the region of Botai in the 4th millennium BC, she tested for the hydrogen isotope deuterium, which appears in waters of the region more abundantly during the more prolifically rainy summer period than in the relatively dry winter months. She has reasoned that since "mares are only milked after they foal in the spring" and as they thus lactate thereafter in the summer, then the fat of a mare's milk will demonstrate the higher concentration of the deuterium isotope, while the fat derived from horse meat will not. She found in five shards of the fifty just such a higher concentration of deuterium isotopes.³⁶

One may offer several cautions regarding this evidence, which is not at all convincing. First, there is no certainty that precipitation patterns prevalent today in the region of Botai are consistent with those obtaining some 5,500 years ago. Second, there is the matter of horse gestation and lactation. The gestation period for a horse is approximately 340 days, and mares' sexual receptivity depends on the photoperiod, i.e., the lengths of days. They enter receptivity as the days begin to lengthen, that is, after the winter solstice, and they begin to lose receptivity toward the end of summer as the autumnal equinox approaches. This means that mares are

³⁶ "Trail of Mare's Milk Leads to First Tamed Horses," in *Science*, 17 October 2008 (322: 368).

sexually receptive from approximately January through August-September, with the peak of mating activity occurring in the spring and early-summer months, or April through July. With a gestation period of just under a year, foaling then also occurs according to virtually the same annual cycle, but only hiked forward a month or so. While the peak foaling season falls in the months of March through June, foaling is also common all the way from late January through August. Now, since foals in the wild may nurse for approximately one year (domestically in the modern world they are typically weaned at the age of between four to eight months; foals begin to graze on grass and eat oats [etc.] at about a month), this means that productive mares lactate virtually throughout the year. Consequently, Stear's evidence showing a greater concentration of the deuterium isotope in equid fats collected from the five pot shards means, well, virtually nothing: it does not show that the fats derive from specifically mare's milk, since mares do not lactate only in the summer months. Any of the specimens exhibiting either higher or lower levels of deuterium could be from either meat or milk fats, and thus the detection of the higher levels does not narrow the identity of the fats in question at all. Additionally, it may just as well be horse meat as mare's milk that reflects the increased environmental deuterium: we cannot know how the metabolisms of individual horses varied in this region in the 4th millennium BC — some horses may have processed and absorbed the deuterium in their environment in a way different from what is considered in modern populations to be the norm. That is, it may be that the higher levels of the deuterium isotope found in the fats of the five of fifty shards simply reflects the presence of meat of a horse, or horses, that processed the deuterium in their water and diet differently from other horses.

Second, even if the heightened level of the deuterium isotope found on the five shards did indeed reflect mare's milk, and not horse meat, this does not mean that the mares whose milk it might have been were necessarily domesticated. Nor need they even have been tamed. They need only have been penned and immobilized, either in a chute-like pole restraint or with the use of restraining ropes secured at each of the horse's pasterns (akin to human ankles), or both. There is no reason to believe that to so restrain a horse, tame or wild, was beyond the capabilities of the inhabitants of the 4th millennium BC steppe.

A third issue is one to which I have persistently referred implicitly throughout this section on the horse. It is that we must parse carefully the words we use and what we intend them to describe or identify when writing of animals and their relationships with humans. We need to distinguish particularly the terms herd, corral or stable, tame, and domesticate. None of them connotes the same meaning, and, when applied to the horse, each denotes a distinct relationship with human beings. First, there is no question that horses were herded, corralled (or stabled), and perhaps even individually tamed on the PC steppe of the 4th millennium BC. Milking a tamed and corralled/stabled mare that had begun life in the wild is not an exceptional feat. But were these horses domesticated? That is, were they bred and raised for generations by their human captors to be kept animals accepting the commands of their human masters? Levine's population studies indicate that they were not. No convincing argument or evidence has been aired to suggest that they were.

Further, were these horses, even if domesticated, ever ridden? As this manuscript was going to press a fresh attempt to locate not just the full domestication but also the biting and riding of the horse at Botai in the middle 4th millennium BC was published: Alan K. Outram et al. have combined evidence obtained from the Botai site that both was previously published by Stear (i.e., that about equine lipid residues on a few pot shards, reviewed above) and is new.³⁷

The new evidence that Outram et al. adduce includes first a study of the relative slimnesses of varied populations of horse metapodia (we are left to wonder whether they are metacarpal or metatarsal metapodia) as measured according to ratios of essentially length to width. The selection of metapodia from the Botai horses display, like a Bronze domestic population of horse dating to c. 1300–900 BC from Kent, Tazakhstan and a sampling of modern Mongolian horses, a slight tendency toward metapodial slimness, while bones obtained from other ancient steppe sites (Kozhai, Kumkeshu, and Kuznetsk) appear to be slightly less thin. The base for comparison is the reported general tendency for the metaopodia of modern domestic

³⁷ Alan K. Outram, Natalie A. Stear, Robin Bendrey, Sandra Olsen, Alexei Kasparov, Victor Zaibert, Nick Thorpe, and Richard P. Evershed, "The Earliest Horse Harnessing and Milking," in *Science*, 6 March 2009 (323:5919): 1332–1335.

horse populations toward a slenderness even more pronounced than the Botai, Kent, and modern Mongolian samples appear to display.

The relevance and validity of this data are questionable on several points. First, we are not told how any of the bones from any of the sites were selected for inclusion in the comparative analysis. What were the criteria established and followed for selection of bone samples for study? How do we or the researchers know that any of the samples was representative? We are not told.

Second, the horse populations demonstrating apparent relative thickness of metapodia were recovered from the Tersek sites of Kozhai and Kumkeshu. A P₂S premolar recovered from a Tersek horse was among the teeth that Anthony promoted as evincing bit wear. In Anthony, then, Tersek horses represent domesticated and ridden horses, while for Outram et al. they represent a pre-domesticated herd. Which are we to follow, then, the dental or morphological evidence, which appear to be at odds, or neither?

Third, no evidence or reference to evidence of modern horse metapodial slimness is offered. What is the basis of this claim? To which among the large number of modern breeds, whose morphologies differ enormously, does the claim apply?

Fourth, even if we were to assume that the samplings were statistically valid representations of the greater populations of individuals of the various horse populations, what is the evidence of the relative morphological slenderness of horse metapodia in the Botai, Kent, modern Mongolian, and modern domestic horse really supposed to mean? Are we to assume a simple equation of horse domesticity with metapodial slenderness, and further that domesticity caused or brought about this slenderness? In turn, do we assume that it was due to the domestication of the Botai horse population in particular that the claimed horse metapodial slenderness in domestic populations came about? That is, are we to assume that the Botai horses represent the actual procreative ancestors of metapodially more slender modern domestic horse populations? What is the linkage or mechanism of reasoning by which one might both argue such a continuum and dismiss obviously obtained objections? And what would have been the causal factor in bringing about relative slenderness of the metapodia? After all, one would expect a thickening of metapodial and other weight-bearing bones with the advent of riding or packing,

given that the ridden horse had newly to support the additional perhaps 10% of its own weight in the pack or person of the rider. Such a selection of/for thicker metapodia could have occurred through human agency (selected breeding on the basis of observation through trial and error, i.e., the observation that heavier horses could better bear the newly imposed weight without injury or excessive fatigue and thus were selectively bred) or morphological evolution. Could not we then justifiably assume rather that the modern domestic metapodial slimness derived from a different wild horse population whose metapodia were in fact even slimmer than those of modern domestic horses? Or, taking an entirely different approach, are we to understand perhaps that the human herders of these ancient horses displaying metapodial slimness selected and then selectively bred such horses in part or in whole on the basis of this characteristic? Why would they have done so, when heavier metapodia would have better supported the increased burden placed on the horses' backs of a human or pack load? On the basis of the evidence offered, one could postulate any number of theories but be able to prove none of them.

The second item of new evidence that Outram et al. offer to prove the domestication and biting / riding of the horse consists of one P₂S molar extracted from a horse jaw found among the Botai remains that shows on its mesial (anterior) edge a vertical strip of damage to both the exterior cementum and exposed enamel layers of the tooth. This is presented as indubitable evidence of damage caused by biting. However, it is extremely doubtful that soft biting material could so deteriorate the very hard cementum and enamel of a horse's P₂S premolar. Close examination of the supplied photograph enlarged shows that the vertical gouge that runs down approximately the top half of the tooth's mesial edge is concave, the valley running from the top of the tooth to the bottom of the damaged area. This damage thus appears to have been caused by not a lateral friction that a bit would create but rather a habitual vertically applied or downward and gouging friction, perhaps from a corner of the poorly occluding, and perhaps broken, opposing tooth of the upper jaw. In addition, this wear is entirely distinct from the type that Anthony recently argued also was caused by soft-bit biting. Which type of wear, then, are we to believe represents soft-bit wear of the 4th millennium BC? Finally, again I suggest that any worn P₂S premolar that is promoted as evidence of biting be accompanied by its mate P₂S premolar

from the other side of the jaw that shows virtually the same or the same wear as the first: bits always wear across both P₂S molars, not only one.

Outram et al. also propose that horses at Botai were domesticated because the site was semi-settled and the remains betray little evidence of hunting. Once again, we need to distinguish between meanings of very particular words that describe specific relationships enjoyed between humans and horses. There is no question that the horses at Botai were corralled. Thus there is no reason to expect hunting apparati to be present in the remains at Botai. Trapping horses to corral them live, one would of course not employ weapons to kill the animals on the site of discovery. Rather, one would entice them closer to home in order to avail oneself of all usable products supplied by the horse and its carcass — meat, sinew, mane and tail hair, bones, later perhaps milk, etc.³⁸ Killing a large animal far from home entails carrying away on a heavily laden and arduous journey home what parts of the carcass one can and leaving the rest to be consumed by various scavengers, presenting the hunter with both a considerable burden and a significant loss of potentially valuable resources. Trapping the animal close to home enables one to employ, upon slaughter, the animal's entire carcass. Therefore, that the horse-trapping and horse-herding inhabitants of 4th millennium BC Botai did not leave behind characteristic apparati of horse hunting (field killing) is not surprising.

Finally, Outram et al. repeat and review in slightly greater detail the evidence that Stear presented in October 2008³⁹ that purports to identify equine milk from adipose (meat) lipids found on pot shards recovered from Botai. Their explanation of the thesis, according to which deuterium evidence found in equine lipids identifies milk fats, differs from the earlier outline offered by Stear, resulting in an overall lack of clarity (Outram and Stear both contributed to the study and reported findings found in both *Science* articles discussed here, so the differences are somewhat perplexing). At any rate, I repeat the objection that the climate of the Botai region

³⁸ On the ambiguity of the archaeological evidence for milking in Europe through the 4th millennium BC, which may have implications for revising downward the date of the advent of milking elsewhere, see Oliver E. Craig et al., "'Milk Jugs' and Other Myths of the Copper Age of Central Europe," *European Journal of Archaeology* 6:3 (2003): 251–265.

³⁹ *Science*, 17 October 2008 (322: 368).

should not be considered to have remained constant over the past 5500 years. Further, mares do not lactate only in summer months; they lactate virtually throughout the year. In addition, the critical claim that "no one would milk a wild mare" is not valid, since it represents an assumption only, and most likely any milked mare would have been at least somewhat accustomed to human presence and manipulation; it is conceivable that any number of such mares could have been actually tamed, and milking a tamed mare would not even have necessarily required that she was restrained.

In sum, the recent evidence offered by Outram et al. still does not in any way prove that people were managing *domesticated* horse herds in the 4th millennium BC steppe settlement of Botai or, for that matter, anywhere else. Aside from requiring of a successful argument for the domestication and particularly the riding of the horse in the 4th millennium BC all of (1) a matched pair of P₂S molars showing identical or near-identical wear of a type clearly caused by laterally abrasive hard-bit biting, (2) a series of clearly documented morphological changes showing a clear progression from securely dated and identified wild to fully domesticated populations of horses that evince expected skeletal adaptations to changing/changed habitual behavior (e.g., carrying a rider or other heavy pack loads), and (3) a metal bit that doubtlessly could cause dental wear that appears identically on a matching set of P₂S premolars, we should also expect that (4) Levine's population analysis that demonstrates that the horse populations at Dereivka and Botai were not domesticated can be explained away. Thus far, it has not.⁴⁰

Ultimately, it is likely that at Botai, Dereivka, and other 4th millennium BC sites in the PC steppe at which large numbers of horse bones have been unearthed we are witnessing the beginnings of human management (herding and corralling for slaughter) of horses, and perhaps

⁴⁰ For a use, similar to Levine's, of comparative analysis of ancient and modern faunal populations to disprove an early-domestication thesis, see Heather Pringle's review of archaeologist Melinda Zeder's work on modern and ancient goat populations, in Pringle's "Neolithic Agriculture: Reading the Signs of Ancient Animal Domestication," in *Science*, 20 November 1998 (282:5393): 1448–1451.

For a brief outline of some of the problems with the evidence adduced to demonstrate pre-3rd millennium BC horse domestication see also Colin Renfrew, "The Tarim Basin, Tocharian, and Indo-European Origins: A View from the West," in Mair (1998): 202–212.

even the beginnings of domestication itself, but the evidence adduced thus far from these bones and other artifacts extracted from the sites simply does not confirm or even indicate the true domestication of horse *populations*. As for riding, the evidence drawn from these sites is even more spotty, internally contradictory, open to interpretation, and thus utterly unconvincing. And considering the matter of equid riding from a larger geographic and demographic perspective, it makes sense that riding began only tentatively sometime during the 3rd millennium BC: as we shall see in later sections of this chapter, (1) riding of equids (and not even *Equus caballus*) becomes apparent in the material record only in the late 3rd millennium BC; (2) control of draught *and* ridden animals in the 3rd and early 2nd millennia BC was effected not by the bit but still by the nose ring; (3) the bit was developed for charioting, not riding, and surfaced only circa 1450 BC; (4) the first widespread bitted and saddled riding of *Equus caballus*, c. 1100–800 BC, occurred as a response to and was modeled after charioting and the riding of *Equus hemiones* and *Equus asinus*; (5) the new technology of large-scale bitted riding of *Equus caballus* spread rapidly across Eurasia once the Assyrians had developed it — very gradually — on the basis of charioting technologies only c. 1100–800 BC. The final point is critical: when such an obviously superior technology of rapid (and mass) transport had been realized, particularly for military applications, it spread fully and rapidly across the entire Eurasian continent. Had bitted riding been invented in the 4th millennium BC, we would have seen a similarly rapid and comprehensive spread of this vastly superior technology throughout Eurasia. That such a development did not occur in the 4th, 3rd, and 2nd millennia BC is ample testament to the fact that the essential technologies of (1) riding, including first and foremost the idea of biting (and the bit) but also (2) the cinched saddle and (3) the critical bit, in current literature, thoroughly overlooked “technology” of understanding intimately the psychology of the horse that enabled humans to train it to take a rider on its back and allow control of it by means of an effective bit through the mouth, had not yet been invented. Humans are immensely adaptive creatures, and they recognize and adopt quickly any freshly conceived or devised technology that will provide them with economic, social, political, or military advantage. If biting and riding had been developed in the steppe as early as the 4th millennium BC, it would not have taken over 2,000 years for organized humans across Eurasia to adopt this technology that very obviously was

vastly superior in many ways to old-fashioned carting or charioting. On the other hand, invention is not an automatic process; neither readily apparent is the realization for drastic technological advancement of the potential of a commonly encountered resource. That it would have taken centuries or millennia for humans to have (1) developed a mature enough understanding of domesticated horse psychology, and (2) alighted upon the idea that the horse's morphology was suited to enabling a human to ride on and control the horse from its back, such that humans would realize the possibility or potential value of actually climbing on the back of a powerful and dangerous animal and being able to transmit their will to the mind and body of the horse to have it act in a desired manner, is not at all surprising.

Returning to the *kurgan* thesis that posits chariot-borne and horseback marauders entering Europe from the PC steppe during the 5th–3rd millennia BC, in sum this thesis does not conform at all with the facts that (1) horses could and did not draw the heavy wagons or carts of the 4th–3rd millennia BC, (2) the battle use of the 2-wheeled oxen-drawn cart, i.e., the early "war wagon," occurred only in the Near East during the 3rd millennium BC and had limited effect, (3) horse-draughted chariot warfare did not even begin until approximately the 16th century BC, (4) hard evidence for equid-riding (and then involving the riding of only asses or hemiones, not true horses) appears only during the 3rd millennium BC, in the Near East, and even then demonstrates only occasional and thoroughly non-military applications of riding, (5) biting appears clearly only by c. 1450 BC, and (6) the idea and use of horse-mounted cavalry began to develop only during the 9th and 8th centuries BC.⁴¹

Therefore, the steppe-nomad cavalries and rapidly mobile armies driving war wagons and chariots of c. 4500–2200 BC have been simply imagined, largely because the evidence for horse domestication and riding and the development of wheeled transport has been misdated, misinterpreted, or stretched and thus historically misplaced. In the case of the cavalries, they probably were displaced historically from the well-documented aggression of Hunnic, Germanic, Turk, and Mongol cavalries who pressed against or well into Europe from Central Asia during

⁴¹ Littauer and Crouwel (1979): 133–5.

the 1100 years or so between c. 400 and 1500 AD. The matters of wheeled and equid transportation will be taken up further in a later segment of this chapter.

In conclusion regarding the Childe-Gimbutas thesis, we may remark that while very probably the Danubian-Pontic-Caspian region did serve as a staging ground for *a* dispersal of some IE language-stem dialects, and most probably the Indo-Iranian dialects, none of Childe's and Gimbutas's proposed periods and methods of, and reasons for, IE languages' entrance into Europe can be accurate. Most of the success of IE language displacement of earlier linguistic strata in Europe and elsewhere can be attributed to the superior economic capabilities of a slowly intruding population entering a given geographic area and the success that such a population enjoyed in diffusing these superior capabilities to local societies and thus transforming them. As a consequence, local populations adopted not only the superior wealth-producing technologies that the newcomers brought but also the languages or dialects that accompanied them. While a significant population did enter Europe during the Mesolithic and Neolithic from the southeast and brought with them IE dialects, they were already present in Europe at the time of the intrusions proposed by Childe-Gimbutas, and their methods and purposes of intrusion were not those of conquerors but rather gradual immigrants.

In his recent book attempting to locate securely the PIE homeland and IE dispersals, David Anthony argues for a PIE homeland in the PC steppe during the 5th–4th millennia BC. He has collected a significant amount of information and updated the field with a new partial summary of recent work on the subjects. However, I find it unfortunate that despite all of the excellent work that fills his book's pages, he suggests, as have so many mistakenly before him, that his solution placing PIE in the PC steppe doubtlessly between 4500 and 2500 BC is now secure, the problem solved.⁴² Frankly, there never will be such a thing as the PIE problem solved — no one can even agree on what PIE should be conceived to have been (e.g., are we including many incremental sub-stages of the evolving PIE continuum, and, if so, do we include Pre-PIE or Drews's PA/PIE? Where do we draw the lines of inclusion and exclusion, and how do we justify our decisions when our subject is a dead, vaguely understood, roughly reconstructed lexicon of a

⁴² Anthony (2007): 5, 458.

language continuum not spoken for at least 5000 years and never written?), much less where it evolved? Everything we write on the subject is so full of conjecture and stitching together of unlike evidence that the best we can do is present a plausible possibility. Like anyone else, Anthony has ignored or skimmed over a great deal of evidence that does not support his thesis, or he has argued such evidence, considerations, or theories away without having really offered them thorough, careful treatment.

Although Anthony has abandoned the most problematic elements of the Gimbutas thesis, and his careful culling and reportage of much of the most pertinent and recent evidence regarding PIE/IE studies make his book required reading for anyone interested in the topic, his placement of PIE in the PC steppe I find problematic, for it does not account for any of (1) the phonetic and morphological changes that D'iakanov identified to trace PIE to the Balkans in the 6th millennium BC, (2) the genetic evidence demonstrating human, faunal, and floral migrations from Syria/eastern Anatolia from c. 9000 BC, or (3) the real timing of the dispersals of the various IE root and branch dialects subsequent to the period of PIE development, and particularly those of the Indo-Iranian group.

Anthony's most pertinent evidence employed to place PIE in the PC steppe during the 5th–4th millennia BC relates to reconstructed PIE terms associated with wheeled transport. Anthony argues that since several IE dialects reflect a common series of PIE roots for wheeled transport terms, then the dispersal must have occurred only after wheeled vehicles were invented, or c. 3500 BC. But this ignores the fact that critical terminology, including that associated with technological advances, tends to remain conservative. That is, usually the term by which a significant new invention has been initially identified remains employed throughout the invention's adoption among people who speak languages distinct from that of the inventing group (e.g. the English *engine* became in the late-19th/early-20th centuries the Chinese *yinqin* and so it remains today). Furthermore, as we shall learn in the remainder of this chapter, although the early dispersals from PIE of archaic- or root-IE dialects occurred gradually over the approximately 3,000-year period from c. 6000 to 3000 BC, such dispersals did not involve yet long-distance (i.e., trans-Eurasian), but only fairly local, movement, such that transport-related terminology likely spread to them fairly easily and rapidly, and thus the transfer of technical

terminology among the several IE root dialects involved few phonetic or morphological changes. The far-flung dispersals of IE root dialects occurred only after the adoption of wheeled transport occurred across southwest Asia, the steppe, and Europe in the late-4th and 3rd millennia BC and beyond, when the relatively rapid transport afforded by the wheeled vehicle enabled long-distance migration over a relatively short span of time. Tocharian and Indo-Iranian in particular appear to demonstrate this pattern, as we shall see below.

Anthony has done a remarkable job of setting up anew the PIE-IE homeland problem, but overall I find his absolute dependence on the terminology for wheeled transport to argue his thesis troubling. In addition, his argumentation tends toward the anecdotal, such as when he employs the example of the spread of Bantu languages in Africa to support his version of the dispersal of IE languages from PIE, or his employment of English and the English Merriam-Webster dictionary that he considers representative of the language to argue that PIE, represented by a reconstructed PIE dictionary, must be considered to follow the same laws and thus also a similar rate of language change as English. But the circumstances — all of geographical, demographic, economic, migratory, technological, cultural, communicational, etc. — surrounding the (1) migration and drift of Bantu languages and English dialects, and (2) development and continuous evolution of either Bantu or modern English have virtually nothing in common with those in which PIE-IE evolved.⁴³ What we witness occurring within either the Bantu or English evolutionary example cannot by any means be applied anecdotally, or unreflexively, to a theoretically reconstructed dead linguistic continuum dating to the preliterate times of between five and eleven thousand years ago, when communication and travel were by comparison excruciatingly slow across great distances.

Another problem that one encounters in trying to agree with Anthony's conclusions is his tendency at critical moments to state opinion as fact but without citing supportive evidence or sources, or affording counter-arguments equal or even minimal consideration. One example regards the Indo-European Anatolian languages of Hittite, Palaic, and Luwian. Anthony remarks, "The Indo-European languages of Anatolia did not have the established population base of

⁴³ Anthony (2007): 80–1, 86.

speakers, and also lacked the kind of diversity that would be expected had they been evolving there since the Neolithic.”⁴⁴ But neither he nor anyone else knows these things. His statement is based on some middle-20th-century linguists’ very old assumptions that (1) IE languages evolved from PIE only as late as the 3rd–2nd millennia BC and thus that (2) any IE language in Anatolia would demonstrate a broad and deep frequency among the languages of inhabitants of particularly eastern Anatolia (where the first written evidence for IE languages, dating to the 2nd millennium BC, has been found) during the middle 2nd millennium BC. But the first, fundamental, assumption was based on highly idealistic, simplistic, and thus very unreliable models of a standard rate of language change (e.g. glottochronology) across history that simply cannot hold up under considerations of widely varying contextual influences such as environment, technology, and cultural idiosyncracies. Without the straight-jacket that these simplistic models imposed, we do not need to continue to assume that Anatolian IE languages could have evolved in Anatolia only from the 3rd millennium BC (or, as was commonly claimed, the *late* 3rd millennium BC). If the Anatolian PIE/IE languages had been spoken in Anatolia as early as the 9th through 7th millennia BC, which is not only possible but probable, the residual influence on 2nd millennium BC languages would have been quite different from what one expected when s/he followed a linguistic rate of change model that insisted on a 3rd millennium BC intrusion of Anatolian IE languages in Anatolia. Although in a section previous to that in which the text quoted above appears Anthony reviewed the Anatolian IE language issue, there still he did not provide realistic assessments of the limitations of the traditional assumptions on which he relied to make his statements — and the limitations are quite severe. In fact, Anthony’s position, representing a traditional opinion that favored the Gimbutas PIE dispersal thesis, in recent years has been called into serious question using very significant linguistic evidence to demonstrate PIE/early-IE languages’ early, wide, and deep-stratum dispersal in Anatolia. We have seen such evidence and arguments outlined above, regarding Anatolian PA/PIE substrates, and we will revisit them further below.

⁴⁴ Anthony (2007): 76.

Another PIE homeland presently promoted, and this by non-specialists arguing on political, not scholarly, grounds, is India, but this, despite Edwin Bryant's extraordinarily gracious book-length treatment of the issue,⁴⁵ is wholly unlikely, on the basis of linguistic, textual, archaeological, and now also archaeogenetic evidence. While in the 19th century India was promoted as a serious possibility for the PIE homeland, linguistic, archaeological, and archaeogenetic evidence brought to light since then has shown an Indian PIE *Urheimat* to be quite untenable. A lively and very useful debate was published in the *Journal of Indo-European Studies* in 2002 that exposed the deep weaknesses of and utter lack of clear, positive evidence to support the India PIE homeland thesis.⁴⁶ At about the same time Michael Witzel issued independently a devastating linguistic refutation of one of the many quite naïve Indian IE nativist arguments.⁴⁷ The Indian PIE homeland thesis presently has little to commend it since it can adduce no solid evidence in its support.

Finally, we may mention Johanna Nichols' thesis of Bactrian-Sogdian PIE origins and IE dispersals,⁴⁸ but current linguistic and archaeological, not to mention archaeogenetic, evidence, does not lend itself to a PIE/IE origin in and dispersal from this part of Eurasia. This will become apparent as we return immediately below to review mostly linguistic and archaeological

⁴⁵ Edwin Bryant, *The Quest for the Origins of Vedic Culture: The Indo-Aryan Migration Debate* (Oxford: Oxford UP, 2003).

⁴⁶ See "Indo-Aryan Migration Debate," *JIES* 30:3&4 (Fall-Winter 2002): 273–409. E. E. Kuzmina, in her "The First Migration Wave of Indo-Europeans to the South," *JIES* 29:1–2 (2001): 3–5, also refutes the Indian *Urheimat* arguments convincingly. On this issue one may also consult now Edwin Bryant and Laurie L. Patton, *The Indo-Aryan Controversy: Evidence and Inference in Indian History* (London: Routledge/Courzon, 2005).

⁴⁷ Michael Witzel, "Westward Ho! The Incredible Wanderlust of the Rgvedic Tribes, Exposed by S. Talageri" (hereafter 2001b), in *Electronic Journal of Vedic Studies (EJVS)* 7–2 (2001): 1–29.

⁴⁸ Johanna Nichols, "The Epicentre of the Indo-European Linguistic Spread," in Roger Blench and Matthew Spriggs, eds., *Archaeology and Language, Vol. I* (London: Routledge, 1997): 122–148; idem, "The Eurasian Spread Zone and the Indo-European Dispersal," in *Archaeology and Language, Vol. II* (London: Routledge, 1997).

evidence that shows clearly that PIE and the various IE root dialects had to have dispersed from somewhere further west on the Eurasian continent.

It was mentioned earlier that the three earliest-dispersing IE root phyla were the Anatolian, Tocharian, and Celtic. Anatolian, or Hittito-Luwian, is the first IE language known to have been written, in cuneiform in eastern Anatolia during and after the 16th century BC. Even earlier, on Assyrian cuneiform trade-related tablets dating to c. 1900 BC and recovered from the central-eastern Anatolian site of Kanesh (modern Kültepe, south of modern Bogazköy), several Proto-Anatolian names of people, divinities, and places were recorded.⁴⁹ The appearance of these names represents that Anatolian-IE-speaking peoples, whose descendants of c. 1600 BC and later are known to modern readers as Hittites (but who identified themselves as *nes* and their language as *nesili*), had by this time already been assimilated into the then-predominantly Hattic-speaking society of eastern-central Anatolia. This fact demonstrates further that these Anatolian-IE speakers surely had arrived in the region at least some several centuries earlier, likely by 2200 BC,⁵⁰ though such a date most likely sets the Anatolian-speakers' entrance into Anatolia far too

⁴⁹ Stefan Zimmer, "The Easy Way to Truth: 'Heaven Does Not Lie'," in *JIES* 30: 3 & 4 (Fall/Winter 2002): 407. See also Robert Drews, *The Coming of the Greeks. Indo-European Conquests in the Aegean and the Near East* (Princeton: PU Press, 1988): 61.

⁵⁰ Some scholars consider that a significant but gradual, non-invasive, migration of such folk into central-east Anatolia from either the Balkans or the Caucasus during the 4th–3rd millennia BC explains their presence. Others interpret evidence of both extensive destruction of earlier settlements and new intrusive elements of the Balkans-Troy V (northwest Anatolia) cultures, the latter including the remains of some of the first known horses of western Anatolia, that swept across western and central Anatolia c. 2300 BC to signal the arrival from the Balkans of the Proto-Anatolians. However, both approaches seem to have the Anatolian phylum splitting from the PIE community far too late, by several millennia.

On the destruction of Bronze Anatolian sites by intruders from the Balkans see James Mellaart, "The End of the Early Bronze Age in Anatolia and the Aegean," in *American Journal of Archaeology* 62 (1958): 1–31; idem, "Anatolia and the Balkans," in *Antiquity* 24 (1960): 270–8; idem, "Anatolia c. 4000–2300 B.C.," in I. E. S. Edwards, C. J. Gadd, N. G. L. Hammond, and E. Solberger, eds., *The Cambridge Ancient History, 3rd ed., Vol. 1, Part 2* (Cambridge: CU Press, 1970; hereafter *CAH*): 363–410; idem, "Anatolia c. 2300–1700 B.C.," in *CAH*: 681–703; and idem, "Anatolia and the Indo-Europeans," in *JIES* 9 (1981): 135–149. For summary reviews see both Drews

late, by up to four or more millennia. As we reviewed above, the root proto-language of Anatolian, or Hittito-Luwian, was the first known IE root language to branch off from the PIE- or Pre-PIE-speaking community, and this had to have occurred either slightly before or just when PIE had arrived in the Balkan-Carpathian region c. 6000 BC. So where did the Anatolians go during the intervening 4000 years? The answer seems to lie in linguistic analysis. While archaeologists favor the late dating of an Anatolian arrival in Anatolia c. 3500–2000 BC, many linguists have, since the 1950s, consistently argued for a much earlier entrance. Focusing on Neolithic substrate placenames terminating in *-ss* and *-nth* (*-nd*) and found in southern and western Anatolia, the southern Caucasus and Armenia, Crete, Cyprus, Greece, and Thrace, as well as Italy, the Balkans, and the Danubian Basin, linguists have argued that such suffixes and the words to which they are attached belong to the Anatolian language sub-phylum, linkable demonstrably to Luwian and Hittite. If this is the case, then it appears that Anatolian shared a close relationship with a very early wave of pre-PIE dispersals that emerged from a pre-PIE linguistic continuum that thrived in and expanded from somewhere between the Caucasus/Armenia/Syria and the Balkans, including Anatolia.⁵¹ The Anatolians, then, may have been in Anatolia all along, in the peninsula's West and South.

Among the three early-dispersing IE root languages, Tocharian's dispersal pattern is the least understood. The existence of Tocharian languages became known only when, in the early 20th century, documents written during the 7th through 9^h centuries AD in two Tocharian dialects, A & B (and perhaps a third, C), were uncovered in the Tarim Basin in Inner Asia. The Tocharian dialects have now long since ceased to be spoken. Tocharian continues to be demonstrated to have been the second root branch to have dispersed from the PIE/Archaic-IE continuum,⁵² but it also evinces, in particularly terminology associated with wheeled transport, that following its initial digression it continued to be influenced by particularly the Celtic, Italic, and Germanic

(1988): 19, 52–4, 131; and Mallory (1989): 28–30.

⁵¹ Drews (1997): 153–157. Drews draws on linguistic work dating from the 1950s through the 1990s by Emmanuel Laroche, Gamkrelidze and Ivanov, Fritz Schachermeyr, and Onofrio Carruba.

⁵² Winter (1998): 347–357.

root IE branches.⁵³ It thus must have remained in proximity to speakers of such root branches, i.e., in Eastern Europe or the South Russian steppe, for some time before having been taken to Inner Asia. The Tocharian issue will be treated more fully below.

The third IE proto-language to disperse from PIE, Celtic, spread into Europe with the practice and technologies of agriculture, beginning probably in the 6th millennium BC. Celtic speakers, or their linguistic Proto-Celtic-speaking ancestors, thereafter spread throughout much of Europe, reaching the Atlantic coast of Western Europe perhaps by c. 4000–3000 BC.⁵⁴ Not long on the heels of the Celtic speakers were the speakers of the Italic and Germanic IE root languages, who also dispersed into Europe during these same millennia, i.e., from c. 6000 to 3000 BC.

The Armenian, Phrygian, Thracian, perhaps Pelasgian, and Indo-Iranian sub-phyla and languages comprise a distinct group that share particular phonetic, lexical, and morphological developments, which group the late Russian linguist Igor D'iakanov termed the Eastern Indo-European Language Group. All are *satem* languages, as opposed to the *centum* Anatolian, Tocharian, Celtic, Italic, Greek, and Germanic groups, but they share a particularly close phonetic relationship with Greek.⁵⁵ Greek was a pivotal language that in terms of historical

⁵³ Hamp (1998): 307–346. See also Martin E. Huld, "Reinventing the Wheel: The Technology of Transport and Indo-European Expansions," in Karlen Jones-Bley, Martin E. Huld, and Angela Della Volpe, eds., *Proceedings of the Eleventh Annual UCLA Indo-European Conference, Los Angeles, June 4–5, 1999; Journal of Indo-European Studies Monograph Series No. 35* (Washington, D.C.: Institute for the Study of Man, 2000): 95–114. Huld's linguistic analysis of six IE words for "wheel" in their various stages of development suggests that Tocharian was near enough the other IE root branches during the post-dispersal period, when the development of the wheel occurred, to inherit many of the evolving IE forms that identify the ever-evolving invention. Thus there seems in the case of Tocharian — as well as Anatolian — to have occurred an early digression from PIE/Archaic IE but continued influence on it by other IE root languages as Tocharian speakers remained for some time in close proximity to the speakers of other IE root branch languages, likely on or near the southern Russian steppe.

⁵⁴ Renfrew (1987): 245.

⁵⁵ These Latin and Iranian words for "hundred," *centum* and *satem* respectively, evince a basic and prominent differentiation between the two main branches of IE languages, which is essentially that *satem* languages developed the affricated palatal guttural *s* while the *centum* languages did not but rather retained the PIE velar phoneme **k* (an asterisk represents that the word following it is not attested but rather reconstructed). In languages

linguistic development forms a bridge between the earlier *centum* and later *satem* languages. What all of this means is that from the Balkan-Carpathian PIE homeland, while, in addition to and later than Anatolian, Tocharian, and Celtic, the IE branch root languages of Italic and Germanic split early and thus retained the PIE *centum* phonetic tendency, the *centum* Greek hived off to the south late enough to share with the Eastern IE Group many of the phonetic isoglosses developed after the early *centum* languages' dispersal from PIE.

Next to split, to the north, was the Balto-Slavic group, the languages of which, while *satem*, nonetheless branched off prior to the development of the phonetic isoglosses that define the Eastern IE Group. Finally, the Eastern IE Group of languages emerged from the Balkan-Carpathian PIE homeland likely in the 4th and 3rd millennia BC to spread to areas mostly east of the Carpathian Mountains.⁵⁶ We can therefore draw roughly both a clockwise southwest-west-north-east geographical and temporal dispersal pattern of post-Celtic dispersals, beginning with the Italic and following with the Germanic, Balto-Slavic, and Greek phyla (although temporally the Greek drifted off to the south before the Balto-Slavic branched northward from the Balkans), with the Eastern IE Group being the last to disperse, mostly toward the east.

Among the Eastern IE languages, the Indo-Iranian (II) sub-phylum became the furthest-reaching, between c. 3600 and 500 BC spreading to and across much of Asia east of the Carpathian Basin, through the Pontic-Caspian and across Central and Inner Asia, both as far east as the western borders of what was to become China, and east and south as far as Persia, the Levant/Syria, and the Indian subcontinent. Following a period during the 5th and 4th millennia BC of intermingling and mutual stimulation between Eneolithic cultures of the Balkans-Carpathian and Pontic regions, likely beginning c. 3600 and continuing through the 3rd, 2nd, and 1st millennia BC Indo-Iranian-speaking people, identified archaeologically with the Yamna (Pit

such as Latin, Greek, Gothic, and Celtic, in the pronunciation of the PIE phoneme **k*, such as in the PIE word for "hundred," **kmtom* (truncated from **dktm-tom*), the PIE velar *k* is retained, and, thus, from Latin *centum* (pronounced *kentum*) this group takes its name. In the Indo-Iranian (i.e., both the Indic, or Indo-Aryan, and Iranian language groups), Balto-Slavic, Armenian, Tracian, Pelasgian, Phrygian, and Albanian languages the PIE guttural velar **k* changes to the palatal sibilant *s*, as in Iranian *satem* ("hundred"); thus this group is known as the *satem* stem.

⁵⁶ D'iakanov (1984): 10–19.

Grave, c. 3600–2000 BC, here including the later Hut Grave phase of the Yamna, c. 2800–2000 BC) cultures/peoples emerged north and eastward from the Pontic to spread across the Caspian steppe and forest-steppe, eventually splitting somewhere in the Volga-Ural and/or Central Asian (Bactria-Margiana) regions into the (1) Indo-Aryans (IA), who entered all of current Afghanistan, Pakistan, and India c. 1800–1000 BC and Syria/the Levant c. 1600–1500 BC; (2) Iranians, who spread across Central and Inner Asia, and likely eastern Persia, during the late-3rd and 2nd millennia BC and who are known to have begun settling in western Persia toward the end of the 2nd millennium BC; and (3) Nuristani speakers, who eventually settled in the Hindu Kush north of the Punjab.⁵⁷ The successor to the Yamna in the Pontic-Caspian steppe, the Srubna (Timber Grave, c. 2000–800 BC) culture, seems to represent the developing Western Iranian-speaking people, while the Yamna-descended Andronovo cultural complex (Phases I, II, and III, c. 2500–900 BC) has been identified archaeologically with the eastern-moving Eastern Iranian-speaking peoples who spread during the 2nd millennium BC across the Urals and through Inner Asia as far as the Yenisei River.⁵⁸

The Andronovo Eastern Iranian-speaking people could not have been the first Westerners to reach Inner Asia, having been preceded by a Caucasoid people who have been identified gingerly as the original Tocharian speakers who had hived off from a pre-PIE, PIE, or Archaic IE continuum some centuries or millennia before. These people seem to appear in the archaeological record as the so-called Tarim mummies, whose burials in four groups in the Tarim and Turpan basins date to as early as 1800 BC, who have been identified

⁵⁷ On the distribution of the Indo-Iranian-descended Indo-Aryan and Nuristani languages, see Asko Parpola, *Deciphering the Indus Script* (Cambridge: Cambridge UP, 1994): 134–135.

⁵⁸ For a detailed but concise review of the critical literature and archaeological data pertinent to this identification, and the connections of the evolving Indo-Iranian steppe cultures with the Bronze cultures (particularly the Corded Ware culture) of Europe, see E. E. Kuzmina (2001): 1–40. But for all Iranian origins and developments see now also Kuzmina's massive and virtually exhaustive study of Indo-Iranian related matters, *The Origin of the Indo-Iranians* (Leiden and Boston: E. J. Brill, 2007), *passim*. Kuzmina now identifies the Andronovo with specifically the Srubna material culture (p. 291–294).

anthropologically and genetically as Caucasoid,⁵⁹ and who are often assumed to have been the ancestors of the Tocharian-speaking and -writing Tarim inhabitants of the 1st millennium AD. We recall that Tocharian, like Celtic, is a *centum* language that split early from either a pre-PIE, PIE, or Archaic IE continuum, and it therefore ought to have diverged initially from such a continuum no later than the 4th millennium BC, and most likely much earlier (c. 6th millennium BC).

Rough identification of the woolen weaves found in the apparel of the Tarim mummies unearthed at particularly Qumul (Hami) and those of the Celts found at Halstatt and Hallein, Germany, has been understood to strengthen the hypothesized link between the Celt-period Tocharian proto-language speakers and the Tarim mummies.⁶⁰ That is, the mummies have been identified tentatively with the Tocharian speakers who somewhat earlier than the Celts split from a pre-PIE, PIE, or Archaic IE continuum somewhere between eastern Anatolia/Syria and the Balkans or from the Balkans region itself. It is thought by many that the ancient Tocharians derived from the Anafasievo farming culture, whose settlements in the regions north of the Tarim basin date to c. 3500–2000 BC.⁶¹

A significant obstacle to accepting this identification is the fact that woolen textiles are not known anywhere in the world prior to the early to middle 3rd millennium BC, and then at Shahr-I Sokhta in eastern Iran,⁶² which means that the mummies, if Anafasievo Tocharians,

⁵⁹ On the mitochondrial DNA evidence seeming to confirm the Caucasoid heritage of the mummies, see Paolo Francalacci, "DNA Analysis on Ancient Desiccated Corpses from Xinjiang (China): Further Results," in Mair (1998): 537–547. On the anthropological evidence, see Kangxin Han, "The Physical Anthropology of the Ancient Populations of the Tarim Basin and Surrounding Areas," in Mair (1998): 558–570.

⁶⁰ Elizabeth J. W. Barber, "Bronze Age Cloth and Clothing of the Tarim Basin: The Krorän (Loulan) and Qumul (Hami) Evidence," in Mair (1998): 647–655.

⁶¹ J. P. Mallory and Victor H. Mair, *The Tarim Mummies. Ancient China and the Mystery of the Earliest Peoples from the West* (London: Thames & Hudson, 2000): 298–318. On the Anafasievo see also Vitali V. Volkov, "Early Nomads of Mongolia," in Jeannine Davis-Kimball et al., eds., *Nomads of the Eurasian Steppes in the Early Iron Age* (Berkeley: Zinat Press, 1995): 320–1, 325.

⁶² Irene Good, "Bronze Age Cloth and Clothing of the Tarim Basin: The Chärchän Evidence," in Mair

would have to have imported with them their woolen textiles to Siberia (and later, by about 2000 BC, to the Tarim Basin) even before woolen textiles' known origins in Shahr-i Sokhta, Iran. Or it could mean that following their arrival or development during the 4th–3rd millennia BC in northern Inner Asia the Anafasievo mummy people acquired through trade or simple diffusion the woolen weaving technology from others, which anyway still would remove for consideration this evidence for their linkage with the Celts and thus also their Tocharian-speaking identity.

Consequently, unless evidence to be uncovered in the future pushes back the *terminus ad quem* for the development of woolen weaves to no later than c. 4000 BC, we cannot on the basis of their woolen weaves fairly assign either the Anafasievo or Tocharian identity to the Tarim/Turpan mummies. It is then perhaps safest to suggest that these mummies, dating to 1800 BC and later, were not necessarily either culturally Anafasievo or linguistically Tocharian but just as possibly early-diffusing Indo-Iranian- or Iranian-speaking Yamna who entered the region from the north and/or west c. 2000 BC. Thus the archaeological and anthropological sources of the Tocharian languages (A & B, and perhaps C)⁶³ in the Tarim Basin of the 1st millennium AD must for now remain uncertain.

After the mention early in the 2nd millennium BC in Assyrian tablets of Proto-Anatolian names, the next datable written evidence for IE languages and IE-speaking peoples occurs in Hittite texts uncovered in Anatolia dating to the early 16th century BC, wherein references are made to several Indo-Aryan-named kings of Hurrian cities.⁶⁴ It is clear from these and other documents⁶⁵ that between the 16th and 14th centuries BC Hurrian and Indo-Aryan elites ruled

(1998): 658. On the earliest known textiles, those of the Iranian plateau dating to the 3rd millennium BC, see now also Irene Good, "Textiles as a Medium of Exchange in Third Millennium B.C.E. Western Asia," in Victor H. Mair, ed., *Contact and Exchange in the Ancient World* (Honolulu: University of Hawaii Press, 2006): 191–214, esp. 199–209.

⁶³ On the possible third Tocharian language, C, or Krōranian, see Mallory and Mair (2000): 278–279, 300.

⁶⁴ See, for example, Drews (1988): 60.

⁶⁵ These are, specifically, the Egyptian Amarna texts written in Nuzi and newly discovered texts and seals from Tell-Brak (ancient Nagar, a Hurrian capital). On these see E. E. Kuzmina, "The First Migration Wave of Indo-

many kingdoms throughout northern Mesopotamia, Syria, and Palestine. One such kingdom surfaces again in several Hittite-Hurrian tablets recovered in 1907 in Kanesh/Kültepe and others unearthed at Boghazköy. These tablets, which date to the 15th–14th centuries BC, demonstrate that the largely non-IE Hurrian-speaking Mitanni kingdom, dominant in the northern reaches of Mesopotamia and Syria between about 1550 and 1300, was ruled by an Indo-Aryan elite class skilled in the raising and training of horses and use of war chariots, the Mitanni. Most famous among the 14th-century Mitanni documents is a treatise in which the Mitanni king's horse trainer Kikkuli essays on chariot-horse conditioning and training. While dictated in Hurrian and written in Hittite and Akkadian, the language of the treatise relies on Indo-Aryan technical terms and numerals for matters pertaining to horses and charioteering.⁶⁶

These Indo-Aryans had been in the Syria-Palestine-Mesopotamia region from no later than between about 1600–1550 BC.⁶⁷ Because it is estimated that 90% or more of the populations of Central-Eastern Anatolia, the Caucasus, Syria, and the Levant spoke non-IE languages at this time, most linguists logically insist that the Indo-Aryan languages of the Near East were a superstrate imposed by a migrating or invading Indo-Aryan warrior elite arriving from northwest Anatolia, the Caucasus, or Persia. Others either remain open to or argue for these languages' having been substrates in the region, that is, that they originated in northern Mesopotamia-Syria-Palestine-Anatolia and migrated eastward through Persia to develop in the late-3rd and early-2nd millennia BC the Bactria-Margiana Archaeological Complex (BMAC) of c. 2000–1500 BC (Phase I c. 2000–1700 BC; Phase II c. 1700–1500 BC).⁶⁸ This much is a rather

Iranians to the South," in *JIES* 29.1&2 (Spring/Summer 2001): 14–15. On other documents identifying Near Eastern Indo-Aryans, see Drews (1988): 59, 90–91, 144–145; and Bryant (2001): 135–138.

⁶⁶ Drews (1988): 58–63; Mallory (1989): 37–8.

⁶⁷ Drews (1988): 60–1; Mallory (1989): 38.

⁶⁸ V. Sarianidi has argued that all Indo-Aryans (and all IE-speaking people), including both those found historically in today's Pakistan-India and the Near Eastern Aryans currently under discussion, expanded during the 3rd and 2nd millennia BC from northern Mesopotamia-Syria through Persia, settling in Bactriana-Margiana to first develop the BMAC before moving further east and south into Afghanistan, Pakistan, and India. Sarianidi traces mostly architectural similarities across Mesopotamia-Syria, Southwest Persia (Elam), and Bactria-Margiana to argue

radical departure from the majority view, which is that the Indo-Iranian dialect continuum evolved during probably the 4th–3rd millennia BC while Indo-Iranian speakers moved east and north across the Pontic-Caspian and Volga-Ural regions and, when some Andronovo Eastern Iranian-speakers moved into Central Asia around 2000–1800 BC, they settled in Bactria-Margiana to merge with the already locally developing BMAC.⁶⁹ This interaction between the groups seems to have stimulated the changes in the Indo-Iranian culture and language that would produce apparently several phases of developing Proto-Indo-Aryan culture and language c. 1800–1500 BC. It appears that at this time from Bactria-Margiana the speakers of the evolving Indo-Aryan language(s) migrated both (1) further east and south in several waves into Afghanistan-Pakistan-India, where they became known in history as the Vedic Aryans, and (2) west-southwest across the southern Caspian, through the Zagros region, and on to the Near East, where they are most well known as having become the ruling elite of the Mitanni kingdom.⁷⁰

The contrary, Indo-Aryan west-to-east Persian migration, thesis is very questionable since it cannot account for largely Indo-Iranian, but also differentiated Indo-Aryan and Iranian (as well as early Western Indo-European), influences on Finno-Ugric languages that had to have occurred far to the north of the Caucasus (and thus also far to the north of the Near East that lay even further south) in what is now central and western Russia.⁷¹ Furthermore, it would be odd

this thesis. See V. Sarianidi, "Near Eastern Aryans in Central Asia," in *JIES* 27.3–4 (Fall/Winter 1999): 295–326. At this writing, in early 2009, it appears that a deeper chronology has come to be accepted for the BMAC, c. 2300–1500 BC. See Kuzmina (2007): 463.

⁶⁹ For a fair review of the various interpretations of the BMAC, see Bryant (2001): 212–217; see also Mallory and Mair (2000): 262–269, 304–318; and Parpola (1994): 145–155.

⁷⁰ For context see Bryant (2001): 212–220; Parpola (1994): 145–155; Mallory (1989): 39–42.

⁷¹ On loans from II, IA, and Iranian into Finno-Ugric, see Christian Carpelan, Asko Parpola, and Petteri Koskikallio, eds., *Early Contacts between Uralic and Indo-European: Linguistic and Archaeological Considerations; Papers presented at an International Symposium Held at the Tvärminne Research Station of the University of Helsinki, 8–10 January, 1999* (Helsinki : Suomalais-Ugrilainen Seura, 2001). See also Parpola, (1994): 145; and idem (1998): 115. For further on both early Northwestern IE influence on specifically Finnic and Lapp, as well as the extensive Proto-Indo-Iranian, Early Indo-Iranian, and Later Indo-Iranian linguistic influences on the Finno-Ugric phylum of languages, see Jorma Koivulehto, "Finno-Ugric Reflexes of North-West Indo-European and Early Stages of Indo-Iranian," in Jones-Bley (2000): 21–43.

indeed if, in an already mature literate period of the center of evolving civilization in the Near East, entire tribes or societies of already politically well established and regionally well known Indo-Aryans were able to traverse Syria, Mesopotamia, and Persia without anyone's having commented on or otherwise noted them. The proposed east-to-west migration theory accepted by most scholars involves far fewer migrants and would have occurred prior to anyone's having paid particular notice of them since they had not yet established themselves in the Near East as a powerful political-military elite.

In addition, the fully urbanized quality of the Near Eastern Indo-Aryans does not resemble the pre-urbanized or mildly urbanized state of culture, as depicted in this culture's earliest recorded literature in the *Rg Veda* (RV), of the semi-pastoralist Indo-Aryans who intruded into the Indian subcontinent. Urbanization of the Near Eastern Indo-Aryans would have occurred after their departure from Central Asia, either during interactions with Iranian urban centers and/or in the Near East itself.

Another factor arguing against the contrary west-to-east view is that the BMAC I and II phases originated some centuries earlier than the Indo-Aryans of the Near East appeared. If the BMAC represents the core of the developing Indo-Aryan civilization, as the contrary view would have it, then it would have been impossible for the later Near Eastern Indo-Aryans to be the ancestors of the BMAC people.

It thus is far more likely that the Indo-Aryan-speaking people originated late in the 3rd or early in the 2nd millennium BC as a distinct linguistic and cultural group either (1) in the Pontic-Caspian, whereafter, while some traveled south through the Caucasus to reach the Near East, the larger contingent moved further east through the Caspian steppe and then south to intermingle with the BMAC civilization, or (2) in Central Asia (Bactria-Margiana) after the onset of the BMAC civilization and developing with the BMAC a new hybrid culture that thereafter at various times during the first half of the 2nd millennium BC hived off groups of Indo-Aryans to both enter the Indian subcontinent to the southeast and traverse Persia east-to-west to alight in northern Mesopotamia, Syria, and Palestine.

Some archaeological evidence has been identified to support the latter scenario. First, Roman Ghirshman lent it apparent support via his association of Gurgan (Shah Tepe, in the

southeast Caspian) grey ware with both of the subsequent grey wares of the Lake Urmia region and the black Habur ware of the Mitannis, spanning the period c. 1800–1500 BC, suggesting that each of the latter derived from its more eastern predecessor, east to west, as the Indo-Aryans moved westward from Central Asia to the Near East.⁷² However, Ghirshman's proposal is by no means certain. Aside from the inherent weakness in any attempt to determine, on the basis of either cross-cultural comparisons or internal breaks of material remains, associations among diverse (even if similar) traditions or the movements of a specific people, another problem with this projection is that the c. 1800 BC *ad quem* date for the Gurgan is probably too early to represent an IA group having diverged from the BMAC, as we shall see below. At this date it seems more reasonable to suspect Indo-Iranian presence here.

Another artifact uncovered among the Gurgan remains has been promoted as a sure sign of the presence of IA speakers in the Southwest Caspian region. This is a cylinder seal found at the Gurgan site of Tepe Hissar IIIb and dated to c. 2000 BC. It depicts what is among the earliest known visual reproductions of an equid-drawn chariot, suggesting that the IA speakers, who, as we have seen, became known not long thereafter in the Near East as foremost experts of the period in horse and chariot use, migrated through the region.⁷³ Again, however, the date of the cylinder seal is probably too early to accommodate the presence of IA speakers at Tepe Hissar IIIb, and again it is more likely the Indo-Iranians who can account for the presence of equid-and-chariot culture here at this early date, particularly considering that the equid-and-chariot culture seems to have matured at about this time among Indo-Iranian tribes in relative proximity to the Gurgan, in the southern Urals among the Sintashta cultural horizon of c. 2000–1600 BC.⁷⁴

And, yet, that the Gurgan material remains should be Indo-Iranian rather than IA does not weaken but rather strengthens the argument for a Central Asian origin of the IA speakers. It seems that the speakers of Indo-Iranian (or, by this time, in the early centuries of the 2nd

⁷² Roman Ghirshman, *L'Iran et la Migration des Indo-Aryens et des Iraniens* (Leiden: E. J. Brill, 1977).

⁷³ For a survey of some of the archaeological finds and their interpretation in the debates over IE, II, and IA origins, see Bryant (2001): 208–212; see also Parpola (1994): 148.

⁷⁴ See Kuzmina (2001): 12–17.

millennium BC, Iranian) merely preceded the IA speakers across the southern Caspian. Elena Kuzmina has collected a wide array of archaeological finds that demonstrates that a distinct connection between Uralic Indo-Iranian tribes and settlements and Central Asian and Iranian cultures, including the BMAC, existed in the early to middle 2nd millennium BC. Her data demonstrate convincingly for the present that both (1) the movements south by Uralic Andronovo Indo-Iranians into Central Asia served as the source of the development of the Central Asian homeland culture of the Indo-Aryans, and (2) Uralic Andronovan and BMAC culture, as seen in pottery, bronzes, beads, daggers, equid-depicting items, etc., spread southwestward and westward into Iran during the period after 1800 BC.⁷⁵ Therefore, it seems more likely that the Uralic Andronovo Indo-Iranians, represented archaeologically by the southern Ural Sintashta cultural horizon, can account for the new Central Asian influences that bore on the development of both the BMAC and the Gurgan cultures.

Textual evidence also supports strongly the Central Asian origins of the Indo-Aryans. First, Indo-Aryan lexicographical forms found in the Mitanni documents of c. 1400 BC slightly predate parallel forms found in the earliest textual strata of the earliest Vedic Indo-Aryan composition, the RV, whose earliest strata are estimated to date at their earliest to c. 1800–1200 BC.⁷⁶ Considering that dialects that migrate out from a homeland tend toward conservatism while the remaining homeland core dialectic continuum tends to innovate, then the Near Eastern Indo-Aryans, conserving earlier lexicographical forms, seemingly had dispersed from the Indo-Aryan linguistic continuum prior to the composition of the early strata of the RV somewhere near where the bulk of the Indo-Aryan-speaking population, that is, the Vedic Indo-Aryans, were located close to the time of the composition of the early strata of the RV. Lexical evidence in these early strata indicates that when these strata were composed the Rg Vedic Indo-Aryans had

⁷⁵ *Ibid.*: 20–29.

⁷⁶ On differences between the Mittani and Vedic Indo-Aryan lexicon see Michael Witzel, "Autochthonous Aryans? The Evidence from Old Indian and Iranian Texts" (hereafter 2001a), in *Electronic Journal of Vedic Studies (EJVS)* 7–3 (2001): 14. On the identification of the earliest strata of the *Rg Veda* (RV) see *ibid.*: 5–6, and idem, "Early Sanskritization: Origins and Development of the Kuru State," in *EJVS* 1–4 (1995): 1–9. On the dating of the Vedic periods, see text and notes further below.

not yet moved into the Gangetic Plain of central-north India but remained at this point first in Bactria-Margiana and, later, in the colder mountainous climes of Afghanistan and the Swat valley in modern Pakistan.⁷⁷ This lexicographical evidence thus suggests that the separation of the two groups of Indo-Aryans had to have occurred not long before the Mitanni and early Rg Vedic documents were written and composed, respectively.⁷⁸ This in turn disqualifies the possibility that the Near Eastern Indo-Aryans arrived there via a north-south trajectory from Georgia and the Pontic-Caspian. Consequently, the east-to-west Persian migration to the Near East of perhaps a series of early Rg Vedic or late pre-Rg Vedic Indo-Aryans appears to best explain the Indo-Aryans' virtually contemporaneous occupation of two geographically discrete regions of South and Southwest Asia.

Further textual evidence, this of a religious provenance, bolsters the argument for the Central Asian origins of the Indo-Aryans. In 1380 (or 1332)⁷⁹ BC the Hittite king Suppilluliuma and the Hurrian king Shattivaza sealed a treaty between them by swearing an oath, the text of which has survived. The oath invokes both Hittite and Indo-Aryan gods and ends with a listing of the names of the Indo-Aryan gods Indra, Mitra, Varuna, and the Nasyatas. That in this oath both of the high gods Indra and Varuna are invoked, in IA lexicographical form, demonstrates that the Near Eastern Mitanni rulers descended linguistically not from a pre-differentiated Indo-Iranian-speaking community but one already differentiated as Indo-Aryan-speaking, and, in fact, Rg Vedic Indo-Aryan-speaking (RV IA).

⁷⁷ Witzel (1995): 14; and idem (2001a): 5–9.

⁷⁸ Though the oral composition of the RV's oldest strata dates to c. 1800–1200 BC, the RV was *written* much later, during the 1st millennium BC, perhaps around 700–600 BC. The earliest primary written documents from the Vedic and later Indian civilizations date to only about 300 BC, from the time of Ashoka, and represent the Prakrit dialects, not the classical Sanskrit language. That is, there is no Sanskrit primary document dating to prior than the earliest Prakrit documents. All Sanskrit documents extant today, while representing an evolved form of the Old Indo-Aryan (or Old Vedic Aryan) language of c. 1800–500 BC, derive from much later redactions of the various components of the corpus of the originally orally transmitted Vedas.

⁷⁹ The former year is that identified by Parpola (1994: 150), while E. E. Kuzmina cites the latter year (2001: 14).

Why? In the earlier Indo-Iranian (before c. 1900 BC?) and later reformed Zoroastrian Iranian (from c. 1500–1400 BC?) religions, while gods belonging to the Asura group were exalted, those comprising the Deva group were relegated to demon status. Indra was the highest god, of war, among the Devas. Varuna was the highest god among the Asuras. Thus in Iranian religion while Indra and all other Devas were treated as nefarious demons, Varuna and the other Asuras were worshiped.

From the earliest strata of the RV it is known that the Indo-Aryans reversed the positions of the two groups of divinities, worshiping the Devas in an attempt to subdue the evil Asura protector spirits of their enemy, the apparently Indo-Iranian-speaking Dāsa. As the two groups intermingled through war and later mutual absorption, however, the RV IA speakers accepted the Asura Varuna (often paired with Mitra [RV IA Varuna-Mitra=Avestan Ahura-Mazda]; thus the 14th-century oath names both Varuna and Mitra) as their high god to stand alongside the Deva Indra. Likewise some Dāsa chiefs absorbed the worship of Indra into their Asura pantheon. It is precisely this reformed and combined religion of the RV IA speakers and the Dāsa that is reflected in the 14th-century Mitanni oath. Consequently we know that the Mitanni had to have derived from the RV IA speakers following their absorption of Dāsa tribes and parts of their religion.⁸⁰

⁸⁰ Most scholars follow Paul Thieme's determination of nearly fifty years ago that the Indo-Iranian languages of the 2nd-millennium BC Near East belonged to the already differentiated Indo-Aryan sub-phylum (Paul Thieme, "The 'Aryan' Gods of the Mitanni Treaties," in *Journal of the American Oriental Society* 80 [1960]: 301–317), and considering the specifically Indo-Aryan names of the gods invoked in the 14th-century Mitanni-Hittite treaty, Thieme's thesis has convinced most. Others, beginning with Annelies Kammenhuber (*Hippologia Hethitica* [Wiesbaden: Harrassowitz, 1961], and *Die Arier im vorderen Orient* (Heidelberg: Carl Winter Universitätsverlag, 1968)), whose work has found influence with some (D'iakanov [1984]: 71; and Drews [1988]: 60–2), have challenged Thieme's thesis, on the basis of words employed in the Kikkuli treatise (particularly over the form for "one," *aika*, employed therein, as compared against Avestan Iranian *aeva* and Sanskrit *eka*), declaring the languages in question to have belonged to the predifferentiated Indo-Iranian phylum. This seems rather slim — and, anyway, inconclusive — evidence on which to attempt to controvert the very firm lexicographical and religious evidence for an IA identification of the Mitanni rulers. For brief reviews of these matters see both Drews (1988): 61–2; and Bryant (2001): 137–8.

The Dāsa, as well as other early enemies of the RV IA people such as the Dasyu, Parna, and Śambaya, have been identified by Asko Parpola as early, or proto-, IA-speaking peoples, while Michael Witzel considers them to have been Northern Iranian tribes. In that the religion of the Dāsa reflects the earlier Indo-Iranian exaltation of Asura divinities rather than the RV IA elevation of the Devas, then Witzel's Northern Iranian identification seems more appropriate.⁸¹

More importantly, the text of the early strata of the RV makes it clear that the geographic context of the earliest battles with the Dāsa and others was Bactria-Margiana, precisely in the region of the BMAC civilization. Furthermore, Parpola has correlated (1) early textual references to the Dāsa that place them historically in Bactria-Margiana, with (2) Rg Vedic descriptions of Dāsa forts as having been surrounded by three concentric circular walls, a design that virtually matches the layout of uncovered BMAC and later Iranian forts. Consequently, the correlation of (1) the RV IA speakers battling Dāsa and other related tribes in Bactria-Margiana in the earliest Rig Vedic period (c. 1800–1500 BC), (2) the Dāsa themselves having been located in this region at this time both textually and archaeologically, (3) the archaeological evidence identifying both the BMAC and Andronovo Indo-Iranian presence in Bactria-Margiana in these same centuries, and (4) the evidence in both the RV and the 14th c. Mitanni oath that demonstrates that in each case the conflation of the RV IA speakers' and Dāsa's religions had already occurred, evinces that the IA development from the Indo-Iranian predecessor occurred in the region of Bactria-Margiana between c. 1800 and 1600 BC. Probably either soon before or after 1600 BC both groups of IA speakers departed the area, one moving west across Iran to Syria and the other making southeast toward India.

One thesis regarding the movements of IA-speaking people into the Indian subcontinent purports that the first group of IA speakers derived specifically from the BMAC I phase (2000–1700 BC) of the BMAC and, having traversed Baluchistan, in the Sind region mingled with cultures of the Late Harappan civilization (more below on the Harappan) to develop the Jhukar culture (c. 1900–1800 BC). Several hundred years later, by about 1500 BC, these folk drifted

⁸¹ On the issues pertaining to the Indo-Iranian, RV IA, and Dāsa religions see Parpola (1994): 149–152; and Witzel, "Substrate Languages in Old Indo-Aryan (Rgvedic, Middle and Late Vedic)," *EJVS* 5–1 (1999): 3; as well as idem (2001a): 13–14, 54.

into the Punjab and later still the Gangetic Plain. It has been suggested that this group's IA sub-dialect might have evolved into the Middle Vedic IA dialect of Māgadha and the speakers of this dialect became the Gangetic Dāsa whom the RV IA speakers continued to battle throughout their push through northern India.⁸² However, this tentative identification of the Dāsa with a specific dialectic continuum within the IA sub-phylum across a thousand and some miles of disjointed migration, settlement, secondary migration and secondary settlement, is very tenuous. The continued presence of Dāsa people in the various temporal and thus also geographically situated strata of the RV might reflect that the Dāsa as battled later in India were only local tribes and that the RV IA speakers simply transferred the identity of the momentarily encountered *dasa*, i.e., "foreigner" and, by extension, "slave," to them on the basis of their being, like the original Northern Iranian Dāsa before them, foreign enemies of the RV IA speakers.⁸³

A second group of IA speakers are thought to have derived from the later BMAC II civilization (c. 1700–1500 BC) and intruded into the Swat Valley, where their archaeological remains are known as the Gandhara Grave, or Ghalegay, culture (Ghalegay IV, 1800–1500 BC; Ghalegay V, 1400–800 BC). These IA-speaking people were responsible for composing orally some of the earliest hymns of the RV. They continued migrating southeastward during the 2nd and early 1st millennia BC, following on the heels of the Indian Dāsa described in the RV, i.e., the people whom Parpola identifies to have been the Middle-Vedic Māgadha-speakers. This second wave of IA speakers continued to move through the eastern Punjab of India and then into and across the Gangetic Plain, at all times battling and absorbing so-called Dāsa and other tribes. Culturally this period represents the RV IA speakers in their Middle and Later Vedic periods, archaeologically corresponding to the mixed cultures (numerous RV IA, other IA, and local tribes/cultures) represented by the Painted Grey Ware (c. 1100–350 BC) and Northern Black

⁸² Parpola (1994): 154–155.

⁸³ This follows Witzel's etymology of the term *dasa*, according to which the term essentially indicated territory conquered from a foreign, and thus enemy, people, which people often became slaves on their having been conquered (2001a: 13). For a different understanding of the etymology of *dasa*, see Parpola (1994): 150.

Pottery (c. 700–100 BC) cultures of the Madhyadeśa, or middle northern plains, and eastern Gangetic regions of modern India.⁸⁴

Michael Witzel also sees the IA speakers entering the Indian subcontinent in multiple waves, but employing very convincing linguistic evidence and analysis of substrate languages in the evolving IA dialects he rather locates the two waves entering Pakistan/India one directly following the other, from Bactria-Afghanistan-Swat, but without detouring south to the Sindh. Drawing from the RV itself he identifies these to have been the Bharata and Kuru tribes, the former representing the Early and Middle Vedic-speaking people and the latter the Late Vedic.⁸⁵

The IA-speaking intruders mostly assimilated the descendents of a great prior civilization of India, the Indus-Harappan, most noted for its highly sophisticated urban development in the Indus River valley and proximate areas from between about 2600 and 1900 BC. In fact this civilization had originated in the first settlements along the ancient course of the Indus (generally west of today's Indus) dating to between 7000 and 5000 BC. From about 4300 BC and on, it is clear, the developing farming and trading communities had established consistent trade contacts with communities as far north as Kashmir, west as far as Afghanistan and southern Iran, and southeast as far as the Kutch, Saurashtra, and North Gujarat regions of modern India. By 3200 BC the interconnected communities were poised to mature into a fully urban civilization with its center at the new city of Mohenjo-daro in the middle south of the Indus valley. Trade between the Indus civilization and the cultures of Iran and civilizations of Mesopotamia and Egypt is known to have flourished during the 3rd millennium BC, when also what many believe to be a logosyllabic (non-alphabetic, non-ideogrammatic) writing system appeared, suddenly, in the archaeological strata of c. 2600–2500 to c. 1900 BC. The urban sites of the Indus civilization were abandoned by or soon after 1900 BC, and its much-declined continuance, involving a series of Late Harrappan cultures, dates to c. 1900–1300 BC.⁸⁶

⁸⁴ Parpola (1994): 148–155. It is not necessarily so that RV IA *people* migrated as far east as Bihar, but only the RV culture. See Witzel (2001a): 5.

⁸⁵ Witzel (1999): 33.

⁸⁶ For a recent survey of the archaeological recoveries and reconstructed chronology of the development of

While for several decades following the initiation in 1924 of the first large-scale excavations of the ruins of the cities of the Harappan-Indus civilization many scholars postulated that it was invading chariot-borne hordes of Indo-Aryans who destroyed them, from both Rg Vedic textual and other archaeological evidence the invasion theory has been soundly refuted, even though the gradual and often locally violent migration of the Indo-Aryans into the Indus region and beyond has not. As we have seen, early-intruding RV IA-speaking intruders fought often with Dāsas, but while they attacked the forts of the Dāsas and came upon ruins, there is no indication that they ever encountered living large cities such as those inhabited by the people of the Indus civilization.⁸⁷ Furthermore, the horse-drawn chariot had not yet been developed at the time of the Harappan collapse, so the chariot-driving RV IA intruders of later centuries could not have encountered the thriving Harappan civilization and destroyed it. Therefore, the RV IA speakers must have entered the Indus and India quite some time after c. 1900 BC, which accords with all other textual and archaeological evidence adduced thus far.

Current and more plausible theories attempting to explain the demise of the Harappan civilization include hydraulic and climatic changes, epidemic disease, as well as a general depletion of soil nutrients and thus the decline of agriculture. Gregory Possehl has suggested that while certain hydraulic shifts indeed occurred in the Indus watershed around 2000 BC, the core problem for the Indus civilization and the real reason for its decline was the failure of its overly harmonious, integrated socio-religious ideological system.⁸⁸ Considering that the inhabitants of the civilization's cities and towns of the cosmopolitan Indus-Harappan civilization certainly spoke a vast variety of languages and lived according to many dissimilar subcultures, it is conceivable that the failure of an umbellate Indus-Harappan ideological system that had perhaps cohered all groups speaking such diverse languages and sustaining such various subcultures

the Harappan-Indus civilization, see Gregory L. Possehl, *The Indus Civilization, A Contemporary Perspective* (Walnut Creek, Lanham, New York, Oxford: Altamira Press [Rowman & Littlefield], 2002: 23–88.

⁸⁷ Witzel (1995): 3; idem (2001a): 5.

⁸⁸ For a review of many such postulations see Possehl (2002): 237–245.

could have caused a rapid dismemberment of the greater civilization. However, this thesis remains purely hypothetical.

It is unclear what the core language the people, i.e., the ruling class(es), of the Indus-Harappan civilization spoke, nor is even the language phylum clearly understood. The extent of our understanding of the language is limited by the severely restricted context in which the written script is found — on approximately 4000–5000 objects dating to c. 2500–1900 BC, which objects are mostly square or rectangular small seals or seal moulds and on which overall are reproduced at most some 400 identifiable symbols in usually very brief, utterly cryptic series of signs. Most inscriptions include between only one and ten signs and average just 4.6. Only one inscription reaches seven lines, and the lengthiest inscription has just twenty-six signs recorded on several separate seals. The longest contiguous series on any one object is just seventeen signs long.⁸⁹ It is no wonder, then, that although more than 100 decipherments have been attempted since the 1870s, when seals bearing the script first were discovered, none has cracked this script or even come close to doing so. Most decipherment attempts have established a target language of either Sumerian, IE (Old Vedic-Aryan, Sanskrit, Prakrits, Hittite), Elamite, or Dravidian, along with some truly bizarre targets such as the native languages represented by the scripts of Easter Island and Central America. Since the 1950s Dravidian and IA/Sanskrit have been the favorites.⁹⁰

Taking into account the many failed attempts at decipherment over more than 130 years, the lack of any Indus texts longer than 17 or 26 characters, and the set of 400 or so symbols' utter opacity to anyone's establishing any consistent system of phonetic, morphological, or syntactic structure, Steve Farmer et al. have argued forcefully that the Indus-Harappan script is no script at all but rather a set of symbols depicting gods on whom the populace relied for good

⁸⁹ For a brief outline of the sign system's characteristics and the context in which the signs are depicted, see Possehl (2002): 127–135, as well as Steve Farmer, Richard Sproat, and Michael Witzel, "The Collapse of the Indus-Script Thesis: The Myth of a Literate Harappan Civilization," in *EJVS* 11–2 (2004): 22.

⁹⁰ See Gregory Possehl's very helpful (and entertaining) narrative review of each of the significant decipherment attempts, in his *Indus Age: The Writing System* (Philadelphia: University of Pennsylvania Press, 1996): 76–161.

fortune. Their data and arguments are reasonable and convincing.⁹¹ If, however, for the moment the set of Indus symbols is allowed still the possibility of its having served as a script, among the possible target languages the two most promising candidates for decipherment are Dravidian and Munda, both of which preceded IA in the Indian subcontinent but which, like IA, were intrusive non-native languages there. Both Munda and Dravidian are demonstrably RV IA substrates.

Dravidian languages, such as Tamil, are spoken today throughout much of central and southern India. David McAlpin attempted to link Dravidian to the non-IE southern Iranian language of Elamite, proposing a Proto-Elamo-Dravidian (PED) language phylum that might have dated to the 10th–8th millennia BC.⁹² It is thought that from southwestern Iran a group of PED speakers may have migrated with the agricultural practices and technologies emerging from the Near East eastward across Iran and into the Indian subcontinent c. 8000–7000 BC, where they established farming communities (indeed farming began in the Indus at this time).

While accepting the validity of much of the nature of the task that McAlpin undertook, i.e., making a morphological comparison between Elamite and Dravidian, Russian linguist George Starostin nevertheless thoroughly rejected McAlpin's conclusion that a genetic link between the two language phyla can be detected. Starostin in fact noted that, on the basis of Vaclav Blazek's lexical comparison of Elamite and Austroasiatic, it appears that the Elamo-Austroasiatic link is actually closer than that between Elamite and Dravidian. Starostin himself has opined on the basis of his review of McAlpin's and Blazek's work and his own research that Elamite might have been a sole survivor of a sub-branch of a very early Eurasian (or "Boreal") super-superfamily of language groups. Other "cousin" branches of this super-superfamily that demonstrate distant connections with Elamite include the theorized Nostratic (or Eurasian) and Afroasiatic (of which Austroasiatic would be a sub-phylum) language superfamilies. Starostin

⁹¹ Farmer et al. (2004): 19–57.

⁹² Such a thesis has been in the air since Robert Caldwell first proposed it in 1856 (*A Comparative Grammar of the Dravidian or South-Indian Family of Languages* (London: Harrison, 1856), but it is David McAlpin's thesis of a morphologically based genetic linkage between Elamite and Dravidian that has shaped the discussion of a PED these past decades ("Proto-Elamo-Dravidian: The Evidence and Its Implications," in *Transactions of the American Philosophical Society* 71:3 [1981]: 1–155).

suggested that the evidence for any genetic connection between any of Dravidian, Austroasiatic languages, and Elamite thus remains — and perhaps always will remain — scant.⁹³ If, however, we accept for a moment the relative validity of Blazek's determination, that Elamite demonstrates closer connections to Austroasiatic languages than it does Dravidian languages, then this might explain the origin in India of the Austroasiatic language family of Munda.

From linguistic evidence (to be reviewed below), we already can surmise that Munda preceded Dravidian in all of the Indus and Gangetic watersheds in Pakistan/India, having entered from the west at an unknown time in the Neolithic, Mesolithic, or even Upper Palaeolithic, but before c. 4000 BC, when Dravidian-speakers are otherwise proposed to have entered the Sindh region of India from Iran (see below). Munda is the furthest west sub-phylum of the Austroasiatic language phylum and is spoken today in eastern North India and Bangladesh. Considering now Blazek's determination that Elamite must have coexisted with a Proto-Austroasiatic (PAA) language sometime in the period before c. 7000–6000 BC, then perhaps it was a Proto-Munda- or PAA-speaking people who first brought agriculture to South Asia from a region in Iran in which Proto-Elamite and a PAA/Proto-Munda both were spoken in mutual proximity. This would mean, then, that a Proto-Munda (or other PAA language) might have been the language spoken by the people of the Indus-Harappan civilization.

Asko Parpola would not agree. While like Starostin rejecting the concept of Proto-Elamo-Dravidian and thus also any genetic connection between the Elamite and Dravidian languages, Parpola nonetheless identifies the language of the Indus-Harappan civilization as having been Dravidian, which, he proposes, the IA-speaking people both absorbed and displaced when they entered and spread throughout the North in the 2nd and 1st millennia BC.⁹⁴

However, Michael Witzel has demonstrated that Dravidian does not appear as a substrate in the language of the earliest stratum of the RV and that therefore it could not have been the

⁹³ See George Starostin, "On the Genetic Affiliation of the Elamite Language," in *Mother Tongue* 7 (2002): 147–170; and Vaclav Blazek, "The new Dravidian-Afroasiatic parallels. Preliminary report," in V. Shevoroshkin, ed., *Nostratic, Dene-Caucasian, Austric and Amerind* (Bochum: Brockmeyer, 1992): 150–65.

⁹⁴ Parpola (1994): 126–133, 174.

language of the northern region of the Indus-Harappan civilization, i.e., the Greater Punjab, where in part the hymns of Rg Vedic Period I (c. 1800–1500 BC) were composed. Witzel identifies the only substrate languages in this earliest Rg Vedic stratum to be an unknown Central Asian language and a Proto-Munda or other PAA language. Geographically the early Rg Vedic period is linked through internal toponymic evidence to all of Bactria, Afghanistan, Baluchistan, Sind, Swat, and the western Punjab. According to Witzel, then, Proto-Munda (or another PAA dialect) thus was the language that the early Vedic Aryans encountered locally in their gradual push from Bactria, Afghanistan, and Swat into the western Punjab during the period of perhaps 1800–1350 BC.⁹⁵ It therefore seems the only reasonable conclusion that this Proto-Munda/PAA dialect(s) was probably the core language spoken by the people who developed the Indus-Harappan civilization, at least in its northern reaches, i.e., in the Punjab.⁹⁶

Witzel demonstrates further that the language of the southern region of the Indus civilization, that is, the Greater Sindh region, neither was Dravidian, and he calls this substrate language, after the name the Mesopotamian traders gave the Sindh, Meluhhan. He believes it too might be a PAA dialect, though differing from the northern Indus (Punjabi) PAA or Proto-Munda. Witzel identifies Dravidian superstrate influence here, meaning that Dravidian-speakers were fairly late intruders in the Sindh.⁹⁷ He cites K. Zvelebil and Walter Fairervis to suggest that pastoralist Dravidian-speaking tribes from the eastern Iranian mountains entered the Sindh c. 4000–3500 BC, where they adopted rice and millet agriculture following their encounters with

⁹⁵ Witzel (1999) offers the roughly assigned dates of c. 1700–1200 for Rg Vedic Periods I, II, and III (I: 1700–1500; II: 1500–1350; III: 1350–1200; see p. 3) but also refers to Period I as dating from 1500 to 1350 (p. 6). I follow his more inclusive dates, but further considering archaeological evidence relative to the BMAC I & II, the Ghalegay IV culture, as well as the religious changes that we know had to have occurred between the BMAC I/II and the time of the appearance of the Near Eastern IA speakers in Mitanni, I extend the *terminus ad quem* of the earliest RV stratum by 100 years.

⁹⁶ Witzel (1999): 3, 5–12. Witzel also indicates that an unknown deeper substrate, which he and others have called "Language X," also appears in early RV-IA text, in words associated with local flora and fauna, agriculture, artisanship, dance and music, household activities, clothing, and religion (p. 13).

⁹⁷ *Ibid.*: 21–33.

the Meluhhan Sindhi.⁹⁸ Since Dravidian appears as a substrate in the languages of the RV beginning only in the second Rg Vedic period of c. 1500–1350 BC, then Dravidian speakers must have migrated north to the eastern Punjab only following the rapid decline of the southern Indus civilization early in the 2nd millennium BC, where they encountered the RV IA speakers for the first time.⁹⁹ Geographically this Middle Rg Vedic period correlates with the RV IA speakers' entrance into the eastern Punjab, in the region of the Sarasvatī and Yamunā (Jamna) Rivers. Otherwise Munda substrate elements continue to appear in the hymns of the RV dating to this period.¹⁰⁰ Thus the people whom the RV IA-speaking intruders encountered c. 1500–1350 in the eastern Punjab appear to have spoken both Munda and Dravidian.

In the following Rg Vedic periods, i.e., the Late RV or RV III (c. 1350–1200) and Post-Rg Vedic Vedic (c. 1200–500 BC) periods, both Munda and Dravidian substrate influence continue to appear in the language of the contemporary Rg Vedic hymns. Geographically these periods correlate with the occupation by RV IA speakers of the Gangetic Plain all the way to Bengal. Many other substrate languages begin to appear in the RV, *Yajur Veda*, *Sāma Veda*, *Atharva Veda*, and subsequent compositions of the Vedic Aryans of these centuries, including Tibeto-Burmese, but it is noteworthy that still Dravidian does not appear to be a low substrate even in the Gangetic Plain, for toponyms do not reflect such a Dravidian heritage there. From among these languages it is, once again, only Munda that demonstrates this early, deep substrate presence in the region. It therefore is apparent that Munda's presence across all of North Pakistan/India, from the Punjab and east, long predates that of Dravidian, the latter having been at the time in question (c. 1350 BC and on) a language family only recently migrated from Sindh

⁹⁸ K. Zvelebil, "The Descent of the Dravidians," in *International Journal of Dravidian Linguistics* 1–2 (1972): 56–63; Walter Ashlin Fairservis, *The Harappan Civilization and Its Writing. A Model for the Decipherment of the Indus Script* (Leiden: E. J. Brill, 1997): 17, 21.

⁹⁹ Witzel (2001): 14–20.

¹⁰⁰ Witzel (1999): 14.

into the Gangetic Plain after the rapid decline of the Indus-Harappan urban civilization c. 2000–1900 BC.¹⁰¹

Thus Dravidian speakers, while beyond most reasonable doubt present in some numbers among the people of the Indus-Harappan civilization (as were, by c. 2000 BC, probably also early-dispersing II or IA speakers), were not the stewards of the culture that developed into the Indus-Harappan civilization. Rather, it appears that Proto-Munda- or PAA-speakers comprised the core human population of the Indus civilization, and that therefore they also very well might have been responsible for having brought agricultural practices and technologies to the Indus from Iran as early as c. 7000 BC. The Indus script, then, if it is a script, likely would be associated with Munda or another PAA dialect.

After the Vedic Aryans, the next literary evidence of a written IE language occurs in southeastern Greece, on approximately 4300 tablets found among the ruins of ancient fortresses at Cnossos, Pylos, and Mycenae. They record mostly inventories of the government of the civilization now known as Mycenaean (c. 1600–1200 BC). The Linear B script employed by the Mycenaean is first attested c. 1400 BC and was descended from the still-undeciphered Minoan Linear A.¹⁰² In its turn the development of the non-IE Linear A of Crete c. 2000 BC certainly was inspired by the non-IE writing systems of Mesopotamian-Anatolian-Levantine cuneiform and Egyptian hieroglyphs. The language recorded in Linear B, or the Mycenaean script, has been identified as a pre-Classical, or proto-, Greek and is the direct ancestor of the written Classical Greek script.¹⁰³ Most who have studied ancient Greece have identified the horse- and war chariot-employing Mycenaean to be the first Greeks who entered the Greek peninsula, and,

¹⁰¹ See Witzel (1999): 38–49, and specifically p. 40 for a comparison of Dravidian and Munda toponyms in Gangetic India.

¹⁰² No one knows to what language phylum the spoken language represented by the Linear A script belonged, though Drews, following Leonard Palmer and Edwin Brown, believes it to have been an early PA/PIE dialect akin to Anatolian (Hittite-Luwian). See Drews (1997): 164–5.

¹⁰³ On the Linear A and B scripts and attendant issues of Cretan-Mycenaean civilization, see John V. A. Fine, *The Ancient Greeks: A Critical History* (Cambridge, MS, and London: Harvard UP, 1983): 1–25.

depending on their interpretation of archaeological data evincing breaks (either slight or significant) in the material cultures of mainland Greece, they have alighted on such dates as 3200, 2300, 2200, 2000, 1900, and 1600 BC as likely identifying when the first Greeks entered Greece.

Over twenty years ago Robert Drews argued for a date of approximately 1600 BC for the entry of the first IE-speaking people, the proto-Greek Mycenaeans, into mainland Greece.¹⁰⁴ For setting an absolute date of 1600 he drew criticism from those defending the more established dates of c. 2200, 2000, or 1900 BC. Notably concise and convincing among his critics was James T. Hooker. Hooker did not argue specifically for a necessarily earlier date, but he did demonstrate how 1600 BC need not be the date, and he did not rule out the likelihood of an earlier arrival in Greece of proto-Greek speakers. He advocated only a broad period of Greek-speakers' entrance into Greece of c. 2500–1500 BC.¹⁰⁵ Exhibiting a remarkable capaciousness of mind, Drews later drastically revised his opinion to have the Greeks entering Greece during the 3rd millennium BC.¹⁰⁶

Other dates and modes of arrival have, of course, been proposed. One is that of A. L. Katona, who, following Marija Gimbutas' thesis of a violent IE-speaking mounted warrior elite's 5th–3rd millennia BC breakout from the Pontic-Caspian to explain the development and spread of IE languages from a PIE *Urheimat* in the PC steppe, has argued for a two-wave advance of IE-speaking people into mainland Greece, from the north. The first he sees as having consisted of a pre-Greek IE-speaking people who entered Greece c. 4500–4000 BC. The proto-Greeks, Katona has opined, arrived in Greece c. 3200 BC.¹⁰⁷ Otherwise, on archaeological grounds John E. Coleman also dates the Greeks' arrival in Greece to c. 3200 BC, while others, such as Michael Sakellarian, argue on the basis of, once again, the Childe-Gimbutas *kurgan* thesis for the more

¹⁰⁴ Drews (1988), *passim*.

¹⁰⁵ James T. Hooker, *The Coming of the Greeks* (Claremont, CA: Regina Books, for the Association of Ancient Historians, 1999): 65–86.

¹⁰⁶ Drews (1997): 153–177.

¹⁰⁷ A. L. Katona, "Proto-Greeks and the Kurgan Theory," in *JIES* 28.1–2 [Spring/Summer 2000]: 65–100.

traditional date of c. 2300 BC.¹⁰⁸ Clearly, we cannot be certain of specifically when, wherefrom, or how the Greeks arrived on the Greek mainland and islands, but we may say safely that they entered Greece likely between c. 3200 and 1600 BC.

Although it is argued from a distinct theoretical perspective, Katona's two-wave view, interestingly, recalls Robert Drews's later, revised, thesis of a similar two-wave IE intrusion into Greece, although the migratory direction that each scholar supported differed: Katona had the Greeks arriving from the Balkans in the north while Drews had them crossing the Aegean Sea in boats. In 1997 Drews accommodated the linguistic findings that, as we have seen above, identified suffixes (-ss, -nth) in placenames of the Greek mainland and islands, Cyprus, Crete, and South and West Anatolia, Italy, the Balkans, and the Danubian Basin with a much earlier substrate of a distinct pre-PIE "Proto-Anatolian/Proto-Indo-European (PA/PIE)" proto-language related closely to Hittite-Luwian (Anatolian). From this evidence he projected anew that the proto-Greek IE-speakers arrived in Greece, as a second wave of IE-speakers, sometime during the 3rd millennium BC, following an initial wave of PA/PIE speakers who migrated all across the Aegean world during the 8th and 7th millennia BC.¹⁰⁹ While Drews's complex migratory model involving PA/PIE and PIE speakers traversing by sea all of the Black Sea, the Aegean, and the Mediterranean and by foot the land between and around them seems a painful (though not impossible) stretch, the particular dating of his two waves of PA/PIE and PIE migratory movement, more than Katona's, agrees generally with the sensibly obtained PIE/IE linguistic evidence reviewed earlier in this chapter, and it does not contravene archaeological evidence, either. His sea-land two-wave PA/PIE and PIE model of dispersal is worthy of further research and consideration.

¹⁰⁸ John E. Coleman, "An Archaeological Scenario for the 'Coming of the Greeks' ca. 3200 BC," *JIES* 28: 1–2 (Spring/Summer 2000): 101–153; Michael Sakellarian, "Who Were the Immigrants?" in Gerald Cadogan, ed., *The End of the Early Bronze Age in the Aegean* (Leiden: Brill, 1986): 125–137.

¹⁰⁹ Drews (1997): 153–177.

The Technologies of Wheeled and Equid Transport, c. 3500–600 BC

For over 150 years it has been argued and often assumed that the historical and archaeological evidence evincing clearly that the IE-speaking Greeks, Mitanni, Hittites, and RV Indo-Aryans employed the equid-drawn light war chariot expertly and/or extensively during the 2nd millennium BC demonstrates that IE-speaking peoples invented this technology. The truth is that we can only say, as Stuart Piggott did, that this technology developed in a large cultural *koine* that spanned from east of the Carpathians through the steppe, the Caucasus, Anatolia, Syria, the Levant, Mesopotamia, and western Persia.¹¹⁰ To this geography we should add now specifically the PC steppe, Central Asia, and eastern Persia. Evidence for the absolute origins of the invention of (1) the lightweight chariot carriage and spoked wheel and (2) the bit that displaced the nose ring as the means to control the equid draught animal that pulled the chariot simply does not exist. All of these contributive technologies evolved during approximately the first half of the 2nd millennium BC throughout our expanded realm of Piggott's "cultural *koine*," and it is simply not possible to pinpoint with certainty a single geographic or cultural source of their invention.¹¹¹ Thus by no means can we assert that IE speakers invented the equid-drawn chariot.

Likewise, since the earliest known representation of a four-wheeled wagon occurs on fragments of a Funnel Beaker (TRB) pot dating to c. 3500–3000 BC and unearthed in Poland, and, further, several actual solid wheels have been recovered from Yamna sites in the PC steppe that are said to date to c. 3100–2500 BC, some have argued that it was, again, the IE-speaking peoples, and particularly the PIE-IE speakers in their Pontic-Caspian *Urheimat*, who invented

¹¹⁰ Stuart Piggott, *The Earliest Wheeled Transport, from the Atlantic Coast to the Caspian Sea* (Ithaca: Cornell UP, 1983): 103–104.

¹¹¹ For comparison note that M. A. Littauer and J. H. Crouwel considered the chariot to have necessarily developed in the Near East, while later Drews insisted Armenia had to have formed the central inventive region of wheeled transport and thus also its contributive technologies. See Littauer & Crouwel (1979): 68–71; Drews (1988): 133–157.

wheeled transport altogether.¹¹² This, too, is purely speculative, for contemporaneous with and earlier than these artifacts from Poland and the steppe, respectively, are the solid-wheel recoveries from the Near East region that prove only that the intelligence indicating the origins of wagon and cart transport, like that of the chariot, is ambiguous.¹¹³ Furthermore, none of the dates attested for these artifacts is absolute, and they are incomparable across regions, since the dates for the European artifacts are calibrated C¹⁴ dates, whereas those for the Near Eastern recoveries are largely theoretical approximations achieved by comparing uncovered earthen strata against a quite vague understanding of political periods. We therefore cannot credit IE speakers with having invented wagon and cart technologies, or what we can call the technologies necessary to wheeled transport.

Still many, if not most, others have argued or assumed that PIE- or IE-speaking peoples first domesticated the horse and initiated equid riding. As we have seen, the first large collection of horse bones representing a sizable population of *Equus caballus*, the true horse, that experienced some close relationship with human beings occurred in the PC steppe at sites such as Dereivka, Ukraine, and Botai, Kazakhstan at strata dating inclusively to c. 4200–3100 BC. The Sredny Stog culture, to which the Dereivka site has been attributed, also has been identified gingerly by many scholars with the predispersed PIE-speaking community.¹¹⁴ Therefore, it has been believed, the horse was domesticated and first ridden by PIE- or IE-speaking peoples in the PC steppe.¹¹⁵

¹¹² David W. Anthony and Bernard Wailes, "Review of Renfrew's *Archaeology and Language*," in *Current Anthropology* 29:3 (June 1988): 443.

¹¹³ For such finds see Piggott (1983): 30–63.

¹¹⁴ Mallory (1989): 198–199, 200–221.

¹¹⁵ Even such careful scholars as Stuart Piggott and M.A. Littauer and J.H. Crouwel have assumed that the equid evidence and so-called horse-related remains of Dereivka and other steppe sites necessarily implies that the horse was domesticated in the PC steppe during the 5th–4th millennia BC, but as we have seen such a position is anything but proven; see Littauer and Crouwel (1979): 61; Piggott (1983): 87; Piggott, *Wagon, Chariot, and Carriage: Symbol and Status in the History of Transport* (London: Thames & Hudson, 1992): 43. For a refutation, different from mine, of the persistent but unproven assumption that IE-speakers domesticated and first rode the true

However, we have seen already how the horse populations in question appear not to have been domesticated but were rather collections of either herded/corralled kept or wild horses hunted for their value as a source of food and other resources (and thus also ritual devotion in a "horse cult"). Furthermore, while it has often been argued that the bit was developed in the Sredny Stog culture and thus that horses were ridden here in the 5th and 4th millennia BC,¹¹⁶ in fact the perforated antler pieces recovered from Dereivka and identified as bridle cheek pieces, which have been adduced to prove that the bit was in use at Dereivka and therefore also that horses were ridden there,¹¹⁷ do not constitute unassailable evidence for either the use of the bit or the riding of horses. Simply because such cheek pieces were apparently employed as bridle cheek pieces two millennia later, in Anatolia during the latter 2nd millennium BC,¹¹⁸ does not at all imply, as Dimitriy Telegin suggested it does,¹¹⁹ that they were so employed in the 5th–4th millennium BC: their later, 2nd-millennium BC, use as bridle cheek pieces may simply reflect an ingenious adaptation of an old technology or tool for use in a new application. If the bit had been invented and used with such "cheek pieces" as early as the 5th–4th millennia BC at Dereivka and other steppe sites, then why, in the interactive *koine* that Piggott describes and we know existed during the 3rd and 2nd millennia BC (taking the rapid spread of wheeled transport as the prime demonstration of this *koine*), did not the technology of the bit and bridle make its way to Anatolia, Syria, Mesopotamia, and Persia to be employed in controlling the draught equids that pulled the early-2nd-millennium BC chariots? All such draught equids were still controlled through c. 1500 BC by the use of a nose ring and rope, this apparatus having been replaced first in the Near East by the bit and bridle only c. 1450 BC.¹²⁰ In fact, while the riding of equids was

horse (*Equus caballus*), see Drews (1988): 121–135.

¹¹⁶ Dmitriy Yakolevich Telegin, *Dereivka, A Settlement and Cemetery of Copper Age Horse Keepers on the Middle Dnieper*, tr. from the Russian by V. K. Pyatkovskiy, ed. by J. P. Mallory (Oxford: B.A.R., 1986): 82–83.

¹¹⁷ *Ibid.*: 83; Littauer & Crowel (1979): 61.

¹¹⁸ Littauer & Crowel (1979): 87.

¹¹⁹ Telegin (1986): 83.

¹²⁰ Littauer & Crowel (1979): 70, 86–89.

practiced in the Near East from the latter 3rd millennium BC and on, this was civilian riding without military application and thus was only occasional because it was considered dangerous and impractical.¹²¹ Furthermore, the equids so ridden were largely *Equus hemiones* (Asiatic half-ass) and only perhaps also at times imported *Equus asinus* (African ass) or *Equus caballus* (horse).¹²² There is no proof at all that any such animals were indeed either *asinus* or *caballus*, and no evidence suggests that *caballus* was even truly domesticated at this time. The true horse, or *caballus*, while surely known throughout the Eurasian steppe, Anatolia, Iran, Europe, and also perhaps the Near East from at least the Neolithic, is first clearly attested as a ridden animal in Anatolia, Syria, Mesopotamia, and Southwest Iran only in the first half of the 2nd millennium BC, and even then only infrequently.¹²³ When horse riding did begin to occur only a little less sporadically, in the latter half of the 2nd millennium BC, it had obviously derived from both (1) riding *hemiones* and *asinus* and (2) charioting, and in fact the 1st-millennium BC development of cavalry among the Assyrians also emerged directly — and only gradually — from the military use of equid-draughted charioting.¹²⁴

In summary regarding the development of wheeled transport and horse riding technologies, we cannot exceed the ambiguous evidence to assert categorically that any one region of our expanded understanding of Piggott's cultural *koine* should be identified as the origin of one or another of them. However, while horse domestication probably did occur first in the PC steppe at sites such as Botai, Dereivka, and those of the Tersek complex (but in the 3rd millennium — not the 5th or 4th millennia — BC), the technologies of wheeled transport and the bitted and bridled riding of *Equus caballus* probably were developed in or proximate to the Near East, for the following reasons. First, during the 4th–2nd millennia BC nowhere but in the Near East were resources so concentrated and was so powerful a momentum of civilizational

¹²¹ *Ibid.*: 36.

¹²² *Ibid.*: 35.

¹²³ *Ibid.*: 56–59.

¹²⁴ *Ibid.*: 70, 94, 134.

development building. The Near East was the center of ancient trade, political organization, developing social complexities, and industry. It was in the Near Eastern *koine* that the technologies of bronze-making and writing emerged. The underlying cause of the Near Eastern momentum of this period was, of course, the region's superior agricultural fertility borne of control of the waters of the Tigris and Euphrates riverine systems. From the 4th through the middle 2nd millennia BC the political, social, cultural, economic (industry & trade), and inventive momenta of the Near East became self-perpetuating, self-magnifying, and self-accelerating as particularly the economic activity of the ancient developing world of our expanded vision of Piggott's *koine* — but here including, even further afield, the cultures and economies of Persia and the Indus region — centered on the pivot of Mesopotamia. With such centrality energies and resources were concentrated in the Near East, which in turn created a self-perpetuating inventive momentum that could not be matched in other regions with far more diffuse demographic patterns and less sophisticated political and social, and thus also labor organization, constructs. Further, political organization begot the concentration of wealth not only in the populace of the Near East generally but also specifically within the grasp of the politically powerful, enabling further a concentrated investment of such wealth in technologies that would lead to both economic and military success. The case of astronomical observation, to be reviewed in the following chapter, is a case clearly demonstrating this point. Again, less organized and more sparsely populated, i.e., less urbanized, regions could not have brought to bear the immense human and physical resources available to the politically powerful and economically prosperous elites of the Near East, and, as a result, with much less ability to invest in the development of promising or successful technologies, the people/cultures of such regions were far less likely than those in the Near East to originate the immensely significant (and expensive) development of the technologies of particularly wheeled transport and bitted, bridled riding of the *Equus caballus*.

Indeed, Piggott, among the most expert of those studying early wheeled transport, concluded that the invention of the tripartite disc wheel on which the early wagons and carts were based was

part of the complex innovations of this period in the Near East rather than in the simpler contexts of Neolithic Europe... The area of invention may have been larger than Sumer and Elam, but they were central to it.¹²⁵

Similarly, M.A. Littauer and J.H. Crouwel, who, along with Piggott, have been since the 1960s the most highly regarded experts on the development of early wheeled-transport and equid-riding technologies, considered all wheeled-transport technologies, including those of the early four-wheeled wagon and two-wheeled cart and the later light, spoke-wheeled and equid-drawn, chariot, to have developed necessarily in the Near East. They further demonstrated that the technology most significant in the development of widespread equid riding in the 2nd millennium BC, the bit, also originated, as well as can be known, in the Near East.¹²⁶

On the other hand, regarding particularly the domestication of horses, it seems reasonable to assume that those enjoying the closest contact with the *Equus caballus* in its native Central Asian/European steppe, European, Iranian, and Anatolian habitats¹²⁷ and who from no later than the Eneolithic had hunted *caballus* for food were also the first to domesticate them. However, this they seem to have done in not the 5th or 4th but rather sometime in the 3rd millennium BC,

¹²⁵ Piggott (1983): 63.

¹²⁶ Littauer & Crouwel (1979): 68–71. Compare this against the position taken by Robert Drews, who later argued that Armenia, since its forest resources would have allowed its inhabitants easy access to the timber that was used to manufacture wheeled vehicles, had to have formed the central inventive region of wheeled transport and thus also supplied its contributive technologies; see Drews (1988): 133–157. His argument is not convincing, since prior to the development of wheeled vehicles timber was of course transported from forested regions throughout the ancient world to the Near East by both water and animal pack. It is particularly telling, further, that Caucasian (Lchashen) chariot wheels dating to the 2nd millennium BC were far less sophisticated than their contemporary Near Eastern counterparts, suggesting strongly that innovations in wheeled-transport technologies did not originate in Armenia/the Caucasus; see Littauer and Crouwel (1979): 81. Littauer and Crouwel's collected evidence also shows that it was in the Near East during the first half of the 2nd millennium BC that innovations in the construction of the spoked wheel occurred, making possible the development of the light equid-drawn war chariot by about the 16th century BC (Littauer and Crouwel [1979]: 68–70).

¹²⁷ The native habitat of the horse now is known to have extended beyond the Eurasian steppe to include Europe, Anatolia, and Iran. See Piggott (1983): 87.

and whoever "they" might have been is indeterminable but can reasonably be assumed to have been either speakers of Indo-Iranian dialects or those who were in close geographic contact with them.

Southwest Asian Technologies in East Asia

The discovery of remains of carbonized wheat in western Gansu (northwestern China) C¹⁴-dated to c. 3000–2500 BC¹²⁸ probably reflects the arrival here from the west of an eastern offshoot of the Yamna (and perhaps specifically the Anafasievo or their relatives), or an earlier-migrating western-steppe people perhaps displaced by them, from Central Asia. We recall that the Yamna tribes almost certainly were Indo-Iranian-speaking people migrating from an ultimate origin in the Lower Dnieper region of the Ukraine from c. 3500 to 2500 BC. The arrival of wheat from the west seems to mark the beginning of what was to become an extensive and ultimately bi-directional west-east interaction that never ceased.

During the 3rd millennium BC bronze-making technology spread north and east across Eurasia as part of the diffusion of this technology from the Near East throughout Southwest, South, and Central Asia and into Europe. Bronze spread to the areas north and west of China proper with subsequent waves of the gradually eastward-extending Yamna or Yamna-displaced peoples. In the forest zones of Siberia north of the steppe one cultural complex in particular, the Siberian Seima-Turbino, seems to have transformed the sheet-metal forging and lost-wax casting metallurgical traditions transferred from the eastern-moving Yamna into a multi-component, multi-valve hollow casting technique that produced the hollows of the socketed axes so prevalent in subsequent East Asian bronze-making practices.¹²⁹ The Seima-Turbino's hollow-casting

¹²⁸ Li Shuicheng, "A Discussion of Sino-Western Cultural Contacts and Exchange in the Second Millennium B.C. Based on Recent Archaeological Discoveries," *Sino-Platonic Papers* 97 (December 1999): 16; and idem, "The Interaction between Northwest China and Central Asia During the Second Millennium BC: an Archaeological Perspective," in Boyle et al (2002): 180.

¹²⁹ E. N. Chernykh, *Ancient Metallurgy in the USSR: The Early Metal Age* (Cambridge: Cambridge

technique in particular explains the origins of the later development in the Erlitou, Erligang, and Shang civilizations in China of the hollow-casting process by which the great bronze vessels of the early Chinese bronze industry were produced.¹³⁰

In what is now Xinjiang Province, i.e., Chinese Turkestan, bronze making evolved under the continuous influence of Central Asian and Siberian metallurgical cultures from about 2000 to 400 BC in some ten or eleven distinct cultural spheres. The earliest among the sites demonstrating its inhabitants' familiarity with bronze is the Qäwrighul cemetery in east-central Xinjiang, on the eastern fringe of the Tarim Basin. The Caucasoid people responsible for the Qäwrighul culture, whose remains help comprise the population of so-called "Tarim Mummies" discussed previously, apparently employed bronze tools, but no actual bronze artifacts have been recovered from these sites. The Qäwrighul remains display a close cultural and technological connection with all of the Yamna, Andronovo, and Anafasievo cultures, in all of ritual / burial rites and practices, use of pure copper to forge various articles, employment of the Bactrian camel, and particularly in dress.¹³¹ The Qäwrighul was followed shortly by the Yanbulaq culture of northeastern Xinjiang, whose simple bronze tools, weapons, and ornaments date to c. 1500 BC. Other bronze sites that slightly postdate the Yanbulaq include those of the Barköl grasslands northeast of Yanbulaq and the Charwighul culture sites ranging over the northern border of the Tarim Basin to the north and west of the Qäwrighul sites.¹³²

The inhabitants of Xinjiang during the 2nd millennium BC were a mixed population of Mongoloids, Caucasoids, so-called Mediterraneans, Pamir-Ferghanans, and others. Quite apparently Xinjiang formed a staging ground for the intermingling of eastern and western cultures and the introduction of advanced West-Eurasian technologies into the settled Neolithic

University Press, 1992): 190–234. See also Kuzmina (2007): 253–6; 464–5.

¹³⁰ Andrew Sherratt, "The Trans-Eurasian Exchange: The Prehistory of Chinese Relations with the West," in Victor H. Mair, ed., *Contact and Exchange in the Ancient World* (Honolulu: University of Hawaii Press, 2006): 43–51, and particularly 47–49.

¹³¹ E. E. Kuzmina, "The Tarim Basin People and Pastoralists of the Asian Steppes" in Mair (1998): 66–72.

¹³² Zhimin An, "Cultural Complexes of the Bronze Age in the Tarim Basin," in Mair (1998): 45–62.

riverine cultures of China proper. However, movement certainly did not occur unilaterally from west to east, since the northwestern segment of the Yellow River corridor's Neolithic Yangshao culture (5000–3000 BC) appears to have spread northwestward from Shaanxi and eastern Gansu into eastern Qinghai and through the Hexi Corridor (Gansu), in the process transforming to become the Majiayao culture (3300–2000 BC).¹³³

Bronze-making entered China proper gradually from the northwest and north, beginning with the Qijia culture c. 2200–2000 BC and continuing with the introduction of arsenical copper to the Siba culture (c. 2000–1500 BC) from the Near East via Central Asia and finally through the Seima-Turbino cultural complex, as described above. The Siba (Huoshaogou cemetery), having developed in part from the Late Majiayao after 2000 BC, refined many of the alloying techniques employed by the metal workers of the Qijia.¹³⁴ East of the Qijia culture and with it helping to form the Northern Zone cultural complex that filtered Siberian, Zungharian, and Central Asian metallurgical technologies, artistic design, and martial practices to pass them into northern China were the Zhukaigou (2500–1500 BC), centered in the Ordos and stretching from Shaanxi and Shanxi north into Inner Mongolia, and the Lower Xiajiadian (2000–1300 BC) of southeastern Mongolia, Liaoning, and Hebei.¹³⁵

By c. 1700 BC bronze making had been imported into the Yellow River corridor of northwestern China, and there, in the Erlitou culture, developed the first large-scale metallurgical industry that employed complex casting techniques. These technologies and techniques were

¹³³ Li Shuicheng (1999): 5; and Shuicheng Li (2002): 172–179. On the most recent scholarship supporting strongly particularly the West-to-East flow of people, cultures, and technologies during especially the 2nd–1st millennia BC, see now Jan Romgard, "Ancient Human Settlements in Xinjiang and the Early Silk Road Trade, with an Overview of the Silk Road Research Institutions and Scholars in Beijing, Gansu, and Xinjiang," *Sino-Platonic Papers* 185 (November 2008): 19–35.

¹³⁴ Shuicheng Li (2002): 180. On Siba metallurgy see also Jidong Yang, "Siba: Bronze Age Culture of the Gansu Corridor," *Sino-Platonic Papers* 86 (October 1998): 6–9.

¹³⁵ On the Northern Zone cultures and their technological and cultural influences on the developing Chinese Yellow River Bronze cultures see Nicola Di Cosmo, *Ancient China and Its Enemies: The Rise of Nomadic Power in East Asian History* (Cambridge: Cambridge UP, 2002): 44–56.

diffused then through the subsequent Erligang culture, which seems to have served as a bridge between the Erlitou and Shang cultures such that Erligang is often identified as the early Shang. With the Shang (c. 1545–1045 BC) a truly massive ore-mining and bronze-casting industry developed in China's Yellow River corridor and North Central Plain.¹³⁶

During this time the technologies of horse-draught and wheeled transport spread across Eurasia and to Shang China by c. 1200 in the form of already maturely designed two-wheeled horse-drawn chariots.¹³⁷ The Shang chariots derive in the designs of all of their draught pole, carriage, and spoked wheels virtually directly from those dating to the middle 2nd millennium BC uncovered at Lchashen in Transcaucasia.¹³⁸ The chariot most likely was spread north and eastward through the Eastern Yamna-derived Andronovo Sintashta-Petrovka cultural complex (c. 2200–1700 BC) of the Southern Urals (about 1050 miles north of Lchashen) and finally was taken as far east and north as the Irtysh and Yenisei Rivers in Siberia via the Andronovo.¹³⁹ The Andronovo influence reached as far as the Yellow River corridor of northern China probably sometime during the 13th century BC, wherefrom ultimately the Shang obtained its chariots and chariot-manufacturing technologies.¹⁴⁰ The use of horses as draught animals to pull the chariots

¹³⁶ For a review of the gradual introduction into and development in China of bronze-making technologies see Robert Bagley, "Shang Archaeology," in Michael Loewe and Edward L. Shaughnessy, eds., *The Cambridge History of Ancient China: From the Origins of Civilization to 221 BC* (Cambridge: Cambridge UP, 1999): 136–171. For a recent and very helpful overview of the early Bronze cultures of China (Erlitou, Erligang, and Shang) see now Robert L. Thorp, *China in the Early Bronze Age* (Philadelphia: University of Pennsylvania Press, 2006).

¹³⁷ Edward L. Shaughnessy, "Historical Perspectives on the Introduction of the Chariot Into China," *Harvard Journal of Asiatic Studies* 48:1 (June 1988): 189–192.

¹³⁸ Stuart Piggott, "Chariots in the Caucasus and China," in *Antiquity* 48:189 (March 1974): 16–25; Piggott, "Bronze Age Chariot Burials in the Urals," in *Antiquity* 49:196 (December 1975): 289–90; Piggott (1983): 91–97; Piggott (1992): 63–65; Littauer and Crouwel (1979): 77–78; Shaughnessy (1998): 201.

¹³⁹ See David W. Anthony, "The Opening of the Eurasian Steppe at 2000 BCE," in Mair (1998): 105–107. See now also Kuzmina (2007): 253–6; 464–5.

¹⁴⁰ Di Cosmo (2002): 29. In a recent and daring study that draws together some very interesting artifacts from Xinjiang, Qinghai, and the Yellow River corridor, Anthony Barbieri-Low has attempted to demonstrate that wheeled transport had already entered Xinjiang, Qinghai, and the Yellow River corridor by c. 2000–1500 BC.

of course accompanied the importation of wheeled technology into and through the Northern Zone to the Yellow River Corridor. The earliest horse remains in the region occur in the Qijia culture sites.¹⁴¹ It can be expected that both chariots and horses entered China through the interaction of this culture with eastward-moving Andronovo peoples. As Stuart Piggot indicated some thirty years ago, it is inconceivable that the use of the horse-draughted chariot entered China as an idea, but that it rather must have arrived there physically, with accompanying experts in the use of the technology, as a fully developed technological package.¹⁴²

Some one to four centuries after the chariot had been introduced to Shang China, the Iranian-speaking Skythian complex, deriving ultimately from a mixing of the post-Yamna Srubnaya (Timber Grave) cultural complex of the Pontic steppe and the Kubanskaya horizon of the northern Caucasus, developed and spread north and east across the Eurasian steppe.¹⁴³ By about the 8th century BC the eastern Skythian Saka had spread across Central Asia to the

Though his attempt to expand the horizons of the study of wheeled transport and early Chinese civilizational development is admirable, his evidence is not convincing. Most troubling is his dating to 2000–1500 BC, on the basis of one anomalous C¹⁴ dating of one post, of two small wheel hubs "that could have held sixteen spokes" and which were uncovered from a Warring States (c. 5th–3rd century BC) site. This would make this wheel among the earliest, if not the earliest, of specimens of the recovered spoked wheel in the world. This is very unlikely given that there is no other clear evidence that suggests the development in East Asia of the technologies of wheeled transport before the sudden introduction of the fully formed chariot c. 1200 BC. Other unconvincing evidence includes (1) two ruts discovered on a ramp of the wall at the Erligang or Shang city of Yanshi that Barbieri-Low interprets to be wheel ruts but which most likely were made by the ends of the drag poles of a travois-like sledge; (2) patterns on Majiayao spindle whorls that look like spoked-wheel designs — such evidence, representative of a technology unrelated to vehicle wheels, cannot be assumed to suggest the presence of wheels or wheeled vehicles. See Anthony J. Barbieri-Low, "Wheeled Vehicles in the Chinese Bronze Age (c. 2000–741 BC)," *Sino-Platonic Papers*, 99 (Philadelphia: University of Pennsylvania, Department of Asian and Middle Eastern Studies, 2000): 9–17.

¹⁴¹ Victor Mair, "The Horse in Late Prehistoric China: Wrestling Culture and Control from the 'Barbarians,'" in Marsha Levine, Colin Renfrew & Katie Boyle, eds., *Prehistoric steppe adaptation and the horse* (Cambridge: McDonald Institute for Archaeological Research, 2003): 163–87, esp. 170, 181.

¹⁴² Stuart Piggot, "Chinese Chariotry: An Outsider's View," in Philip Denwood, ed., *Arts of the Eurasian Steppelands*, No. 7 in *Colloquies on Art & Archaeology in Asia* (London: University of London, Percival David foundation of Chinese Art, School of Oriental and African Studies, 1977): 32–44, esp. 43–44.

¹⁴³ Vladimir G. Petrenko, "Scythian Culture in the Northern Caucasus," in Davis-Kimball (1995): 5.

southern Siberian regions of the Ob and Irtysh Rivers and the Tian and Altai Mountains.¹⁴⁴ In Siberia the Skytho-Saka cultural complex intermingled with the Siberian Karasuk culture centered in the Minusinsk Basin. The origin of the Karasuk is unknown, and while it perhaps developed from a fusion of the metal-working Iranian Andronovo and pastoral Siberian Seima-Turbino complexes,¹⁴⁵ certain Karasuk cultural artifacts evince a direct origin in the Central Asian steppes.¹⁴⁶ Further east in Mongolia, by the 7th century BC the Mongolian Slab Grave culture, having derived in part from the Karasuk but whose people were, unlike the Karasuk, not Caucasoid but Mongoloid, completed the Eurasian circuit of the Skytho-Saka-Siberian complex, whose influences have been recorded for this period from the Elbe in Germany to eastern Mongolia.¹⁴⁷

The Skytho-Saka-Siberian complex was the first truly nomadic culture and the first to rely very heavily on an ability to ride the horse — for both herding and military purposes. By about the 7th–6th centuries BC the easternmost among the Skytho-Saka-Siberians, whom the Chinese referred to derisively as “Hu” (usually understood from contemporary literature to connote something like “northern barbarians”), had brought the riding of *Equus caballus* to the northern steppe bordering Zhou China.¹⁴⁸ Among the Chinese Zhou dynasty (c. 1045–249 BC) states, the northern border state of Zhao first adopted horse riding and its associated dress, along with the military use of cavalry, very late in the 4th century BC.¹⁴⁹

¹⁴⁴ Leonid T. Yablonsky, “The Material Culture of the Saka and Historical Reconstruction,” in Davis-Kimball et al. (1995): 232–8.

¹⁴⁵ Di Cosmo (2002): 30–1.

¹⁴⁶ Volkov (1995): 321, 331.

¹⁴⁷ Volkov indicates particularly the presence of the so-called deer-stone stelae, or *olenniye kamni*, across Eurasia as representing the wide range of cultural influence of the Skytho-Saka-Siberian complex. See *ibid.*: 332.

¹⁴⁸ Di Cosmo (2002): 31–43.

¹⁴⁹ See Di Cosmo’s discussion of the oft-cited text of *Shiji* 86 that describes Zhao King Wuling’s adoption of horse riding, cavalry techniques, and associated riding apparel of the northern “Hu” people (2002: 127–138).

The technology of writing appears suddenly and morphologically fully developed on Shang oracle bones and, later, bronzes at about the same time that wheeled transport was introduced, or c. 1220–1200 BC, and one can only assume that the idea and practice of writing were brought from the settled civilizations of South or Southwest Asia by waves of migrating Iranian Andronovo tribes, though no concrete trace of the spread of writing from the west toward or into Shang China has been discovered. Although clan or other symbols had appeared previously on Neolithic and Bronze-period artifacts in China,¹⁵⁰ they in no way represent an indigenous development of the full script and syntax that graces Shang bones and, later, bronzes. Nor can they be argued to represent either a language syntax or a set of logographically expressed individual words. They are, in short, simply marks, ones that probably denote the identity or clan / tribe of either the maker of the artifact or its sponsor or owner.

The entire issue of the sudden appearance of the recursively developed Chinese logographic script c. 1200 BC is puzzling, and if, as it seems likely, the idea for and practice of writing were introduced from the West, there must be as yet a — or several — missing link(s) in the record of transmission, since the script(s) that the Iranians could have brought with them would have been consonantary or alphabetical (syllaberial, or uniliterally or phonetically applied), not logographic (see Volume II, Chapter V for a brief discussion of the possible presence in the Shang Sinitic script of a consonantary derived perhaps from the Phoenician consonantary). Since, when it first appears c. 1200 BC, the Shang, or Sinitic (proto-Chinese), Oracle Bone Script is already fully developed recursively (on the basis of the extensive use of the rebus), some argue that the script must already have been developing *in situ* in the Yellow River corridor for at least several hundred years or longer.¹⁵¹ The fact that the script is nowhere evident on any artifacts datable to before the late-13th century BC reflects to many scholars an earlier tendency, for at least several hundred years, to record writing on perishable materials. According to this thesis, the first evidence of true writing in the Chinese context can be found in graphs

¹⁵⁰ William G. Boltz, "Language and Writing," in Loewe and Shaughnessy (1998): 107–23.

¹⁵¹ William G. Boltz, "The Invention of Writing in China," in *Oriens Extremus* 42 (2000): 1–17, esp. p. 8–9.

expressing only lineage emblems and day-names that were cast on bronzes, occurring at about the same time as and slightly later than the earliest OBIs, in a style that has been theorized to have developed directly from painting characters on perishable materials using brush and ink.

However, such a thesis is wholly conjectural. In a ground-breaking study of inscriptions found on "practice bones" at the late-Shang capital Anyang, recently Adam Smith has demonstrated that scribes at work in the Shang court's scribal workshops of the 13th and 12th centuries BC, which were essentially diviner-group schools that trained Shang oracle-bone scribes in the preparation of the scripted oracles etched onto turtle plastrons and cattle scapula, most probably were responsible for creating rather rapidly the fully effloresced script that developed at the Shang court for the express purpose of communicating between mostly the Shang king and his ancestors' spirits using oracle bones.¹⁵² It may well be, then, that the proto-Chinese Sinitic OBI script, the first script in East Asia, was developed fully artificially to serve the specific and very critical purpose of communication for the sake of obtaining and retaining a religiously based socio-political power. This in turn supports the argument that the idea for and practice of writing were imported sometime during the 15th–13th centuries BC, for it seems that once the Shang Chinese court had been exposed from its contacts with outsiders to the power of the written word, it commanded the creation of a usable script from among the Chinese linguistic and cultural context. In a mere several generations, it seems, the scribal authorities commissioned with this task succeeded in developing a workable and thoroughly indigenous script, based not only on the idea and practices of writing that had been transmitted from Southwest Asia but also graphically in large part upon a tradition of scratching symbolic clan- or ownership-marking graphs onto various owned artifacts, a tradition that had been practiced in China since Neolithic times. Therefore, it appears, the first Chinese script, while dependent on the importation from the West of the "technology" of the powerful idea for and practice of writing a language, was developed specifically for the purpose of scratching onto bone with a stiff, sharp stylus characters created momentarily in court educational centers, and not, as it is

¹⁵² Adam Smith, *Writing at Anyang: The role of the divination record in the emergence of Chinese literacy* (UCLA Ph.D. dissertation, 2008).

often argued, from the earlier use of a brush to paint signs on perishable materials (for which absolutely no evidence actually exists). The script seems to have evolved rather lineally and, from a native point of view, indigenously, from the millennia-old habit of employing a stylus to scratch symbols and signs onto items of personal — or personally created — and mostly ceramic objects. Therefore, although the idea for and practice of enscripting a language appear to have been exogenous, the *nature* of the first writing in China, using a hard and sharp stylus to etch signs onto bone or other hard but permeable material (typically, pottery), appears to have followed directly from indigenous Neolithic-Bronze period traditions of sign-making on items of personal property to identify origin or ownership. This is not at all to suggest that the Neolithic-early Bronze signs constitute any kind of true writing but only that the approach to designing and etching graphs of the OBI script appears to follow from the earlier native — though not at all commonly attested — approach and methods.

Contact between Chinese and bordering civilizations continued throughout the period of and after the late Shang, or c. 1200 BC and on, such that Chinese civilization should not be misconceived, as it often has been, to ever have been free of external influences from at least c. 1500 BC and on. Moreover, as we shall see in subsequent chapters, it would be exceptional if the proto-Chinese ever had been sealed off from Inner Asian and Siberian/Mongolian influences, from the Palaeolithic and on. Both human mtDNA and Y-chromosome genetic and sundry cultural evidence establishes that this continuous contact occurred from very early on.¹⁵³ With regard to the continuing contact during the 1st millennium BC, cultural interaction between China and the Eurasian world north and west of it is evidenced in burial customs of the Western Zhou

¹⁵³ For the genetic evidence that ties northern Chinese to Siberian (or Russian Altai) populations from as early as 43,000–40,000 BC, see Oppenheimer (2004): 224–235. For new mtDNA evidence demonstrating the Caucasian makeup of Neolithic- and Bronze-period Southern Siberian populations, see Christine Keyser et al., "Ancient DNA provides new insights into the history of south Siberian Kurgan people," in *Human Genetics*, published online May 16, 2009: <http://www.springerlink.com/content/4462755368m322k8/>. For astrological / astronomical evidence, see Chapters 2–4 below.

(1045–771 BC) of the capital region;¹⁵⁴ the appearance of likely-imported faience in middle Western Zhou graves;¹⁵⁵ artistic motifs appearing on Chinese artifacts recovered from particularly the 6th century BC and later;¹⁵⁶ the architecture of tombs, and particularly the appearance of tumuli (i.e., *kurgans*) from approximately the same period;¹⁵⁷ the importation into China of the lost-wax bronze-casting technique c. 600 BC;¹⁵⁸ and a clear influx by c. 450–400 BC of developments in astrological / calendrical constructs or inchoate astronomical sciences that originated in Southwest and / or South Asia between c. 3000 and 1000 BC. The latter will be evident in Chapters 2 and 3 below.

That the influences meaningfully reaching the Chinese throughout this period originated not only in the nearby steppe but also very often as far away as Central Asia and even the Black Sea region has been attested by several scholars. Emma Bunker has suggested one such artistic influence dating to the Zhou period and originating in the Black Sea region of the PC steppe —

¹⁵⁴ Lothar von Falkenhausen, *Chinese Society in the Age of Confucius (1000–250 BC). The Archaeological Evidence* (Los Angeles: Cotsen Institute of Archaeology, 2006): 94. von Falkenhausen makes a tentative connection between burial customs originating in the Qijia or even Indo-European cultures and those of the Zhou royal center/elite as evidenced in the Yu cemetery at Baoji, near the Zhou capital. See also p. 204–213 for descriptions of exotics in Western Zhou capital and Jin state burials. See, as well, pp. 229 and 290.

¹⁵⁵ Jessica Rawson, "Western Zhou Archaeology," in Michael Loewe and Edward Shaughnessy, eds., *The Cambridge History of Ancient China, from the Origins of Civilization to 221 BC* (Cambridge: Cambridge UP, 1999): 431, n. 132.

¹⁵⁶ Wu Hung, "Art and Architecture of the Warring States Period," in Loewe and Shaughnessy (1999): 688–91; 695–6; 702. See also Jenny F. So and Emma C. Bunker, *Traders and Raiders on China's Northern Frontier* (Seattle and London: Arthur M. Sackler Gallery, Smithsonian Institution, in association with the University of Washington Press, 1995): 33–87; and Emma C. Bunker, "The Steppe Connection," *Early China* 9–10 (1983–5): 70–77 (see p. 72 on particularly a distant influence from the Black Sea area apparent in Chinese animal art of the 5th century BC).

¹⁵⁷ Wu Hung (1999): 713. See also von Falkenhausen (2006): 336.

¹⁵⁸ Wu Hung (1999): 675–7; and see Wu's sources, Tan Derui, *The Splendid Craft of Lost Wax Casting in Ancient China* (Shanghai: Shanghai Scientific and Technological Literature Publishing House, 1989); and Jenny F. So, *Eastern Zhou Ritual Bronzes from the Arthur M. Sackler Collection* (Washington, D. C.: Arthur M. Sackler Foundation, 1995): 54–5.

we can, on the basis of the content of the foregoing chapter, assume a Skytho-Saka-Siberian transmission across Eurasia;¹⁵⁹ Louisa G. Fitzgerald-Huber has demonstrated earlier direct and strong associations in the styles of and artistic motifs appearing on vessels originating in the BMAC civilizations and those of the Qijia and Erlitou civilizations.¹⁶⁰ We know already that the technologies of wheeled and equid-draughted transport and metallurgy certainly entered China from the west and north between c. 2200 and 1200 BC, and more likely than not the technology of script and writing also spread from the West to China during the same period. That other influences, including those of a linguistic, religious, and artistic nature, should have accompanied such monumental cultural dispersals across Eurasia need not startle us.

Through following mostly language but also technological diffusion across Eurasia during the Neolithic and Bronze periods we have in this chapter established the labyrinth of movements and influences that truly interconnected — at some level, either distantly or intimately, directly or indirectly — virtually all developing civilizations of Eurasia, from the Atlantic to the Pacific, and from Siberia to northern India, during the period of approximately 9000–500 BC. In the following chapter we will review the development of an entirely different kind of technology, that of astronomical observation and the mapping of the sky that resulted in the development of the calendar, which, I will argue, should not be considered exclusive of the pattern of rapid diffusion across Eurasia of new technologies that in the present chapter we have seen occurred over several millennia's time. The theme of intercultural interaction as a significant factor in the development of Chinese technologies, traditions, and cultural identifiers will remain a concern through the remainder of Volume I, and thereafter, in Volumes II and III, the understanding of this constant interaction having occurred will be assumed. In the conclusion to Volume III (Chapter 7), having reviewed both Southwest Asian and Chinese religious systems that focused attention on the stellar population of the nocturnal heavens, we will take up

¹⁵⁹ Emma C. Bunker, "The Steppe Connection," *Early China* 9–10 (1983–5): 72.

¹⁶⁰ Louisa G. Fitzgerald-Huber, "Qijia and Erlitou: The Question of Contact with Distant Cultures," *Early China* 20 (1995): 17–67.

discussion of the possibility that the religious system of Bronze-period Mesopotamia that developed a pantheon of gods who populated the stars made its way in some modified form to China by the period of the Shang. It is very possible that Shang — and therefore all later Chinese — religion owes much at a very basic level to both indigenous and exogenous influences.

Chapter 2: The Power of the Celestial Pole in the Ancient World

Sources recording early celestial observations undertaken in many world civilizations support the proposition that for ancient peoples the sky, and particularly the celestial pole and its circumpolar stars, constituted the point of center and/or origin of things, and also the ultimate guide and source of solace for humans when they were astray, alone, or otherwise insecure in the world. Essentially, people looked to the sky to establish their own context and thus gain a sense of security.

Part of such security seems to have been achieved when ancient observers across many civilizations imposed their wish for escape from the natural earthly cycles of life and death, that is, for immortality, on the one natural phenomenon that never rested, and thus never died, the northern celestial pole. Such an immortality often involved the apotheosizing of human leaders on earth such that they came to form part of a given civilization's godhead. In other cases the celestial polar godhead, while anthropomorphized, did not as far as we understand embrace the spirits of deceased ancestral kings. In both cases, however, the northern celestial pole seems to have served as either the font or seat of the perceived and projected universal high power.

For a moment let us consider what happens in the night sky that we observe, in both nightly and longer cycles. Viewing the night sky from the northern hemisphere of earth, as the apparent celestial bowl spins counterclockwise over the earth each night, stars seem to rise from the eastern hemisphere of one's view (azimuth 0° to 180°) and set in the western hemisphere (azimuth 180° to 360°). Aside from the stars' nightly revolutions over the earth, on an annual basis they also appear to complete a single, calendrical, cycle relative to our planet. We know now that such an apparent revolution results from the earth's own annual elliptical cycle of movement around the sun, but to ancient observers such revolutions of the stars coincided with the seasons such that solar equinoxes and solstices could be measured by not only the declination or altitude of the sun's ecliptic arc across the sky but also either (1) the rising or setting of specific stars at certain points on the horizon at particular points in the year, or (2) simply the angular attitude relative the horizon of certain constellations or bright stars at specific times of

the day, and usually dawn or dusk, at particular points in the year.¹ Such stars are known as heliacally rising and falling stars.

In this regular system of movement the only points that do not appear to move are the northern and southern celestial poles. From most of the northern hemisphere, of the two only the northern pole is visible. Thus the entire night sky seems to revolve, as a wheel on a hub, in its counterclockwise movement, around this one fixed point in the northern sky. But the celestial poles in fact are not immobile, for the precession of the equinoxes, which results from the circular wobbling of the earth on its own polar axis, as a top, over a period of approximately 25,800 years, causes the apparent northern celestial pole to shift very gradually but always consistently over the ages, at a rate of approximately 0.014° each earth year. Precession is known to have been realized by Hellenistic Greeks only as late as 150 BC and probably slightly later in China, c. 100 BC (for the Greeks, see below this chapter; for the Chinese, see Chapter 3).

The ability to map celestial markers in a relatively accurate manner and thus predict rational celestial motion and events and link them with practical terrestrial contexts, that is, seasonal and annual shifts and geographic positioning, was a long time developing. In the literature treating the history of the ancient development of astronomical science it is often pondered whether the human impulse to observe, mark, and thus understand the formulaic shifting of the celestial canopy originated in a need for either calendrical and navigational or psycho-spiritual guidance. That is, we wonder, which came first, a celestially based calendar or a celestially oriented projection of protective and guiding deities?

Likely we will never know the answer with any certainty, though I should think that calendrical and religious observations of celestial bodies arose roughly in tandem. We recall Marshack's proposition that the human recording of lunar phases began no later than around 28,000 BC and that it likely served a rough calendrical purpose. Probably the beginnings of observing and remembering simpler celestial events, particularly the heliacal rising of certain bright stars, to establish, for food-gathering and migratory purposes, seasonal and annual time, began long before that.

¹ For an explanation of the apparent movements of the heavens, see Kuhn (1957): 1–25.

Some have suggested that the pointed observations of these celestial events led by "the Ice Age," or c. 22,000–18,000 BC, to the construction of fragments of the zodiacal (and, we can assume, other, non-zodiacal) constellations that have been passed down to us through the historical period.² While it is impossible on the basis of no concrete evidence to project backward 20,000 years the beginnings of the development of the constellations as we have inherited them, if we allow Palaeolithic human beings even the slightest intelligence of consciousness (and there is no reason to believe that our ancestors were in their operative mental faculties any dimmer than we) it seems very reasonable to conjecture that any Palaeolithic observation of bright heliacally rising stars involved also projecting onto stellar patterns surrounding them pictures relevant to the real or imagined earth experience of the observers. This is the pattern of constellational creation that we find, at least, in the records of the earliest-developing constellational systems of which we have record, in Mesopotamia, Egypt, Greece, and India. As we have seen, such Lithic constellations would have marked the seasons and years, but they might also have been simply practical measures to enhance identification of the particular heliacally rising star that was significant to the observers. The constellational pictures thus may have served as contextual or even mnemonic prompts.

Of human projection of divine meaning onto the sky we have no clear sources dating to before the appearance of written records, and without written sources our guesses as to origins will always remain guesses. However, the early development of the calendar in Babylon and Egypt and the association in the earliest written records of other cultures of gods with calendrically significant stars, asterisms, and constellations suggests very strongly that the identification of stars with the divine began at least as early as did rough calendrically oriented stellar observation. From what we learn in records evincing omenological traditions that can be traced back to no later than the middle 3rd millennium BC it is reasonable to suppose that, just as human beings did in historically documented civilizations, people of Neolithic, Mesolithic, and Palaeolithic times considered that the stars that marked the seasons for them in fact caused the seasonal changes and, further, affected both public well being and many other associated minute

² Owen Gingerich, "The Origin of the Zodiac," in *Sky & Telescope* 67.3 (3/1984): 220.

facets of individual people's lives. Both the early omenological records and later, 1st millennium BC, horoscopic astrological developments, which we will consider below, justify our conjecturing on reasonable grounds that earlier people with even fewer clues to the workings of the universe that surrounded them also would have projected onto the stars a causal, effective influence over themselves and their earthly environs. As mentioned in the first pages of this book, likely this originated as not only a simplistic response to patterns observed in the environment but also a root psychological impulse to manage the feared unknown. In that such a process to a degree rationalized the universe, the causal relationship established psychologically between stellar phenomena and earth events lessened the extent and intensity of the unknown and thus reduced people's fear of it. Such a projection of causal power onto the sky, then, would have been, in fact, a human grab for power over the awe-inspiring mechanism by which the universe was perceived to operate. This may explain the origin of human projection of not just imagined organizational pictures but also divinity onto celestial bodies.

Almost inevitably in most cultures, as the sky was above, it therefore also was the abode of those above, i.e., deities. In his treatise "On the Heavens" Aristotle (384–322 BC) noted this human tendency to place its gods physically above humanity, in the sky:

For all men have some conception of the nature of the gods, and all who believe in the existence of gods at all, whether barbarian or Greek, agree in allotting the highest place to the deity, surely because they suppose that immortal is linked with immortal and regard any other supposition as impossible. If then there is, as there certainly is, anything divine, what we have just said about the primary bodily substance (i.e., that which is eternal, like the earth and its soils, which neither diminishes nor increases) was well said.³

³ Aristotle, "On the Heavens," in Aristotle, *The Complete Works of Aristotle. The Revised Oxford Translation*, Jonathan Barnes, ed. (Princeton: Princeton UP, 1984): Vol 1, 448.

Aristotle proposed further that the sky itself, being immortal in its consistency, is God, and this in fact defines why it acts the way it does, that is, revolving eternally without change:

The activity of God is immortality, i.e. eternal life. Therefore the movement of God must be eternal. But such is the heaven, viz. a divine body, and for that reason to it is given the circular body whose nature it is to move always in a circle.⁴

Plato (427–347 BC), too, Aristotle's teacher, believed the heavenly sphere to be divine and the stars on its rotating surface imbued by God the creator with divine souls with which they then animated creatures below on earth.⁵ But to Plato God was before, beyond, and exceptional to his imperfect creation, the universe, and perfection was to be found only in the pure reason or principle that underlay and motivated that physical creation.⁶

The Classical Greeks inherited and rationalized both native and endogenous ancient traditions. In their references to the spherical heavens and the perfection of the (mathematical, geometrically ordered) principle by which they had been created, Aristotle's and Plato's words reflect the then-developing Greek geometric astronomy that objectified the universe and all of its parts. But this development rested on an already long evolution of ideas about and observations of the heavens.

Ancient, pre-Classical, Greek expressions concerning the sky reflect a far more intimate, anthropomorphic projection onto that constant companion that is typical of early-literate societies. Consider the character of Zeus, the high god of the Greek elite Olympian pantheon and also the father of all other Olympian gods. Zeus was also the sky god and, as storm god, as well,

⁴ *Ibid.*: Vol. 1, p. 472.

⁵ B. A. G. Fuller, *A History of Philosophy, Revised Edition* (New York: Henry Holt, 1938 & 1945): 164.

⁶ Plato, *The Republic*, Part III, "The Philosopher King," Chapter 26, "Higher Education: Mathematics," Section 4, "Astronomy," 528 E-540 C (Francis MacDonald Cornford, tr. & ed., *The Republic of Plato* [London: Oxford UP, 1941 (rpt. 1981)]: 248).

was the source of thunderbolts and rain. Of course, his name and identity share roots with the PIE god *Dyeus, the Italic god Dies or Deus (or, in the Latinized Greek, Jupiter), which in English becomes both *day* and *deity*, and the Indo-Aryan (and certainly originally Indo-Iranian) sky god and divine father, Dyaus. Thus Zeus (Dyaus, Dies, Deus, Jupiter, *Dyeus) was a pre-Greek sky god dating to prior to the dispersal of the Greeks, Indo-Iranians, and Italics from the PIE continuum, probably of an origin no later than the 6th or 5th millennium BC.

In Zeus there is inherently always reference to the sky. Much like Dyaus in the Indo-Aryan RV,⁷ in early Greek literature Zeus is often identified as the heavenly canopy itself. Thus, in the mid-7th century BC the Greek poet Hesiod wrote in *Works and Days* about the passage from winter solstice to spring equinox that it consisted of diurnal cycles of "Zeus," or the heavens:

When the keen sun's strength stops scorching and sweltering, after mighty Zeus begins the autumn rain... the star Sirius goes but briefly by day above the heads of men who are born to die, having a larger share of the night...⁸

When Zeus completes sixty days of winter after the turning of the sun (the solstice), then the star Arcturus leaves the holy stream of Oceanus and for the first time rises shining just at dusk.⁹

From this it is apparent not only that the ancient Greeks anthropomorphically mythologized the stars but that they also observed their regular and predictable motion and thus

⁷ Compare RV1.89, "Pitar Dyaus," meaning "Heavenly Father," with the common identification of Zeus in Greek literature, "Pater Zeus."

⁸ Hesiod, *Works and Days*, in *Theogony and Works and Days*, tr. M. L. West (Oxford: Oxford UP, 1998): 49.

⁹ *Ibid.*: 54. In passing it is noteworthy that on February 20, 650 BC, viewing the sky from central coastal Greece (or Athens, at 38°N, 121°E) at twilight, or approximately 7:20 p.m., indeed Arcturus rose from "the Ocean," which to the eastern coastal mainland Greeks the eastern horizon was.

from them established annual, seasonal, and nightly rhythms by which human activities could be measured and planned. While the changing altitude of the sun's path across the sky, defined by the ecliptic, literally determines the seasons and the tropical year, the long-term shifts of the stellar canopy as a whole¹⁰ in its annual sidereal cycle also signify seasonal changes and define the slightly longer sidereal year.¹¹ From Hesiod we know that the ancient Greeks understood both measures, even though at this early date they certainly understood none of the oblique circular path on which the sun apparently travels, precise measurements of the tropical or sidereal years, and in fact that there existed any difference in nature or measurement of the tropical and sidereal years.

To many readers certainly the most familiar example that associates the divine with what lies above is found in Levantine tradition, in the Pentateuchal story of creation recorded in Genesis 1:1–2:

In the beginning of creation, when God made heaven and earth, the earth was without form and void, with darkness over the face of the abyss, and a mighty wind [or spirit] that swept over the surface of the waters.¹²

Here the wind or spirit swept *over* all that was, and thus quite apparently it was the nature god of

¹⁰ Despite the great momentum with which each star hurtles through space, due to the great distances relative to the earth-bound observer, angular separations of stars do not change perceptibly. That is, from a terrestrial perspective stars always appear to maintain fixed distances from one another. Thus, aside from the sun, moon, solar-orbiting planets, asteroids, comets, meteors, and, in the modern world, human-originated objects, nothing else in the sky shifts its position relative to its stellar companions.

¹¹ Due to precession the sidereal year does not remain synchronous with the tropical year, falling behind by about 20 minutes each year. The sidereal year is 365 days, 6 hours, 9 minutes, and 9.5 seconds long.

¹² Joint Committee on the New Translation of the Bible, ed. and tr., *The New English Bible, with the Apocrypha* (New York: Oxford UP, 1961, 1970): 1. The parenthetical emendation "[or spirit]" was drawn from the gist of a footnote in the original translation.

the sky — merely the fact that the original *ruah* could mean either wind or spirit assures us that this is so.

Over two millennia before the Genesis creation lore was recorded the pattern of attributing divine identity to heavenly bodies was already well established in the developing Sumerian literate tradition. This we observe in the Sumerian pictograph for what we understand as "god," *dingir* (or *ilu* in Akkadian), ✳, which graphically represents a star and signifies heaven, or what is elevated or superior.¹³ Thus in one graph are connected the meanings of star, god, sky, heaven, and above. Unless we are to believe impossibly that the newly literate culture of Mesopotamia artificially created for its newly literate life an entirely fresh set of beliefs that suddenly involved for the first time the stars in its members' psycho-spiritual constitution, then the tradition of associating divinities with stars had by c. 3000 BC already enjoyed a long, long development.

The Development of Babylonian Astronomy, Omenology, and Horoscopic Astrology

On the basis of the very common theme in early historic Southwest Asian art of the battling bull and lion that seemingly originated in the 4th millennium BC, in the 1960s Willy Hartner identified what he considered the earliest projected Babylonian or Mesopotamian zodiacal constellations to be Taurus and Leo, which, he argued, along with Scorpius had originated in the 4th millennium BC as heliacally rising equinoctial (vernal Taurus and autumnal Scorpius) and summer solstitial (Leo) markers.¹⁴ In that some of the brightest ecliptical stars help to comprise these constellations (Taurus: Pleiades, Alderaban; Leo: Regulus; Scorpius: Antares), it is not unreasonable to assume that people living during or even much earlier than the 4th

¹³ Jean Bottéro, *Religion in Ancient Mesopotamia*, tr. Teresa Lavender Fagan (Chicago: University of Chicago Press, 2001): 58. For further on *dingir*, see below, this volume, Chapter 4, as well as Volume III, Chapter 7.

¹⁴ Willy Hartner, "The Earliest History of the Constellations in the Near East and the Motif of the Lion-Bull Combat," in *Journal of Near Eastern Studies* 24.1–2 (1965): 1–16ff.

millennium BC would have taken note of the season-marking significance of the heliacal rising of these stars and their contextual stellar patterns, but it is indeterminable if anyone had conceived of specifically Taurus, Leo, and Scorpius prior to the 2nd millennium BC.

Another reasonable but unprovable thesis regarding the origins of the Babylonian zodiacal constellations was offered some twenty years later by Alexander Gurshtein, who in a series of articles argued for an evolutionary model of constellational development originating in the 6th millennium BC. Gurshtein identified three quartets of zodiacal constellations, the Gemini (Gemini, Virgo, Sagittarius, and Pisces), Taurus (Taurus, Leo, Scorpius, and Aquarius), and Aries (Aries, Cancer, Libra, and Capricornus), locating their sequential evolution in the context of the precession of the equinoxes. According to Gurshtein, while in the 6th–5th millennia BC the Gemini quartet marked the solstices and equinoxes, by the 4th and 3rd millennia BC, because of the effects of precession on the coordination of the ecliptic and heliacally rising stars, the Taurus quartet now accurately marked seasonal shifts in the night sky. Consequently they were projected, or created, first in the 4th millennium BC to serve as new calendrical markers. Likewise, by the 2nd and 1st millennia BC the Taurus quartet had fallen out of phase with the solstices and equinoxes and was replaced by the Aries quartet, which completed the creation of the zodiac as it was installed to mark annual time synchronously with the solar ecliptic.¹⁵

Unfortunately, there really is no way to truly test either Hartner's or Gurshtein's hypotheses, but it should be noted that the imagining and projection of the mounted archer Sagittarius by people living in a period thousands of years before anyone had, according to our current knowledge, ridden any kind of animal mount is doubtful. Furthermore, Sagittarius does not show up in the well-documented Babylonian constellational history until c. 1000 BC, even though during the Kassite period in Nippur, Sumer, c. 1600–1200 BC, on property boundary-marking stones the figure of a mounted archer appears with other constellational depictions identifiable with, for instance, the later-developed constellations of Aquarius, Capricornus, and

¹⁵ Alexander Gurshtein, "Prehistory of the Zodiacal Constellations," in *Vistas in Astronomy* 36 (1995a): 347–362; idem, "When the Zodiac Climbed into the Sky," in *Sky & Telescope* 93 (1995b): 47–50.

Scorpius.¹⁶ Still, Sagittarius's and, in fact, many other zodiacal constellations' failure to appear in 2nd-millennium BC Babylonian star or constellation lists demonstrates that it was not a standard calendrical or religious/cultural icon universally recognized or applied in Sumer, which one would expect had it been a constellation already having been established by this time for some 4,000 years (it is worth noting that at the same time Capricornus, Scorpius, and Aquarius do appear in star and constellation lists of c. 1200 BC).

However, while no evidence exists to prove outright that people across the world living during or long before the 6th millennium BC projected pictures onto the stellar patterns surrounding heliacally rising stars that marked the seasonal shifts, there is no particular reason to doubt it, either. What seems doubtful is only that people would have projected the specific later-known zodiacal constellations onto star patterns when written Babylonian sources of the 2nd–1st millennia BC reveal clearly that during this period there occurred only a gradual process of knitting, sifting, and codification of the particular asterisms and zodiacal constellations that have since been passed down to us. Indeed, the zodiacal belt was not even recognized as being particularly significant calendrically until c. 1100–1000 BC, as we shall see below.

The knowable, textually represented, origins of Babylonian calendrical science in the 2nd–1st millennia BC evince that both the religious and crude calendrical observation of the night sky had for some time already developed hand-in-hand at the folk level. In the many cultures of the Near East, from Elam in southwest Persia to Sumer, Akkad, Assyria, Syria, and Amurru, during the early 2nd millennium BC state-employed omenologist-astronomers were, on the basis of much older folk wisdom of sky-borne divinities and folk observations of the motions of calendrically significant stellar bodies and events, developing a mathematically oriented astronomy that sought to identify accurately and thus fix calendrically the salient moments of the

¹⁶ For illustrations and descriptions see William John Hinke, "A New Boundary Stone of Nebuchadrezzar I. from Nippur, with a concordance of proper names and a glossary of the kudurru inscriptions thus far published," in H. V. Hilprecht, ed., *The Babylonian Expedition of the University of Pennsylvania, Series D: Researches and Treatises* (Philadelphia: University of Pennsylvania, 1907): 98–115. For a reproduction of Hinke's illustration of Capricornus based on his rubbing of the stone, see below, Volume II, Chapter 1, Figure 5.

combined tropical (solar ecliptic) and sidereal (stellar) year. Ever more accurately, between c. 2000 and 400 BC they fixed the points in the year at which heliacally rising "stars," including constellations and the naked-eye-visible planets (Mercury, Venus, Mars, Jupiter, and Saturn) marked monthly, seasonal, and annual points of change. Persistently observing stellar motion and recording their observations, the efforts of the scribes responsible for these astronomically oriented activities led to the establishment of the world's earliest known observationally and mathematically derived accurate calendars.

During the Old Babylonian period (c. 2000–1600 BC) in Babylon astronomers had already established a twelve-month standard calendar that was issued throughout the kingdom. With months of twenty-nine or thirty days, their short year of 354.46 days required intercalation, though this was carried out only irregularly until the 6th century BC.¹⁷ During the Old Babylonian period these astronomers had also begun employing a linear zigzag function to determine periodic variations in time with reference to the equinoxes and solstices.¹⁸ By no later than c. 1000 but perhaps as early as c. 1561 BC they had recognized the periodicity of Venus's phenomena and had observed and recorded the planet's patterns of motion sufficiently to predict its periods of visibility and invisibility.¹⁹ Between c. 1400 and 900 BC these omenologist-astronomers had also observed and recorded carefully the occurrences of lunar eclipses and, some sources may indicate, by the 7th century BC had successfully predicted them.²⁰ During approximately these same centuries, the Babylonian astronomer-omenologists mapped the sky progressively more accurately, identifying up to sixty constellations and eventually their usually fairly accurate dates of heliacal risings, as well as the five naked-eye-visible planets of Mercury,

¹⁷ Bartel van der Waerden, *Science Awakening II: The Birth of Astronomy* (Leiden: Noordhoff; NY: Oxford, 1974): 47.

¹⁸ Hermann Hunger and David Pingree, *Astral Sciences in Mesopotamia* (Leiden, Boston, & Köln: Brill, 1999): 49–50; 53.

¹⁹ See Hunger-Pingree (1999): 32–39 for the dating of the text in question, "The Venus Tablet of Ammisaduqa," to c. 1000 BC; for the possible earlier date of 1561 BC see van der Waerden (1974): 50–56.

²⁰ van der Waerden (1974): 90–1.

Venus, Mars, Jupiter, and Saturn. By the 5th century BC they had recognized and identified the ecliptic and populated it with essentially the twelve zodiacal signs that define still the geocentric sidereal year.

But quite apparently neither objective knowledge of skyborne phenomena nor even calendrical accuracy seems to have been an end goal in itself. From earliest times Babylonians and their Sumerian predecessors in Mesopotamia identified celestial objects, including the sun, moon, planets, and stars, with their gods. Three most obvious examples include the later king of the gods, Marduk; the goddess of love, Ishtar (Inanna); and the god of war, Nergal, identified respectively with the planets Jupiter (*nibirum*, or UD.AL.TAR), Venus (DIL.BAT), and Mars (*salbatanu*).²¹ Indeed the earliest known textually recorded astronomically oriented traditions in Mesopotamia, those of the *Enūma Anu Enlil* (hereafter *EAE*) omenological tablets and their predecessors, dating to c. 1600 BC and later but having evolved from Sumerian traditions of some 800–1,000 years previous,²² in their astronomically oriented sections display concern primarily with the interactions of celestial bodies and their motion with human and natural earth events and circumstances. We may note first that the name by which these tablets have been known already indicates clearly the divine source of the omens recorded: *Enūma Anu Enlil*, a phrase that precedes every omen, means "When the gods Anu and Enlil..." and refers to the father-and-son high sky gods of the Sumerian pantheon of the 4th–3rd millennia BC and later. The tablets thus evoke the power of the gods that lie behind both the celestial motions and the omens.

In the *EAE* tablets particularly lunar eclipses and the motions of Venus, Jupiter, and Mars drew omenologists' attention. Celestial events were thought to either signal or cause events that would occur in the human-natural earthly environs. For example, often the appearance of Venus, identified as the goddess of love, Ishtar, was thought to augur good fortune, while the presence of Mars, as the god of war Nergal, signaled potential trouble.²³ Warnings offered by the

²¹ van der Waerden (1974): 47. Upper-case type represents that the word is Akkadian; lower-case italic type indicates that the word is Sumerian.

²² Hunger-Pingree (1999): 6–7.

²³ van der Waerden (1974): 59.

movements of the divine celestial phenomena enabled the king, on the advice of his expert omenologists, to avert the signaled ill fortune through prescribed ritual response. In this non-horoscopic and, aside from the person of the king, non-individualistic astrological system omens warned of both greater public or state and personal kingly peril. Astral divinity thus stimulated Babylonian, and surely earlier Sumerian, observation of celestial phenomena. It was mostly for the purpose of discovering the auguristic meanings to humanity of lunar eclipses and planetary and stellar periodicity that accurate records of lunar eclipses and the periods of Venus's motion had been compiled by c. 1100–1000 BC.²⁴

Further attestation of the religious orientation of and stimulus to the development of Mesopotamian astronomical traditions is found in the *Enuma elis* (hereafter *EE*), the world's first known creation epic. Surviving *EE* texts date to c. 1000–750 BC but are written in an Akkadian language style that dates to c. 1500–1250 BC. Many of the story segments from which the tale was stitched together date to the Sumerian period in the 3rd millennium BC (e.g. the theogony of the Sumerian Anunnaki gods; the cosmogony or creation of the universe) and the Old Babylonian period (c. 2000–1600 BC), but the ascendancy of Marduk (Jupiter) to his reign as active king over the pantheon and creator and administrator of the known universe, having occurred during the reign of Hammurabi (r. c. 1727–1685), dates the story in its present form to between c. 1700 and 1250 BC.²⁵

In Tablet V of *EE* Marduk, having just dispatched his ancestress Tiamat in order to thereby succeed to the rulership of the bevy of gods in the pre-human and uncreated universe, is said to have created heaven and earth from parts of Tiamat's corpse. Central to this process was his establishment of a calendrically reliable structure and system by fixing the gods as stars in the

²⁴ On the *EAE* tablets and their omenological and astrological content and significance see particularly Hunger-Pingree (1999): 5–50; and van der Waerden (1974): 49–59.

²⁵ Thorkild Jacobson, *The Treasure of Darkness: A History of Mesopotamian Religion* (New Haven and London: Yale UP, 1976): 167–191; idem, "The Battle between Marduk and Tiamat," *JAOS* 88.1 (Jan.-Mar. 1968): 104–108; E. W. Lambert, "Review of 'E. O. James, *The Worship of the Skygod: A Comparative Study in Semitic and Indo-European Religion*,'" in *BSOAS* 27.1 (1964): 157–158; and Alexander Heidel, *The Babylonian Genesis* (Chicago and London: University of Chicago Press, 1942): 12–14.

firmament and apportioning three (heliacally rising) "stars," i.e., stellar phenomena including constellations, among each month of the year:

He created stations of the great gods;
The stars, their images, as stars of the firmament, he fixed.
He determined the year, defined the divisions;
For each of the twelve months he set up three constellations.
After he had defined the days of the year by means of constellations,
He founded the station of Nibiru (Jupiter, i.e., the path of Anu)
To make known their duties.
That none might go wrong and be remiss,
He established the stations of Enlil and Ea together with it.
He made strong locks to the left and right.
In the very center thereof he fixed the zenith.²⁶

In this scheme the sky is divided into three sectors, or paths, named after the high gods Ea, Anu, and Enlil of the 4th–3rd-millennia BC Sumerian Anunnaki pantheon. The three paths were demarcated latitudinally at approximately 17° N and S of the celestial equator (the imagined arc defining the midpoint between the poles), at least according to contemporary and later texts that define so conceived a sky in more detail and with greater precision.²⁷ Mapping the sky on a flat plane with the NCP at the center, such a scheme is drawn as three concentric circles.

²⁶ Translation modified slightly from Heidel (1942): 44.

²⁷ The placement of the demarcations of the paths at 17° N and S of the celestial equator derives from van der Waerden (1974: 47; and idem, "Babylonian Astronomy. II. The Thirty-Six Stars," in *Journal of Near Eastern Studies* 8.1 (January 1949): 16), who followed Schaumberger. Hunger-Pingree (1999: 61) settled rather on approximately 15° N and S for the borders of the path of Anu and in this perhaps followed Bezold, whose estimations Schaumberger adjusted (see also p. 62 for Hunger and Pingree's estimation of 13° N and 11° S as the demarcation points between the actual constellations populating the paths of Enlil and Ea, respectively, in texts dating to c. 1100–1000 BC, to be discussed below).

Ea, the god of fresh waters and the freshwater sea, governs over the outer ring (17° S and south). Anu, the father of the Anunnaki gods and forever ultimately the highest god, reigns over the middle sector (17° S to 17° N), and Enlil, Anu's son and successor as chief administrative god during the Sumerian period in the 3rd millennium BC (though Anu never lost his highest godly ranking),²⁸ rules over the center circle (17° N and north). The celestial equator (not yet the ecliptic) falls in the middle of the path of Anu at, of course, 0°. In this stellar cartograph months are demarcated by drawing twelve radial rays connecting the NCP in the center with points on the outermost circumference that signifies the real and projected horizon, across the concentric circles representing all three paths. Essentially, the developers of this scheme were attempting to unify the tropical and sidereal years by combining schema identifying the annual movements of both the sun and heliacally rising stars.

This system we understand from three groups of contemporary and later religio-astronomical cuneiform documents that developed from or alongside the system outlined in *EE*.

²⁸ That Anu retained his highest ranking among the gods even into the Assyrian period is very apparent from his first ranking and numerical assignation of 60 in the *An: ^dAnnum* god list. Furthermore, while in 3rd-millennium BC lore Enlil inherited the reins of active authority from Anu but then in 2nd-millennium BC reorganizations of the pantheon relinquished them to Marduk, Enlil remained the second-highest-ranking god, assigned the number 50 in the same text. For a reconstruction and translation of *An: ^dAnum* see Richard L. Litke, *A Reconstruction of The Assyro-Babylonian God-Lists, An: ^dAnum and An: Anu Sa Amēli* (New Haven: Yale Babylonian Collection, 1998): 20, 37. This indicates clearly that, unlike the Greek mythical tradition whereby Kronos castrates and casts out his father Uranos and Zeus in turn vanquishes his father Kronos, which tales surely derived from the Mesopotamian lore of the passage of active power from Anu to Enlil and Enlil to Marduk, in Mesopotamia the transition of power among chief gods was not accompanied by a violent patricide. The Greek patricide seems to have derived instead from battles recounted in Mesopotamian lore (in the *EE*) that were induced by older ancestral gods' attempts to harness the energies of their progeny, young gods such as Ea/Enki and Marduk. In Mesopotamian lore Anu's grandparents and the ultimate originators of all, the god Absu (Apsu) and the goddess Tiamat, were slain brutally by Anu's son Enki/Ea and Ea/Enki's son (and thus Anu's grandson) Marduk, respectively, with the consent of Tiamat herself in the case of Absu and Anu in the case of Tiamat. Greek tradition seems to have combined elements of both of the Mesopotamian traditions of the overthrow of the ancestors and transmission of power through generations of divinity. The difference is that in Mesopotamia, while the earlier revolution against Absu and Tiamat was bloody and the later two transferences (Anu to Enlil to Marduk) cordial, in Greek lore the story centers on the hatred felt by Kronos for his father Uranos and Zeus for his father Kronos. It is noteworthy that in almost all cases the gods involved in owning power are gods of the sky and/or storm gods, including Anu, Enlil, Marduk, Uranos, Kronos, and Zeus.

These are the lists known as the Great Star Lists, the Three Stars Each (or Astrolabe) lists, and the ^{MUL}APIN texts, dating to between c. 1700 and 600 BC and demonstrating increasingly accurate and sophisticated astronomical observation and understanding. The first group, the two so-called Great Star Lists, delineate the thirty-six supposedly heliacally rising stars and constellations of the three paths of Ea, Anu, and Enlil referenced in Tablet V of *Enuma elis* (the thirty-six stars represent the *EE*'s three stars for each of the twelve months, among the three paths). Here, however, the paths are identified using the names of the three most significant political demarcations in Old Babylon, the state of Elam geographically of the east, Ammuru of the west, and Akkad of the center. It is noteworthy that Akkad governed the cosmologically central sector otherwise, as in *EE*, understood to be the path of Enlil, clearly reflecting Akkad's centrality and political superiority in Old Babylonian Mesopotamia. Thus we can postulate that the star lists were compiled in Old Babylon. Further helping to date the lists to Old Babylon is the fact that, like Tablet V of *EE*, they denote Jupiter (Marduk's station) using the old Sumerian name of *ni-bi-rum* (as contrasted with the later-used Akkadian UD.AL.TAR, which also appears in these lists). But actually the lists, or their predecessors, likely date to some 500 to 1000 years earlier than Hammurabi's reign (c. 1727–1685 BC) in Old Babylon, to the Sumerian period. This we gather from the fact that nearly all of the star/constellation names in the Great Star Lists are either old Sumerian names or Akkadian adaptations of old Sumerian words.²⁹

Although the Great Star Lists would have been very inaccurate in identifying truly heliacally rising stars in the twelve months of the year, this may have been due in part to irregular intercalation in the Old Babylonian period. However, their inaccuracy also is surely due to the fact that early Babylonian astronomy was based as much on mythology as astronomical

²⁹ On the Sumerian heritage of Babylonian omenological-astronomical traditions see Hunger-Pingree (1999): 6–7; van der Waerden (1974): 49; and E. C. Krupp, "Night Gallery: The Function, Origins, and Evolution of the Constellations," in *Archaeoastronomy* 15 (2000): 47. For a discussion of interesting work by Kathleen Adamson identifying Neo-Babylonian cylinder-seal art motifs with similar motifs found in both earlier Babylonian and even Sumerian times, see David H. Kelley and Eugene F. Milone, eds., *Exploring Ancient Skies: An Encyclopedic Survey of Archaeoastronomy* (NY: Springer, 2006): 213–216. See also their source, Kathleen M. H. Adamson, *Iconography of Istar* (University of Calgary Ph.D. dissertation, 1988).

observation and calculation.³⁰ The Great Star Lists, though astronomically oriented, were, like *Enuma elis*, informed more by the placement of gods in appropriate places in the firmament to identify them with stars and constellations than by actual correspondences to observed patterns of stellar motion. They reflect the creation in the 3rd millennium BC of the pan-Mesopotamian Anunnaki pantheon out of the diverse local traditions of divinity scattered across the Mesopotamian city-states of the period.³¹ Examples of stars/constellations included in the lists that demonstrate the lists' inaccuracy include the planets Jupiter and Mars and the constellation MAR.GID.DA, or Wagon, denoting the Big Dipper. Given that Jupiter and Mars do not rise in a fixed month of the year and the Dipper did not rise at all since it was circumpolar, very apparently these skyborne phenomena were included in the lists for either contextual or mythological reasons (and likely both) since they could not have been heliacally rising.³²

The increasingly accurate Mesopotamian observational and stellar mapping tradition continued to develop throughout the 2nd and 1st millennia BC, culminating first in the Babylonian Three Stars Each star lists of c. 1200 BC, or the so-called tripartite Astrolabes (lists that apparently in their original format were circular stellar maps delineating the positioning in the sky of thirty-six supposedly heliacally rising stars)³³ that have been reconstructed from them, and later the famed Assyrian lists of thirty-six stars and sixty constellations recorded in the ^{MUL}APIN ("^{STAR}PLOUGH" = the star Gamma Andromedae + the Triangulum constellation) texts whose

³⁰ van der Waerden (1949): 11–12, 17; Hunger-Pingree (1999): 53.

³¹ van der Waerden (1949): 11–12.

³² For identification of the stars of Elam, Amurru, and Akkad in the Great Star Lists see van der Waerden (1974): 68; idem (1949): 11.

³³ On the apparent original circular format of the Three Stars Each lists see van der Waerden (1974): 65. For Schott's original reconstruction of the circular arrangement of the star list of 1200–1100 BC see Albert Schott, "Das Werden der babylonisch-assyrischen Positions-Astronomie und einige seiner Benignungen," in *Zeitschrift der Deutschen Morgenländischen Gesellschaft* 88 (1934): 308; van der Waerden's printing, which I reproduce in **Figure 1**, follows Schott's (van der Waerden, 1949): 9, and idem (1974): 66. For a simple three-dimensional reconstruction of the ^{MUL}APIN thirty-six star list of 687 BC see Bartel L. van der Waerden, "History of the Zodiac," in *Archiv für Orientforschung* 16 (1953): 221.

sources date to c. 1100–1000 BC. **Figure 1** shows a reconstructed three-ring astrolabe that these texts describe.

The earliest among several known Three Stars Each astrolabe lists is what has been termed Astrolabe B, which was copied apparently soon after 1200 BC but based on observations that date to c. 1400 BC.³⁴ The famous Pinches Astrolabe, or Astrolabe P, i.e., that which T. G. Pinches reconstructed in 1900 from several tablets and which thereby drew attention to the original circular format of these lists, derives from Astrolabe B and dates to much later, just prior to 700 BC.³⁵ Several other lists survive, all being virtually identical with B and P. Here we focus on Astrolabe B, the earliest and most elaborate series of lists among this type of text.

³⁴ van der Waerden dated the observations that informed the various Three Stars Each lists to between 1400 and 900 BC (1949: 16–17). For dating, see also the following note.

³⁵ For dating of the astrolabe lists see Hunger-Pingree (1999): 50–53. For Pinches' astrolabe see T. G. Pinches, "Review of R. Brown, *Researches into the Origin of the Primitive Constellations of the Greeks, Phoenicians, and Babylonians*," in *Journal of the Royal Asiatic Society* 1900: 571–577.

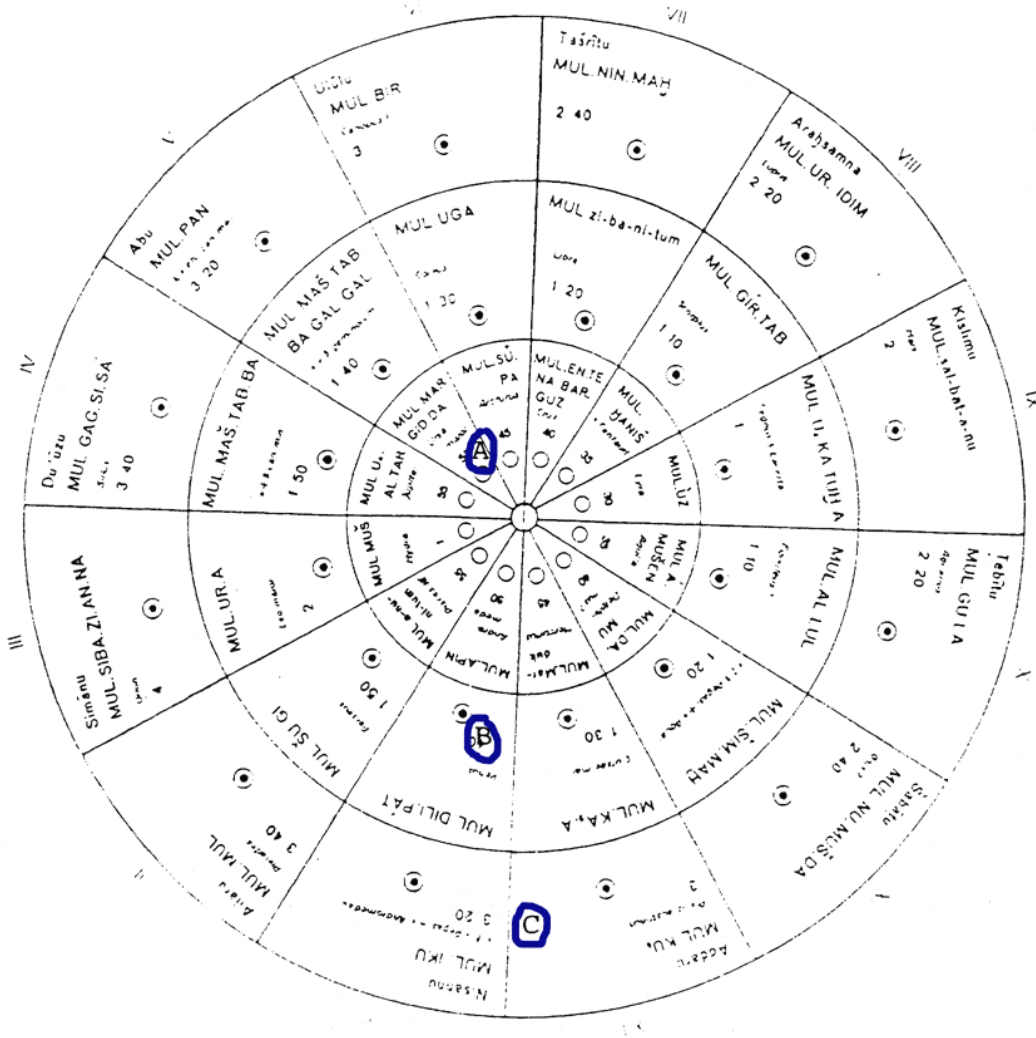


Figure 1. *Astrolabe B*, from van der Waerden (1949: 9), after Schott (1934: 308). A = Enlil's inner polar circle; B = An/Anu's middle circle of the sky; C = Ea/Enki's outer circle.

There are three sections to *Astrolabe B*. The first two sections list thirty-six stars and constellations apportioned among either the twelve months of an unintercalated solar year or one of the three paths of the sky that we saw appeared also in the Old Babylonian Great Star Lists and were reported in Tablet V of *EE*. Here the paths have been formalized and identified explicitly with the names of the gods Ea (outer or southern), Anu (middle), and Enlil (inner or northern), following Tablet V of *EE*. The first list of *Astrolabe B* also identifies the stars/constellations each with a god and appends miscellaneous mythological comments. The

stars/constellations named are, but for one exception, identical to those identified in the Great Star Lists (and even the exception is merely a different name for the same object, Jupiter/Marduk). The third section lists one constellation from each path for each of the twelve months and then claims that the three constellations of each month rise heliacally in that month and then set heliacally seven months hence. This represents wishful thinking inherited from the mytho-astronomical tradition embodied in *EE* and the Great Star Lists and is grossly inaccurate. Also unreliable is the list of heliacal risings themselves: in projections backward to c. 1200 BC many of the stars/constellations said to rise heliacally do not do so in the months to which they're assigned. Furthermore, when comparing these stars as listed here with the same stars listed in later, more accurate (the ^{MUL}APIN), tables, some thirteen of the thirty-six appear in the wrong paths.³⁶ The inaccuracy of the stated heliacal risings may, as in the Great Star Lists, again be partially a problem of a lack of intercalation. However, the misplacement of some of the stars/constellations in incorrect paths (when comparing against the more accurate later tables) may have resulted in part from changes made in the degrees imagined to demarcate the paths (i.e., a shift from 17° S to 15° S in identifying the border between the paths of Ea and Anu, and from 17° N to 15° N between Anu and Enlil, might explain some of the inaccuracies). Still, the primary culprit seems to remain the omenologist-astronomers' overindulgence in the mythological idealization of the stellar universe: the system in the astrolabes continued to derive as much from religion as it did from astronomical observation.

Inaccurate as they surely were, particularly interesting in the astrolabe arrangements is that they formalized a four-season year among the three delineated paths and have recognized as occurring among the seasons twelve artificial (sidereal) months of equal length (30°) that together describe an idealized (inaccurate) combined tropical-sidereal year of 360° and 360 days. In this system three months each are apportioned to Ea and Enlil, and six to Anu. In brief, the Three Stars Each lists appear to simply formalize the system inherited from the vague Great Star Lists and *EE*.

Only by about 1100–1000 BC were Babylonian astronomers seemingly shedding the

³⁶ Hunger-Pingree (1999): 50–51.

mytho-religious foundations of their astronomical tradition. In the ^{MUL}APIN series of tablets that date to the early 7th century BC and later, but whose source astronomical observations date to as early as c. 1400 BC in Assyria and whose textual sources date to c. 1100–1000 BC,³⁷ astronomical accuracy had improved immensely. The ^{MUL}APIN series is contained in two tablets. Tablet I is the most significant, comprising six star lists that demonstrate that the Assyrian astronomers who inherited the Babylonian tradition had learned to measure quite accurately nocturnal time intervals using clepsydras (water clocks) and thus also space differentials between stellar events (risings, settings, and culminations).

List 1 delineates seventy-one celestial objects, including sixty rising and setting and six circumpolar constellations, as well as the five naked-eye-visible planets. All are apportioned, as in previous lists, among the three paths of Ea, Anu, and Enlil: thirty-three in Ea, twenty-three in Anu, and fifteen in Enlil. Here the four seasonal sectors comprised by the three paths are identified explicitly with certain sidereal months of an ideal year (Anu = months 12–2 and 6–8; Enlil = months 3–5; Ea = months 9–11), with equinoxes falling on the fifteenth of the first and seventh months and solstices on the fifteenth of the fourth and tenth months. The list still relies in part on the mythological foundations apparent earlier in the Great Star Lists and Three Stars Each lists and is therefore still idealized, but many constellations have been moved across the paths and many more new constellations have been introduced to create a far more accurate stellar map and calendar for its time than either the Great Star Lists or the Three Stars Each lists had been.³⁸

List 2 provides dates in an ideal sidereal year (12 months @ 30 days/month = 360 days = 1 year) for the heliacal risings of thirty-five constellations. Twenty-four among the constellations correspond directly to the thirty-six constellations of Astrolabe B, and among those, while eleven rise in the same month in both lists, thirteen have changed positions in ^{MUL}APIN List 2.³⁹ List 4,

³⁷ See Hermann Hunger and David Pingree, *MUL.APIN: An Astronomical Compendium in Cuneiform* (Horn, Austria: Verlag Ferdinand Berger & Söhne Gesellschaft M. B. H., 1989): 10–12.

³⁸ Hunger-Pingree (1999): 58–62; van der Waerden (1949): 14–16.

³⁹ van der Waerden (1974): 75; idem (1949): 16.

which is based on List 2, gives time intervals between dates in an ideal sidereal year of the heliacal risings of pairs of constellations. While Lists 2 and 4 have improved upon the accuracy of the Three Stars Each lists, they still fall far short of offering consistently reliable risings.⁴⁰

List 3 offers observed and carefully compiled simultaneous risings and settings of constellations; more than any other, this list has allowed modern historians of astronomy to identify the constellations and stars of the ^{MUL}APIN and earlier star lists.⁴¹ Also beneficial in this task have been Lists 5a and 5b, which identify culminations (when a star is on the meridian) and combined culminations-risings of sets of stars. While in many cases erroneous, these lists still demonstrate a certain precision with which the astronomers were able to measure time against space using the clepsydra.⁴² Finally, List 6 identifies seventeen constellations in the path of the moon and, further, an exemplary star of each constellation that was "touched" by the moon in its passing. Dating to c. 1100 BC, this first-ever list of what are essentially zodiacal constellations certainly made its way within a couple of centuries to India, where virtually the identical constellations were transformed (only by splitting in two certain of the Babylonian constellations and otherwise adding constellations outside of the lunar ecliptic) into the twenty-eight *naksatras*, or lunar mansions.⁴³ From India the system of twenty-eight lunar mansions (or, really, celestial lunar lodges) certainly was transferred to China, where it is first attested there painted as a complete system on a lacquer chest recovered from the tomb of Marquis Yi of Zeng, which is dated to c. 433 BC (see below, Volumes II and III). It is certain that the Chinese adapted some of their pre-existing indigenously developed constellations to this newly imported system.

The limitation that persisted in both the Three Stars Each and ^{MUL}APIN schemes was that

⁴⁰ Hunger-Pingree (1999): 65–68.

⁴¹ For such identifications see van der Waerden (1949): 8; idem (1953): 219; idem (1974): 72–3; Hunger-Pingree (1999): 271–277.

⁴² van der Waerden (1974): 77–79; Hunger-Pingree (1999): 65–70.

⁴³ David Pingree, "MUL.APIN and Vedic Astronomy," in Ake W. Sjöberg, Hermann Behrens, Darlene Loding, and Martha Tobi Roth, eds., *DUM-E₂-DUB-BA-A. Studies in Honor of Ake W. Sjöberg* (Philadelphia: Samuel Noah Kramer Fund, University Museum): 439–442; Hunger-Pingree (1999): 71–73.

while the sun's annual motion was divided into twelve equal (sidereal) parts, the seasonal or tropical sectors of Enlil, An, and Ea that describe the zodiacal belt remained only four, not twelve, and thus the twelve sidereal months did not correspond to the twelve parts of the actual ecliptic, or the tropical year. However, in the ^{MUL}APIN texts, from among the thirty-six stars or constellations that in the earlier lists had been distributed throughout the sky with no special concern for the ecliptic, seventeen now have been established along the zodiacal belt. This new arrangement signifies that the Assyrian astronomers were already aware that the sun, like the moon, traveled in an apparent oblique circle (the wandering ecliptic) and did not merely move latitudinally north and south in the sky. By 600 BC Babylonian astronomers were consistently placing planetary motion along the ecliptic, as well,⁴⁴ demonstrating clearly that they understood the oblique circular nature of the ecliptic belt.

By 587 BC, during the apogee of the prestige of the Chaldean dynasty of Babylon (626–539 BC), the number of zodiacal or ecliptic signs/constellations in this advancing Babylonian-Assyrian astronomy had been reduced to twelve (VAT 4956), and by 419 BC, long after Babylon had, in 539 BC, fallen under Achaemenid Persian dominance, the final adjustment correcting the zodiacal seasonal division from four to twelve had been made, when a planetary text (VAT 4924) denoting twelve signs, or divisions of the zodiacal belt along the ecliptic, as accurate monthly divisions of the year was produced.⁴⁵

Not long thereafter this refined Babylonian/Chaldean zodiac made its way to Greece, where by 366 BC it was recorded in Eudoxus of Cnidus's *Phaenomena*. The zodiac expressed in this text, though lost early on, was transmitted in essence by Aratus of Soli in his own poetic record of the same name dating to 270 BC. The Greeks adopted the Babylonian twelve zodiacal and eighteen other constellations virtually wholesale, in most cases simply translating or adjusting the names to suit Greek usage or tastes. Non-Babylonian elements of some signs

⁴⁴ van der Waerden (1949): 23.

⁴⁵ van der Waerden (1953): 219–220.

included in the Greek zodiac derived from either native Greek folk traditions or from Egyptian sources.⁴⁶

During these, the 5th through 3rd, centuries BC the Greeks developed their mathematically founded geometric astronomy based on the inherited Babylonian-Assyrian observational and mathematical astronomy, including the crucial element of the discovery of the obliquity of the solar ecliptic.⁴⁷ Around 150–130 BC Hipparchus of Nicaea (fl. c. 190–120 BC) systematized the Chaldean and Greek astronomical discoveries (and perhaps in this he borrowed from the later famed Chaldean astronomical synthesizer Kidinnu, fl. c. 4th century BC) and from this foundation discovered (1) the precession of the equinoxes, (2) an accurate mathematical computation of the motions of the sun and moon, and, therefore, also (3) how to predict solar eclipses. Circa 150 AD Ptolemy (Claudius Ptolemaeus, fl. c. 90–168 AD) improved upon the uncoordinated star catalog produced by Hipparchus, carefully identifying each star within the forty-eight constellations that he recorded (including the twelve zodiacal constellations). It was ultimately from Ptolemy's *Almagest* (*Syntaxis*) that, through intervening Arab and later Latin translations, the constellational organization that Johann Bayer reproduced in his *Uranometria* of 1603, and thus our zodiacal and thirty-six other constellations and asterisms among the eighty-eight now recognized internationally, derived.⁴⁸

⁴⁶ van der Waerden (1953: 218) believed that except for the insertion of Aries, which "Greek" constellation/sign he thought might have derived from Egyptian tradition, the three other constellations/signs of the Babylonian zodiac that the Greeks altered constituted mere adjustments to the original Babylonian signs. His assertion has been largely reinforced by Hunger-Pingree's determination of the Babylonian-Assyrian constellations. See Hunger-Pingree (1999): 271–277.

⁴⁷ Anaximander is usually credited with having discovered the obliquity of the solar and lunar ecliptics c. 550 BC, but this is already implied in the ^{MUL}APIN texts of c. 687 BC, as reviewed above.

⁴⁸ For a both technical and readable account of the significant influence of Babylonian on Greek astronomy, see Otto Neugebauer, *A History of Ancient Mathematical Astronomy*, 3 vols. (New York, Heidelberg, Berlin: Springer-Verlag, 1975): v. 2: 573–614. For the transmission and development of astronomical science through Arabic and Latin literature, from Ptolemy to Kepler (16th–17th c. AD), see Albert van Helden, *Measuring the Universe. Cosmic Dimensions from Aristarchus to Halley* (Chicago & London: University of Chicago Press, 1985): 15–94.

It should be noted that although much of the stimulus for the development of astronomical science in Babylon lay in the religious projection of divine identity and power onto celestial bodies, the practice of zodiacal or horoscopic astrology could not have begun prior to the zodiac's having been established on the basis of scientific observation and calculation between c. 1100 and 400 BC, and indeed there is no record of an astrological interpretation of zodiacal constellations or signs from prior to about 410 BC.⁴⁹ We may mention here as well that while we know from our previous quotations from Hesiod and Homer that in the Greek tradition predating the importation of the Babylonian zodiac (and astronomical science) during the 5th century BC the pre-Classical ancient Greeks associated mythical lore of divinities with celestial bodies, they had not developed themselves a zodiacal science. Nor then could the rich body of Greek divine myth associated with the Babylonian-derived constellations have developed together with those constellations. Greek myth seems rather to have been applied retroactively and rather abruptly to the Babylonian- and Assyrian-organized mapping of the zodiac that had passed first through the crucible of Hellenistic syncretisms as represented by Eratosthenes (c. 250–200 BC). The earliest known adaptations of Greek sky myths to the Babylonian-Hellenistic constellationary cartograph are found in works compiled quite late, such as the *Catasterismi* (1st or 2nd c. AD) by a so-called pseudo-Eratosthenes, and the *De Astronomia* (*Poeticon Astronomicon*), written by an apparent impersonator of the Latin author Gaius Julius Hyginus (64 BC – AD 17) known as pseudo-Hyginus (c. 1st c. AD).⁵⁰

Egyptian Astronomical Observation and Astronomically Oriented Religion

We know that Egyptian astronomical observation had begun by the beginning of the 3rd millennium BC since in a 1st Dynasty (2920–2770 BC) royal tomb Sirius (Sothis) is described to

⁴⁹ A. Sachs, "Babylonian Horoscopes," in *Journal of Cuneiform Studies* 6.2 (1952): 52 (49–75).

⁵⁰ Krupp (2000): 44–45.

be the "bringer of the new year and of the [Nilotic] inundation."⁵¹ Furthermore, in Pyramid Texts dating to the 5th and 6th dynasties of the Old Kingdom (c. 2465–2134) some stars and constellations are mentioned among some 700 astronomically oriented spells. By the late-16th and early-15th centuries BC, both the Egyptian Northern (polar) and Southern (roughly, zodiacal) Groups of Egyptian constellations, as well as Sirius and Orion, had been delineated to the degree that they could be painted on the ceilings of royal sarcophagi and tomb chambers. The Southern Group of thirty-six constellations, called decans, were, very much like their early Mesopotamian thirty-six star counterparts, simple longitudinally divided ten-degree sectors that together defined both a rough annual solar calendar of 360 days and a diurnal twelve-hour night time-reckoning system.⁵² This was a very unsophisticated astronomy, no doubt dating at least in part but perhaps substantially to the Old Kingdom, that did not develop either mathematically or observationally beyond its initial organization and thus did not contribute in any recognizable way to the maturation of the more sophisticated Babylonian or Mesopotamian system. Some of the Egyptian decans did, however, during the Hellenistic Egyptian Seleukid period (311–83 BC), become intermingled with the combined Babylonian-Greek zodiac, the results of which can be observed, for instance, in the pictorial Roman-period round zodiac of Dendera (1st c. AD; see further below, **Figure 3**).⁵³

⁵¹ van der Waerden (1949): 7.

⁵² Each decan appeared in the night sky for ninety nights, migrating gradually from east to west until it disappeared below the western horizon. Seventy nights later it returned in the evening at the eastern horizon. Each successive decan culminated above the eastern horizon ten nights after the previous one. Later the system was adapted to nightly hourly measurement. On the decans and their dating, see O. Neugebauer and Richard A. Parker, *Egyptian Astronomical Texts III. Decans, Planets, Constellations and Zodiacs* (Providence and London: Brown UP and Lund Humphries, 1969), *passim*. See also Neugebauer (1975): Vol. 2, 560–8.

⁵³ For a photographic reproduction of the Zodiac of Dendera see below, **Figure 3**, as well as Giorgio de Santillana and Hertha von Dechend, *Hamlet's Mill. An Essay on Myth and the Frame of Time* (Boston: Gambit, 1969): 216–217.

Early Indian Stellar Observations

Without a script, or without its having been deciphered, we cannot really know the extent to which the people of the Harappan-Indus civilization might have developed an organized mapping of the night sky. Still, many scholars believe that the balance of the 400 or so symbols found on Harappan seals and other media denote stellar divine and, derivatively, human personal or office, names, after the practice followed in Mesopotamia from no later than the 3rd millennium BC of associating humans with stellar divinities through names. As Farmer, Sproat, and Witzel have written of the Harappan symbols' meaning,

Their most likely function, as suggested by Near Eastern parallels, was to associate individuals, families, clans, offices, cities, festivals, or professions, etc., with specific gods or their celestial counterparts, partly for identification purposes and partly to draw down whatever magic was accessible through those gods' symbols.⁵⁴

I agree that the symbols likely are indeed steeped in Harappan-Indus religious significance and that they denote religiously pregnant celestial objects, but this obviously must remain theoretical, and the theory's discussion would best be left to the proper context, below in this chapter and Chapter 4.

Early Vedic astronomy is quite vague, and the dating of the more explicit astronomical texts associated with the Vedas has posed a problem for historians of Indian astronomy for over two hundred years. In essence, however, only the Vedas themselves can be taken to represent the culture of the earliest strata of Vedic society known to us, and later-appended or -emended texts must be dismissed from a discussion of early Vedic astronomical knowledge. These texts include particularly the *Jyotisha Vedanga*, for which a date of composition of 1370 BC has been

⁵⁴ Farmer, Sproat, and Witzel (2004): 42–3.

claimed but which certainly was drawn up only as late as between c. 400–200 BC and 400 AD,⁵⁵ and the *Surya Siddhānta*, traditionally claiming for itself a date of 3102 BC by its description of a conjunction that was supposed to have but did not occur in that year, which was compiled c. 1068 AD and later.⁵⁶

Drawing from the RV text itself, we have very few clear and consistent statements about celestial bodies, their motion, or their meaning, except that we understand that the celestial bodies were personified divinities. From the few explicitly celestial-related statements in the RV we can surmise that the RV IA-speaking people possessed only a rudimentary understanding of the celestial realm. For instance, there are in the RV only inexact scattered references to a few among what became later, in the Middle- and Late-Vedic *brāhmana* and *samhitā* of the *Yajur* and *Atharva Vedas*, the twenty-seven or twenty-eight *naksatra* constellations. These references

⁵⁵ For the dating of the *Jyotisha Vedanga* to 1370 BC see Kripa Shankar Shukla, "Main Characteristics and Achievements of Ancient Indian Astronomy in Historical Perspective," in G. Swarup, A. K. Bag, and K. S. Shukla, eds., *History of Oriental Astronomy: Proceedings of an [sic] International Astronomical Union Colloquium No. 91, New Delhi, India, 13–16 November 1985* (Cambridge & NY: Cambridge UP, 1987): 13. For the more reasonable dating of 400/200 BC- 400 AD see G. R. Kaye, *Hindu Astronomy, Ancient Science of the Hindus* (New Delhi: Cosmo Publications, 1981; rpt. of 1924 ed.): 7–9. Kaye opined further the *Jyotisha Vedanga* dates most probably to the 1st century AD (p. 9). For independent dating of the *Jyotisha Vedanga* (and Siddhāntas) to post-Vedic times see (1) Rajesh Kochar and Jayant Narlikar, *Astronomy in India: A Perspective* (New Delhi: Indian Natural Science Academy, 1995); and (2) Yukio Ōhashi, "The Legends of Vasistha — A Note on the Vedānga Astronomy," in S. M. Razaullah Ansari, ed., *History of Oriental Astronomy* (Dordrecht, Boston, London: Kluwer Academic Publishers, 2002): 75–82.

⁵⁶ John Bentley, *Historical View of the Hindu Astronomy, from the Earliest Dawn of That Science in India, to the Present Time* (Osnabrück: Biblio Verlag, 1970; rpt. of 1825 edn.): vi-xvi. Bentley showed that a significant increase in the error of the *Surya Siddhānta*'s eclipse predictions directly correlated with increasing temporal distance backward from 999 AD to 3102 BC, proving that the text was a compilation of c. 1000 AD. Kaye (1981: 3) supported Bentley's conclusions. In a fascinating account, Bartel van der Waerden traced the origins of the theory of the conjunction of 3102 to tables drawn up by Hellenistic astrologers hoping to date the Biblical Deluge on the basis of the Mature Epicycle Theory of Apollonios (of Rhodes, 3rd century BC Alexandria, Egypt). van der Waerden showed how the tables passed through Sassanid Persia before entering India in the 1st millennium AD, where they were applied with some revision to support the thesis of the *kaliyuga*'s having begun with a great conjunction of planets on the night/morning of Feb. 17–18, 3102 BC. See B. L. van der Waerden, "The Conjunction of 3102 BC," in *Centaurus* 24 (1980): 117–131.

are found only in the relatively late-emended sections of the RV, i.e., Book 10, and they include Maghā (or Aghā; RV 10.85.13), Arjunī (or Phalgunī; RV 10.85.13), and Tīsyā (or Pusya, the archer(s); RV 10.64.8). Aside from the *naksatras*, a few other constellations referenced in RV 10 have been identified, such as Canis Major and Minor (RV 10.14.11) and the Heavenly (or Golden) Boat (RV 10.63.10).⁵⁷

Later Vedic and post-Vedic Vedanga astronomy developed into a complex and useful system of locating accurately the moon in twenty-seven and, slightly later, twenty-eight *naksatras* for the purposes of scheduling and performing rituals to certain stellar and other deities at precise and appropriate times. Essentially the Indian system revolved on five-year cycles, or *yuga*, constituting a luni-solar calendar whose periods consisted of sixty solar, sixty-one civil, sixty-two lunar, and sixty-seven sidereal months, employing intercalary months at 30-month (or so) intervals to adjust the lunar to the solar calendar. The year consisted of six seasons (Spring, Summer, Rainy, Autumn, Winter, Chilly Winter), the week of six days.

Some still debate whether the more refined elements of the system, including the twenty-eight *naksatras*, emerged autochthonously or were imported from Babylon-Assyria.⁵⁸ Two importations have been proposed, the first to have occurred soon after 1000 BC and the second during the Achaemenid Persian occupation of the Indus valley c. 550–520 BC. There really is little left to debate regarding the origins of Indian astronomical science, since comparative evidence objectively viewed demonstrates clearly the Babylonian-Assyrian origin of the more advanced elements of Vedic and later Indian astronomical science, including the *naksatras*.⁵⁹ Although the *Atharva Veda* lists the twenty-eight *naksatra* lunar mansions/celestial lodges (the

⁵⁷ Shukla (1987): 10; Kaye (1981): 12–13.

⁵⁸ In his "The Mesopotamian Origin of Early Indian Mathematical Astronomy" (*Journal for the History of Astronomy* 4 (1973): 1–12) David Pingree advocated a Persian — and thus ultimately Babylonian -- influence (as did Bartel van der Waerden), while Yukio Ōhashi (1997: 76), among many others, has argued for an indigenous development of Indian Vedanga astronomy.

⁵⁹ See Hunger-Pingree (1999: 46, 67, 72–3) for virtually unassailable evidence of the Babylonian origins of not only Vedanga astronomical constructs and mathematics but also early, Vedic (c. early 1st millennium BC), *naksatra* arrangements, as noted previously in this chapter.

earlier *Yajur Veda* lists twenty-seven) and its reference to an intercalary month perhaps implies the use of the five-year *yuga* that becomes explicit in the much later *Jyotisha Vedanga*,⁶⁰ seemingly during the Vedic period (to c. 500 BC), other than the appearance already of the *naksatras* and a definite interest in and focus of religious and observational attention on the northern celestial polar region (to be addressed below), the calendrical system was yet inchoate and unsophisticated mathematically.

The question of whether the Vedic and later Indian calendrical system developed independently of Mesopotamian influence or derived from the earlier Babylonian system has extended as well to Chinese developments along similar, virtually identical, lines. As we noted above, one or the other of the Mesopotamian calendar or the Indian system of twenty-eight *naksatras*, and almost certainly the latter, certainly spread to China sometime between c. 900 and 400 BC — they first appear as a complete system in China only as late as c. 433 BC.⁶¹ As Otto

⁶⁰ Kaye (1981): 14.

⁶¹ Scholars have argued for hundreds of years now the relative priority of Chinese, Indian, and Babylonian lunar mansions deriving from a polar-equatorial view of the movements of the stars. Needham reviewed the long-unresolved debate and concluded that likely the Babylonian astrolabe predated and influenced both the Indian and Chinese developments of similar schema (Joseph Needham and Wang Ling, eds., *Science and Civilisation in China, Volume 3, Mathematics and the Sciences of the Heavens and the Earth* [Cambridge, England: Cambridge University Press, 1959]: 252–259). See also Ho Peng Yoke, *Modern Scholarship on the History of Chinese Astronomy* (Canberra: The Faculty of Asian Studies, The Australian National University, Occasional Paper 16, 1977): 3–12, for a helpful review of the major contributors, both Western and Asian, over the past several hundred years, to this debate.

The argument for an autochthonous development of Chinese astronomical science recently has been promoted again, from both the Chinese and Western scholarly viewpoints. First, Cheng Cheng-yih 程貞一 and Xi Zezong 席澤宗 ("The *Yao Dian* 堯典 and the Origins of Astronomy in China," in Clive L. N. Ruggles and Nicholas J. Saunders, eds., *Astronomies and Cultures* [Boulder: University Press of Colorado, 1993]: 32–66) took Needham to task for stipulating the primacy of the Babylonian system. But while Cheng and Xi's article is an interesting piece, it suffers from inconsistent and unclear referencing to sources, and thus it fails to persuade the reader of the earlier origins of the twenty-eight Chinese lunar mansions. Nathan Sivin has also concluded that, "Despite a continual passage of scientific ideas and techniques back and forth [across Eurasia] since the Neolithic, Chinese astronomy evolved with little influence from the Old World (i.e., Chaldea)" (Nathan Sivin, "Chinese Archaeoastronomy: Between Two Worlds," in Aveni [1989]: 56). However, Sivin did not offer concrete evidence to

Neugebauer noted,

I think it is fair to say that practically all fundamental concepts and methods of ancient astronomy, for the better or for the worse, can be traced back either to Babylonian or Greek astronomy. In other words, none of the other civilizations of antiquity, which have otherwise contributed so much to the material and artistic culture of the world, have ever reached an independent level of scientific thought.⁶²

And again,

substantiate his point, and thus his statement reads more as an opinion than a thesis.

David Nivison has argued directly for the primacy of the Chinese lunar mansions. In his analysis of a second and, he posits, earlier, twenty-eight lunar-mansion / lodges calendar than the one, dating in China to 433 BC and later, that all others have studied and employed to compare against the similar systems known from Babylon and India, he has suggested that the Chinese may have devised a twenty-eight lunar-mansion calendar as early as 3000–2800 BC. His evidence includes textual data with reference to the precession of the equinoxes and his passing notice of patterns on a Neolithic pottery sherd unearthed from Zhengzhou, Henan (David S. Nivison, "The Origin of the Chinese Lunar Lodge System," in A.F. Aveni, ed. *World Archaeoastronomy. Selected Papers from the Second Oxford International Conference on Archaeoastronomy Held at Merida, Yucatan, Mexico 12–17 January 1986* [Cambridge: Cambridge UP, 1989]: 213). Having reviewed Neolithic and later evidence relevant to the development of astronomical knowledge in China, India, Mesopotamia, and elsewhere, I find it extremely unlikely that at any time prior to the Warring States period was anyone in China capable of developing so advanced an understanding and mapping of the motions of celestial phenomena. We have seen in the text of this chapter how great a temporal frame that an already long-urbanized civilization in Mesopotamia required to make and record the kinds of consistent astronomical observations that finally enabled them, after probably some 1500 years of consistent centralized observation, record-keeping, computation, and analysis, to develop the system of seventeen constellationary lodges that were then further divided to become the twenty-eight lunar mansions. That the Chinese or anyone else could have accomplished this very same end without having experienced a similarly long and consistent process of organized discovery in a stable urban setting is, frankly, inconceivable. Therefore, the transmission of the essential seventeen constellationary constructs from Babylon to northern India c. 1000–900 BC and the subsequent transmission of the expanded Indian set of exactly twenty-eight from northern India/Afghanistan/Central Asia to the Yellow River corridor by 433 BC is certain to have occurred.

⁶² Neugebauer (1975): Vol. I, p. 6.

Our knowledge of Babylonian methods has become a valuable tool for the discovery of historical connections between the Mediterranean world and India... because remnants of undoubtedly Babylonian methods were discovered in Sanscrit...⁶³

Neugebauer's view was adumbrated and has been echoed by other formidable scholars of early astronomical developments. In 1919 Carl Bezold noted that,

Native Chinese astronomy/astrology was probably modified from the Babylonian by at least the sixth century B.C.... Mesopotamian and Chinese visions of the sky share a number of constellations. The relations of the moon and planets with certain asterisms are similar; so is the significance of the brilliance and color of Venus; and certain omens, especially those with an emphasis on war, victory, civil strife, drought, and rain, are much alike.⁶⁴

In his careful study of the origins of the Japanese term for the Pleiades, *subaru*, which also explained the source of the Chinese name of the same cluster, *maotou* 髦頭 ("mane head"), Roy Andrew Miller observed of the term *maotou* and the perception of the Pleiades that it represents, that, "what we have is another instance of the same second-hand Babylonian

⁶³ *Ibid.*: 3. Oddly, in a thoroughly self-contradictory way, in Part Three of this same study Neugebauer took Needham to task for the latter's having seen in the twenty-eight Chinese celestial mansions their counterparts in Babylonian zodiacal constellations (*Ibid.*: 1073). In this latter case, Neugebauer inexplicably failed to consider the likely transitioning of the constellations through India c. 1000–900 BC, where they were transformed into twenty-eight and wherefrom they quite apparently spread to East Asia.

⁶⁴ Quoted in Edward H. Schafer, *Pacing the Void: T'ang Approaches to the Stars* (Berkeley: University of California Press, 1977): 10; and Roy Andrew Miller, "Pleiades Perceived: MUL.MUL to Subaru," in *Journal of the American Oriental Society* (JAOS) 108:1 (Jan-Mar 1988): 4. I am indebted to Victor Mair for steering me to Miller's fine article.

elements surviving in Chinese astronomy to which Bezold drew attention in 1919."⁶⁵ Miller observed repeatedly that, "Once more, history begins in Sumer, or at least somewhere in the land between the rivers."⁶⁶

Bezold's research into the similarities in Babylonian and Chinese astrological-astronomical systems and Miller's study confirming the transmission from Mesopotamian to East Asian civilizations of lexical and mythical traditions involving the Pleiades provides formidable evidence of the indubitable spread of Southwest Asian star lore and calendrical organization to East Asian civilizations. From the examples drawn here, as well as from (1) the findings of Chapter 1 above regarding quite consistent early Eurasian technological transfers to China through c. 500 BC, and (2) additional extensive evidence of continued transfer that will be presented throughout the remainder of the three volumes of this study, there really can remain little question of the clear dependence of East Asian astrological-astronomical systems and lore on extensive prior developments in Southwest and, derivatively, South, Asia. As we shall see, the cultural influx to China from surrounding areas began perhaps as early as the Palaeolithic and continued throughout the Mesolithic, Neolithic, Bronze, and historical periods. That some such influx during the 2nd and 1st millennia BC involved the entrance into the Yellow River corridor of the far more advanced astrological-astronomical developments spreading ultimately from Mesopotamia should not be an issue to cause us to even raise our eyebrows.

The Early Recognition of Circumpolar Stars and the Celestial Pole

Above we considered Gurshtein's thesis projecting the gradual development of the zodiacal constellations from a beginning in the 6th-5th millennia BC. While we reasoned that to locate to so early a time the *specifically named and formulated* zodiacal constellations that have been passed to us since having been codified by the 7th-5th centuries BC does not seem truly

⁶⁵ Miller (1988): 4-5.

⁶⁶ *Ibid.*: 5; see also p. 25.

justified, Gurshtein's keen observation that the age of a constellation tends to correlate with its size, such that the older constellations are far larger than the later ones, lends credence to the idea that the *base* constellations from which the later zodiacal (and other) constellations were created very well could have evolved according to Gurshtein's proposed evolutionary scheme. Gurshtein's scheme implies, then, that the earlier, larger constellations were simpler. Less minutely parsed than the later-formed constellations, they seem to preserve a coloring of the sky by simpler, broader strokes of the brush of human imagination, which vast strokes in turn evince a simpler purpose: the middle Neolithic or earlier people who might have projected these constellations onto the sky were marking not twelve months but simply a few (probably two or four) seasonal shifts in a year. And recalling our prior discussion of the functions of projecting constellational pictures onto the stellar contexts of heliacally rising stars, we may posit that the larger, simpler early constellations helped to locate the salient stars of those constellations in both space and memory. The constellations may well have served a rough periodic time-keeping purpose, enabling Lithic peoples to anticipate seasonal changes by observing the advance heliacal risings of certain groups of stars that signaled the imminent appearance at dawn on the eastern horizon of the bright season-marking stars, stars such as Pollux, Castor, or Alhena of Gemini; Spica of Virgo; Kaus Australis of Sagittarius; and Mirach then in Pisces (but formalized after the 7th century BC to sit in the Andromedae constellation) of Gurshtein's 6th-5th millennia BC Gemini Quartet of zodiacal constellations.

Why and how, then, did constellational projection develop into the complex observational record such as we find in the Babylonian records of c. 1000 BC? Likely smaller, more minutely differentiated constellations were projected as the human collective or community memory of observation of the heavens accumulated and thereby advanced. That this would have occurred in the Neolithic, or perhaps even in the Mesolithic, likely was a function of human demographics following the peak of the last great ice age c. 20,000 BC: even prior to the advent of agriculture c. 9,000 BC, as people recognized sufficient sources of food in a given area to provide year-round sustenance, they formed permanent settlements that in turn provided an environment more conducive than their earlier migratory socio-economic patterns to producing growth in population and economic wealth. As population and wealth increased so did both the

specialization of tasks and leisure. Such an improved, stabilized living environment would have enhanced the retention and transmission of community knowledge within and between generations, thus enhancing significantly the community memory. With such stabilized memory the old knowledge base would have been augmented and refined. As advances occurred during the Neolithic in the technologies of particularly agriculture and transportation, then wealth, leisure, and internal economic and intercommunity specialization grew exponentially, and the opportunities to share knowledge between growing and diversifying settlements increased dramatically. The shared intercommunity knowledge base was synthesized and further refined, culminating in ever more rapidly evolving technological advances, including the quick progression of astronomical knowledge and, eventually, the mathematical and geometric sciences that eventually enabled the Babylonians to construct their geocentric scientific astronomy between approximately 1200 and 400 BC.

Reasonably, then, we may assume that the largest and simplest, most easily recognized and defined constellations and/or asterisms were the first to be formulated in people's minds and projected onto the stars. Across the northern hemispheric world of the Later Neolithic, Chalcolithic (or Eneolithic, i.e., Copper), and Bronze periods the asterism recognized and identified earliest probably was the one that remains to us today the most prominent and familiar in the sky, the Big Dipper. From c. 4500 BC until c. 500 BC all seven of its very bright stars (the dimmest among them is Megrez, with magnitude 3.31; the brightest is Alioth, with magnitude 1.75) were fully circumpolar when viewed from the latitude of Mesopotamia (Baghdad, in what was once Akkad, or Northern Mesopotamia, lies at $33^{\circ}20'$ N), meaning that no one alive and resident at any time in Mesopotamia during the 4,000-year period between 4,500 and 500 BC ever would have seen any of the stars of the Dipper at their lowest altitude sink below the horizon (**Figure 2** shows the stars of the Dipper skimming far above the horizon viewed from Athens, Greece during the 1st millennium BC). In more northern latitudes, from about 48° N (e.g. München, Germany), the Dipper has remained circumpolar from c. 6660 BC. In the Far North, or about 60° N (e.g. Helsinki, Finland), the Dipper has never dipped below the horizon since c. 8880 BC. It is easy to see, then, that even though the Dipper was prominent in the night sky of

any locale in the northern hemisphere, for people living in the North and especially the Far North it has been the utterly dominant stellar phenomenon for between ten and fifteen thousand years.

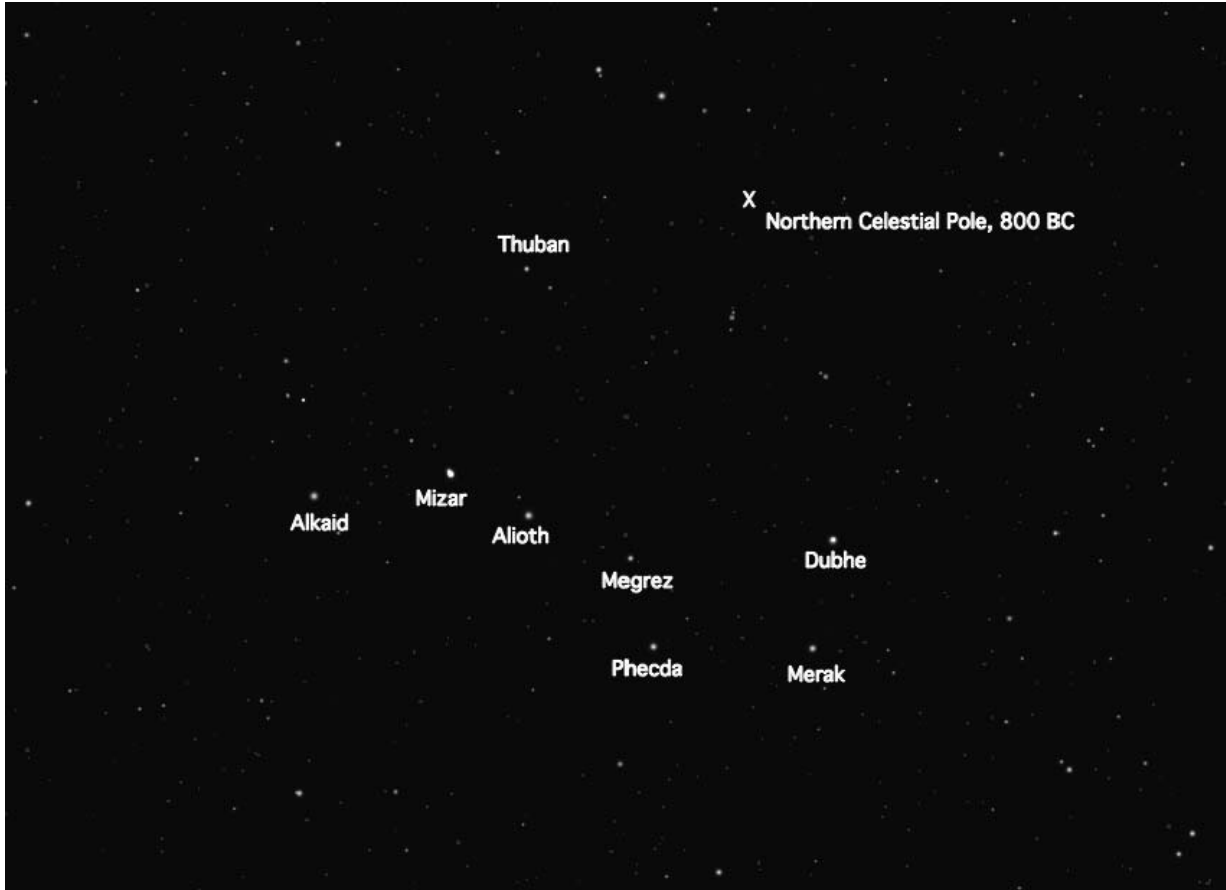


Figure 2. The stars of the circumpolar Dipper, shown at their lowest altitude, looking north toward the celestial pole from Athens, Greece, 800 BC.

The seven-star Dipper is also among the very largest of recognizable asterisms in the sky, its stars further among the brightest in the entire celestial canopy. Even in the present, when from the latitude of Mesopotamia among the Dipper's stars only Dubhe continues in a circumpolar celestial revolution (and just barely so), this asterism remains overall the most apparent and imposing in the sky. Indeed for observers at such latitudes it may be that long prior to the Dipper's having nudged gradually into its circumpolar revolutions it would have been observed to mark the seasons. For instance, for an observer standing at 33° N c. 22,000 BC the star Dubhe, which marks the outer lip of the bowl of the Dipper and is the first among that asterism's seven

stars to rise, ascended the sky in the northeast at dusk at about the time of the summer solstice. And from this same latitude in c. 14,000 BC the Dipper rose heliacally along the east-northeast horizon at the time of the spring equinox. Its luminous, easily recognizable pattern therefore could have served during the Upper Palaeolithic, Mesolithic, and early Neolithic as not a circumpolar but calendrical guide.

It is, however, in its role from c. 8800 or 6600 BC and on in Europe and Mesopotamia, respectively, as pointer to the NCP that the Dipper interests us, for among observers in the developing major civilizations of Eurasia during this period (the Neolithic, Chalcolithic, Bronze, and Iron periods) such attention paid the Dipper and NCP invariably translated into the promotion of the NCP to a supremely divine — and thus consummately powerful — status. Giorgio de Santillana and Hertha von Dechend argued that due to its prominence in the night sky and its proximity to the NCP the Dipper was a central component of the sky's divinity, its having been "systematically linked with those which are considered the operative powers of the heavens," in that each of its seven stars represented one among the seven "planets" (including the Sun, Moon, Mercury, Venus, Mars, Jupiter, and Saturn).⁶⁷ Geoffrey Ashe, in his study of the significance of the number seven in ancient lore, both concurred that "there is no doubt that in several myths Ursa Major (the Big Dipper) was held to be the motive-power of the heavens" and traced the human imputation of magical properties to the number seven found across early-historic northern hemispheric civilizations to the seven stars of the Dipper.⁶⁸

Ancient Greek Observations of the Dipper Near the Pole

To the ancient Greeks the northern celestial pole was the pivot around which the rest of the heavens rotated. They separated it and its circumpolar stars out from other stars and

⁶⁷ De Santillana and von Dechend (1969): 3.

⁶⁸ Geoffrey Ashe, *The Ancient Wisdom: A Quest for the Source of Mystic Knowledge* (London: MacMillan London Ltd., 1977): 128–140; quotation from 130.

constellations as being the only ones that never disappeared from sight in the night sky and that thus were forever reliable. In this regard consider, for instance, the shield of Achilles fashioned for him by the divine smith Hephaestos (the Roman Vulcan), as the shield's manufacture was related in *The Iliad* by the late-8th-century BC poet Homer:

He forged a shield that was huge and heavy,
adorning it with beautiful designs all over...
Upon it he wrought the Earth, and the sky, and the sea's waters,
and the tireless Sun, and the Moon waxing into her fullness,
and on it all the constellations that festoon the heavens,
the Pleiades and the Hyades and the strength of Orion
and the Bear, whom men also give the name of the Wagon,
who turns about in a fixed place and looks at Orion
and she alone is never plunged in the wash of Ocean.⁶⁹

Significantly, emblazoned on the surface of the shield for the purpose of affording protection to the battling Achilles were the stars and other celestial and earthly symbols of superhuman powers. This supports the thesis that the stars of the night sky provided security and power to observant humans on earth. We note as well that Homer indicated the Bear or Wagon, i.e., the Dipper, particularly for its circumpolarity. Indeed, aside from Alkaid, the 7th or last star of the handle of the Dipper, from Greece still the stars of this constellation do not "plunge in the wash of the Ocean."

So unswerving and reliable was the Dipper as it circumambulated the NCP that Homer otherwise told in his *Odyssey* of how Odysseus, as instructed by the goddess Calypso, employed the Bear/Wagon as his nocturnal guide during his sailing sojourn eastward across the sea:

⁶⁹ Homer, *Iliad*: XVIII, 483–489. Tr. adapted from W.H.D. Rouse (*Homer, The Iliad*. Edinburgh: Thomas Nelson & Sons, 1938) and Richard Lattimore (*The Iliad of Homer*. Chicago: Chicago UP, 1961).

Delighted at the breeze, godly Odysseus stretched his sails
And he steered on with the rudder skillfully
As he sat. Nor did sleep fall upon his eyelids
While he watched the Pleiades and late-setting Boötes,
And the Bear, which they call, too, by the name of the Wagon,
Which turns in one place and also points at Orion,
And alone has no share in the washings of Oceanos.
The divine goddess Calypso bade him to keep that star
Upon his left hand, as he fared over the sea.⁷⁰

Here, beyond the absolute centrality of the polar region in guiding an ancient nocturnal traveler, we may note further that the goddess Calypso, daughter of the god Atlas, the latter being he who held up the pillars that prevented the heavens from crumbling earthward, has recommended this guide to the human Odysseus. Thus the Bear, or Wagon (Chariot), and the celestial polar center around which it hovered lay above and beyond the realm of the common gods, of whom Calypso and her father Atlas belonged. This betrays that to Homer and his contemporary Greeks the status of the NCP exceeded even that of these gods.

Mesopotamian Views of the Pole

Babylonian-Assyrian astronomical traditions clarify even more how ancient people revered most exaltedly the celestial pole. In fact, the origins of Homer's understanding of constellations as recorded in his *Iliad* and *Odyssey*, quoted above, quite apparently derived from the schemes and even the phraseology found in the ^{MUL}APIN and other Babylonian-Assyrian

⁷⁰ Homer, *Odysseus*: V, 269–277. Tr. Albert Cook (*Homer/The Odyssey*. New York: W.W. Norton, 1967). Lines 273–275 are repeated from lines 487–9 of Chapter 18 of *The Iliad*, as quoted above. Differences apparent in the translation of the set of lines in each book result only from the individual translators' different approaches to the original Greek.

astronomical texts: (1) his delineation in *The Iliad* of specifically "the Pleiades, the Hyades, and the strength of Orion" in that sequence corresponds precisely to the order of constellations in List 2 of ^{MUL}APIN; (2) his alternate name for the Bear, i.e., Wagon, recorded in both *The Iliad* and *The Odyssey*, derives from the Akkadian MAR.GID.DA (Wagon) as found in the Great Star Lists, Three Stars Each, and ^{MUL}APIN tables; and (3) the phrase "who turns about in a fixed place," referring to the Dipper and its circumpolarity, derives from an Akkadian phrase, "The Wagon stands all year, namely, it circles around," found in an Akkadian astronomical tablet.⁷¹ Very apparently the Greeks, like the Vedic Indians, absorbed astronomical knowledge from the Mesopotamians in two waves — or consistently — from perhaps the 10th–9th centuries BC through the Hellenic period.⁷²

In a previous section we saw how, partially on the basis of Sumerian traditions of divinity dating to the 3rd millennium BC, Babylonian omenologist-astronomers from probably the early-2nd millennium BC divided the stellar canopy into three concentric latitudinal realms of Ea, Anu, and Enlil. Among known texts preserving this tradition, the *Enuma elis* (*EE*) and Great Star Lists are the earliest and transmit only a crude outline of the system. The Three Stars Each astrolabe lists of c. 1200–1100 BC and the ^{MUL}APIN texts of c. 1100–1000 BC formalized this stellar cartographic system, extending its detail and augmenting its accuracy. The three concentric or latitudinally divided rings are named after (or name) the three highest and most central gods of the ancient Sumerian and Semitic pantheon, Ea (Enki), Anu (originally, in Sumerian, An, and, in Akkadian, Anum), and Enlil (or Nunamnir). In this pantheon dating to the 4th–3rd millennia BC, Ea, god of the city of Eridu, was also the god of the lifegiving waters, including streams, rivers, lakes, and the freshwater sea; An, or Anu, patron god of the ancient city of Uruk most prominent in Sumer in the early- to middle-3rd millennium BC, was the early god of the sky, father to other ranking gods, and the highest-ranking god of his namesake Anunnaki pantheon; and Enlil, both

⁷¹ Hunger-Pingree (1999): 67–8.

⁷² For a careful review of Homer's many borrowings from Mesopotamian myths and texts that include but also range far beyond these matters of astronomical myth, see Walter Burkert, *The Orientalizing Revolution, Near Eastern Influence on Greek Culture in the Early Archaic Age*, tr. from the German by Margaret E. Pinder and Walter Burkert (Cambridge, MA: Harvard UP, 1992): 88–127.

patron god of the city of Nippur religiously paramount in 3rd-millennium-BC Sumer and the storm god of the pantheon (Enlil means "Lord Wind" and, in particular, the lifegiving moist spring winds from the eastern mountains), had become, by the middle of the 3rd millennium BC, the administrator of his father An's cosmic kingdom and therefore actively the most powerful god of the Sumerian-Semitic Mesopotamian pantheon. In turn, in time Ea/Enki came to administer the universe on behalf of both An and Enlil.⁷³

As we have seen in *EE*, by c. 1700–1600 BC Marduk, patron god of Babylon, had assumed the superior position in the pantheon, having taken on the rulership of the Anunnaki pantheon and with it the powers of Enlil and thus also the mantle of controlling and administering the universe. He became in fact the creator of the universe that he then administered. The transfer of divine supremacy from An, Enlil, and Ea to Marduk reflects Babylon's eclipse of Nippur as the great religious center of the ancient Mesopotamian world and helps to date the three-ring system of stellar cartography and astronomical organization to the 3rd and early-2nd millennia BC.

Apparently the outer ring of the stellar cartographic system, Ea, was so called because the stars found in this sector dipped below the horizon each night to be bathed in the sea. In this system An/Anu clearly retained his status as sky god, but now of the middle sky and not the high heavens. Finally, Enlil, identified in this system with the central ring, or the highest region, of the heavens in particular draws our attention.

That the Dipper, which as we have seen in Akkadian is identified as MAR.GID.DA, the Wagon, consistently shared in the celestial pole's wealth of power is apparent in this constellation's appearing in the central ring of Enlil not only in the ^{MUL}.APIN and Three Stars Each texts of c. 1200–600 BC but also in the older Great Star Lists. MAR.GID.DA is not and was not in Mesopotamia c. 1700–700 BC a heliacally rising star as are most others in all of these supposedly calendrically oriented lists. Its consistent presence in these maps in the sector of the heavens representing the traditionally highest divine power likely reflects both its religious

⁷³ On An, Enlil, Ninhursaga (the third among the triad of highest Sumerian-Akkadian gods/goddesses), and Ninhursaga's rival Ea (Enki), see Jacobson (1976): 95–116, 167–191. On the Sumerian pantheon one may consult also Bottéro (2001): 59, 83.

significance and its then already ancient usefulness as a navigational and calendrical (but of course already not for some time heliacally rising) marker.

The then-circumpolar movements of MAR.GID.DA and other constellations such as APIN (Plough) described in the path of Enlil obviate that this path identifies the celestial circumpolar realm and that the central point of Enlil is the NCP itself, around which the stars represented in the three paths spin to create their twelve-month sidereal year. By deducing from the three-ring arrangement and their divine names that power increases with proximity to the center, then we understand that to the ancient Sumerians, Babylonians, and Assyrians the NCP itself was the ultimate source of power in the universe. In addition, the fact that in the earliest among the star lists, the Great Star Lists that originate most likely in Old Babylon, the high god Marduk, as Jupiter, appears not in the path of Anu, where he/it ought in an accurate mapping of the paths of celestial objects, but rather twice, as both Sumerian *nibirum* and Akkadian UD.AL.TAR, in the path of Akkad,⁷⁴ i.e., Enlil, strengthens the case that the NCP was the seat of the two successive high god(s) and creator(s)/administrator(s) of the universe, Enlil and Marduk. Surely Anu had once also sat at the pole, as evidence presented in Chapter 4 will demonstrate. In the ancient Mesopotamian religion, then, the highest divine power rested apparently in and immediately surrounding the NCP itself.

The centrality of both the Dipper and the NCP in Sumerian observation of the sky and religious projection of divinity onto its stellar phenomena during the 3rd millennium BC can also be seen in what is probably the oldest surviving work of literature known in the world, the *Epic of Gilgamesh*, which originated in epic cycles about the historic King Bilgamesh (Gilgamesh in Akkadian), who ruled the city of Uruk c. 2700 BC. In a subplot within *Gilgamesh* that dates to c. 2000 BC or earlier⁷⁵ Ishtar (Inanna), the daughter of the sky god Anu and the goddess identified with the planet Venus and romantic love, tempted Gilgamesh to become her lover, but to no avail. In response to her advances Gilgamesh taunted and insulted her for her ill treatment of

⁷⁴ For a listing of the stars of the three paths in the Great Star Lists see van der Waerden (1974): 67–68.

⁷⁵ Jacobsen (1976): 208–215. For a helpful introduction to *The Epic of Gilgamesh* see Maureen Gallery Kovacs, tr., *The Epic of Gilgamesh* (Stanford: Stanford UP, 1989): xiii–xxxiv.

previous lovers, whereupon Ishtar, stunned and hurt, retreated to heaven to complain to her father Anu and mother Antum, demanding of Anu the Bull of Heaven so that she could send it to Uruk to destroy Gilgamesh's city. Anu hesitated, warning her that, "If you demand the Bull of Heaven from me, there will be seven years of empty husks for the land of Uruk."⁷⁶ With Ishtar's continued insistence, Anu relented and "placed the nose-rope of the Bull of Heaven in her hand. Ishtar led the Bull of Heaven down to earth. When it reached Uruk"⁷⁷ and stood on the bank of the Euphrates, with several snorts it opened up pits in the earth into which several hundred men fell and died. Gilgamesh's attendant hero Enkidu grabbed the Bull of Heaven by its horns and invited Gilgamesh to vanquish it by thrusting his sword down through its neck and head. This Gilgamesh did, killing the bull. Enkidu then flung the hindquarters of the bull at Ishtar, hitting her in the face.

Anu's reference to the number *seven* in relation to the Bull of Heaven reveals that the Bull symbolized the Dipper, the seven years of famine caused by the Bull's removal from the sky correlating with the Dipper's seven stars. Probably the Bull's subsequent slaughter in the story at the hands of Gilgamesh and Enkidu reflects in part an earlier myth of the morning sky's diurnal dispatching of the sky's nighttime overseer, the circumpolar Bull (Dipper). Indeed supporting this interpretation is that before Enkidu threw the bull's thigh at Ishtar, he and Gilgamesh cut out the bull's heart and offered it ritually to Shamash, the sun god.

Further helping to identify the bull in this story with the Dipper and the northern celestial pole is the fact that in the 1st-century AD Roman-period Egyptian Round Zodiac of Dendera, a bull's thigh, obviously illustrating the thigh of the Bull of Heaven that Enkidu threw at Ishtar, appears at the northern celestial pole, having replaced what originally was in Egyptian stellar iconography of the 2nd millennium BC the similarly shaped "mooring post" that represented the NCP (see below).⁷⁸ At this late date in Hellenic-Roman Egypt the bull, represented now by the zodiacal constellation Taurus, lies of course in the zodiacal belt that corresponds to the old

⁷⁶ Kovacs (1989): 54.

⁷⁷ *Ibid.*: 54.

⁷⁸ de Santillana and von Dechend (1967): 216f.

Babylonian Path of Anu. **Figure 3** shows the bull's thigh in Egyptian polar iconography of the late-1st millennium / early-1st millennium AD. See **Figures 4a-c** further below for the earlier iconography of the polar bull at the mooring post.



Figure 3. The Round Zodiac of Dendera. From de Santillana and von Dechend (1967: 216f).

Aside from its significance in the myth of the god of the day sky, the sun, that vanquishes the god of the nocturnal sky, it is possible that the story of the slaughter of the Bull of Heaven reflects a change in Babylonian theogony and iconography whereby an earlier, perhaps purely Sumerian, myth identifying the Bull of Heaven as the Dipper at the NCP, gave way to a newer, perhaps Semitic, tradition developing wherein the Bull was identified as the heliacally rising (and later recognized to be zodiacal) constellation Taurus. The Dipper, in the meantime, became known in Babylonian traditions not as the Bull of Heaven but as MAR.GID.DA, the Wagon, as we have seen. Such a change probably would have been due simply to the fact that during the 3rd millennium BC in Mesopotamia, as carts or wagons proliferated, they became objects not only ubiquitous but also increasingly critical in everyday life. As we have indicated previously,

people across the world very reasonably projected onto the stars the shapes or outlines of material things most familiar and significant to them in their natural and human socio-economic and political environs on earth.

Further helping to identify the highest and originating divine power in Mesopotamian tradition with the NCP and the god who resided there, Enlil, is the tradition whereby the Dipper was identified with the god Ninlil ("Lady Wind," to accompany "Lord Wind," Enlil), who in the Anunnaki pantheon inherited from Sumer was the wife of the Sumerian high administrative god Enlil.⁷⁹ In another reported tradition it is the son of Enlil and Ninlil, Nergal, otherwise and commonly identified with Mars, who comes to be associated with the Wagon when it is described as his heavenly vehicle.⁸⁰ In either case, Enlil's primary identification with the NCP thus becomes ever more secure with his family's secondary identification with the Dipper. Power in the Mesopotamian pantheon and cosmogony/cosmology appears to have sourced in the NCP and worked through the Dipper.

The Significance of the Pole in Early Egyptian Civilization

Probably inheriting the tradition from 4th–3rd millennia BC Sumer, the ancient Egyptians also identified the NCP and the polar region with a bull. At the apex and center of the night sky the Bull constituted the pivot of the daily regeneration of the day sky by the night sky. Ancient Egyptians considered the night sky to be the source of the day sky and its sun, and viewed the pole as the center of that night sky and a place or source of immortality. Egyptian cosmogony/cosmology posited a female night sky god, Nut, who each night swallowed in the west the sun and transported it within her starry body over the earth during the night, west to

⁷⁹ She is so identified in the first list of the Astrolabe B (Three Stars Each) series of tablets and in ^{MUL}APIN List 1. See Hunger-Pingree (1999): 59. On the ancient story of Enlil's rape of and subsequent marriage to Ninlil see Jacobsen (1976): 103–4.

⁸⁰ E. Weiher, *Der babylonische Gott Nergal* (Berlin: Kevalaer, Butzon, & Bercker, 1971): 35.

east, to give birth to the sun again each morning in the east. Pictorial representations of this daily regeneration, which adorn the insides of the lids of several 2nd-millennium BC pharaonic sarcophagi, were intended to guide the deceased pharaoh in his posthumous stellar journey in immortality. In these tomb paintings the Bull, i.e., the Dipper, stands tethered to the "mooring post" that identifies the NCP, i.e., the pivot of the universe. Placed in the center of the Nut sky maps and surrounded by additional constellations unfamiliar to modern Western inheritors of the ancient Babylonian-Greek constellations, the mooring post lies at the star Thuban, the northern pole star during the 3rd millennium BC when the early pharaonic pyramids were built.⁸¹ **(Figures 4a-c)**

Thomas Kuhn remarked on ancient Egyptian views of the NCP that,

The circumpolar stars ... were recognized as "those that know no weariness" or "those that know no destruction." From such observations the northern heavens were identified as a region where there could be no death, the region of the eternally blessed afterlife.⁸²

Consequently, at death the pharaohs, as gods, were thought to travel to the NCP (as well as Orion) to reside in immortality.⁸³

⁸¹ On the role of the NCP in Egyptian astronomy see E. C. Krupp, "Egyptian Astronomy: Temple, Traditions, Tombs," in idem, *Archaeoastronomy and the Roots of Science* (Boulder: Westview Press, for the American Association of the Advancement of Science [AAAS Selected Symposium 71], 1984): 289–320. On Nut, the revolutions of the heavens, the northern celestial pole, constellations, and the sun, see esp. p. 298–306. For translations of Egyptian astronomical texts see Neugebauer and Parker (1969), *passim*. For general treatments of Egyptian astronomy see Gregg DeYoung, "Astronomy in Ancient Egypt," in Helaine Selin and Sun Xiaochun, eds., *Astronomy Across Cultures: The History of Non-Western Astronomy* (Dordrecht, Netherlands: Kluwer, 2000): 475–508, and van der Waerden (1949: 7–8; 1953: 228–230; 1974: 8–45).

⁸² Kuhn (1957): 6.

⁸³ See below, Chapter 4, as well as Krupp (1984): 304.

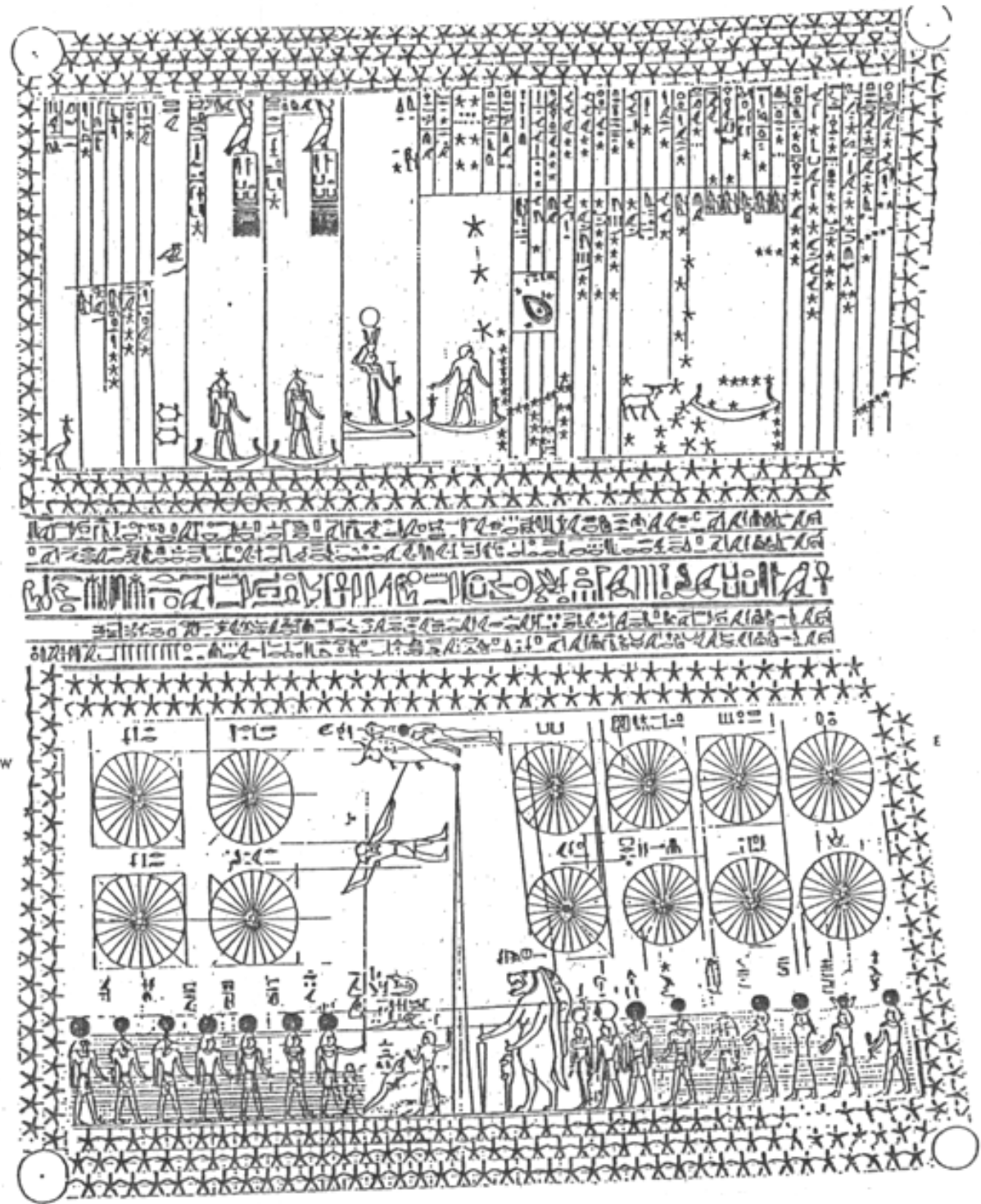


Figure 4a. The Egyptian northern constellations as depicted in the tomb of Senmut, Thebes. Note the bull and its mooring, which respectively represent the Dipper/Bear and Thuban/10 Draconis, i.e., the northern celestial pole stars. From DeYoung (2000).

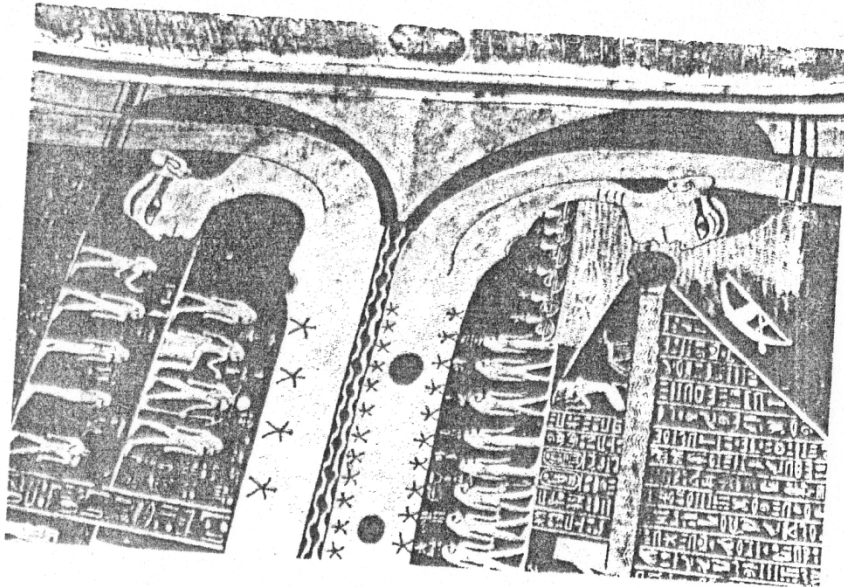


Figure 4b. Nut, the Egyptian sky goddess, passes the sun during the night. From Krupp (1984a): 300.

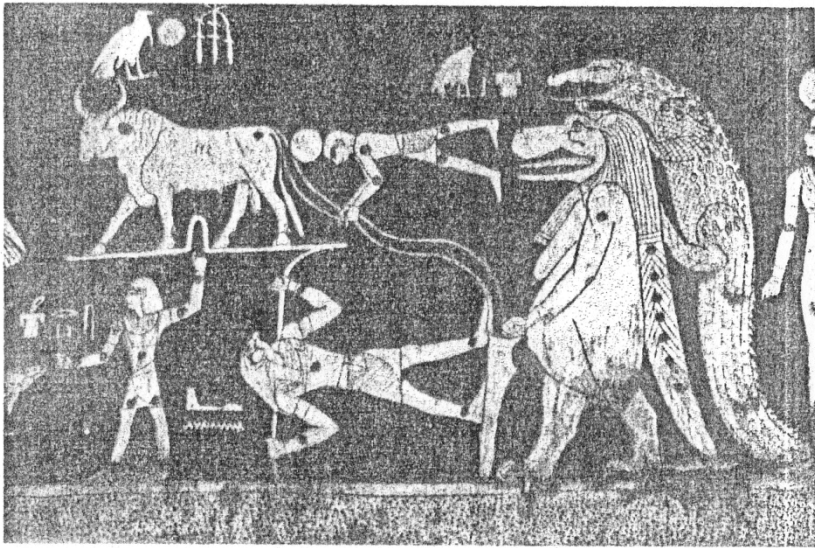


Figure 4c. Detail of Egyptian tomb portrayal of the northern celestial polar constellations, including the mooring post (celestial pole) and the bull (Dipper). From Krupp (1984a): 301.

Harappan-Indus and Vedic Polar Observations

The earliest known evidence from an Indian civilization that represents astronomical awareness and projection of divinity onto astronomical objects occurs on square and rectangular seals dating to c. 2500–2000 BC. It is on these thousands of seals that the 400 or so graphs that may or may not comprise a true script appear. On many of the seals are also visible representations of mostly bulls but also elephants, rhinoceri, and other animals; anthropomorphic and seemingly divine figures; and an apparatus appearing in a lower corner that seems and has usually been interpreted to represent a square ritual censer atop a stand or post.

Most scholars have interpreted the seals to have served both trade and religious purposes. In trade the seals seem to have been lashed to shipped goods and thus identified the goods with the owner at the point of origin. As religious objects, the seals appear to have served as protective charms, and the best literature describing the characters of the "script" that appear on them represent them to be names or iconographic representations of gods.⁸⁴ Some seals were threaded with a string or cord and worn on the person, likely as protective amulets. A given seal thus apparently served to both identify the owner of the seal and invoke for its bearer the protection of a deity or deities. As we noted in Chapter 1, it is possible that the seal owner and the deity even shared a name, the practice of naming children after gods — or of an adult taking the name of a god as his moniker — likely having been inherited from a similar tradition commonly practiced in Sumer. These protective amulets and/or identification seals thus can be reasoned to have served their Harappan owners as mobile altars or axes of religious power, through which the gods represented thereon extended to the wearers their protective and assistive powers.

Most significant about the iconography on the seals is the appearance of the image of the bull (*Bos indicus* and *Bos primigenius*; see **Figures 5ab**). As we have just seen in the preceding sections, in both Mesopotamia and Egypt the bull clearly was identified with the Dipper. Here it is, along with the so-called "unicorn," which really is a humpless bull (*Bos primigenius*) in

⁸⁴ See Farmer, Sproat, and Witzell (2004): 42–43; Parpola (1994): 179–272.

profile, and the other animals, obviously a sacred creature that is most likely a representation of a god.⁸⁵ Given our understanding of both (1) the Mesopotamian and Egyptian traditions whereby the bull represented the Dipper, and (2) the fact that a lively trade that persisted among Harappan, Mesopotamian, and Egyptian civilizations during the 3rd millennium BC facilitated known cultural interactions, not to mention (3) the sacred status of the bovine in India through the subsequent ages, then it appears that a bull appearing on a given seal identified the seal, its owner, and the goods protected/identified by the seal with the bull-god of the Dipper. The censer that often appears on the seals near the nose of the bull seems to represent the Harappan version of the Egyptian mooring post, that is, the NCP. However, on the seals the religious significance of the icon has been clarified in that it probably represents a ritual apparatus. A seal so bearing the religiously pregnant images of both a bull and a ritual censer therefore appears to depict both the NCP and the circumpolar Dipper and, quite literally, religiously pregnant space. Such seals then seem to have served as miniature mobile altars, whatever their specific use in any given case (in trade or as personal amulets).

⁸⁵ See Jonathan M. Kenoyer, ed., *Old Problems and New Perspectives in the Archaeology of South Asia* (Madison: University of Wisconsin Press, 1989). See also Kenoyer's web site, <http://www.harappa.com> (and subsite <http://www.harappa.com/indus/indus7.html>). On the bulls that appear in the seals, and for a succinct account of the religious significance of the seals, see Jack Finegan, *An Archaeological History of Religions of Indian Asia* (New York: Paragon House, 1989): 8–11.

Figure 5a



Figure 5b



Figures 5ab. *Bos indicus* (5a) and *Bos primigenius* (5b) and censer on square Indus seals. From <http://www.harappa.com>, downloaded on December 15, 2002.

Vedic Indian literature strengthens the religious interpretation of the Harappan seals, for the god that became during the greater part of the Vedic period the high divine personality of the Vedic pantheon, Indra, was identified clearly with the bull. In RV 1.33.10 we read, for instance, that, "Indra, the Bull, made his ally the thunder, and with its light milked cows from out of the darkness." That is, Indra, the heavens-borne storm god and thus the igniter of lightning, "struck the clouds with his lightning, and [thereby] made the milky streams of fertilizing rain."⁸⁶ Probably the Vedic IA-speakers inherited this tradition from Mesopotamia through both the intermediacy of their Indian Harappan predecessors and their own contemporary contacts. As we shall see below, Indra, as creator, is also clearly identified in the RV with the NCP.

Prior to Indra's having emerged gradually in the Vedic tradition as the high god, Dyaus, father of all other gods, ruled the universe from the heavens. Dyaus, inherited from before the Indo-Iranian speakers digressed from the Indo-European-speaking community, remains in the

⁸⁶ Ralph T. H. Griffith, tr., *Rgveda* (Reprinted from the 1896 ed. as *Sacred Writings. Hinduism: The Rig Veda*, series ed. Jaroslav Pelikan [NY: Book of the Month Club, 1992]): 22. Unless otherwise noted, all translations from the RV are quoted from Griffith (1896/1992). In the following pages, in each parenthetical source citation following a quotation from the RV, the numbers following "RV" denote, in order, the RV book, chapter, and verse numbers, and the number following the semi-colon identifies the page number in Griffith on which the cited verse can be found.

RV quite vague, and in the shadows of the text in which Indra usually is treated clearly as the high divinity, it is rather Varuna, the highest god of the night sky, who displays, as an aspect of Indra, the greatest heavenly and thus also divine power. Varuna, as highest among the Asura deities of the Indo-Iranian religion, was paired in the Vedic religion with Indra, high god of the Devas, to form an amalgam of sorts of Vedic and rival traditions, which were combined, as we saw in Chapter 1, likely when tribes of Vedic Aryans and their erstwhile enemy Dāsa intermingled in northern India/Pakistan. Paired intimately with Varuna also was the god of the day sky and sun, Mitra (Mithra). The most exalted status of this pair dates to a pre-RV time, when the Vedic Aryans had not yet diverged from the Indo-Iranian tribes. This we know from their Iranian equivalent, Ahura-Mazda, Ahura representing the Indo-Iranian origin of Varuna and Mazda the earlier form of Mitra.

For our present purposes the most significant fact about Ahura-Mazda/Varuna-Mitra is that they appear in the *Avesta* as one among the seven Amesha spenta, or seven stars of the Dipper. Ahura-Mazda became leader among them, the other six becoming his subjects.⁸⁷ A similar tradition survives in the RV, wherein the very vaguely defined daughter of Dyaus, Aditi,⁸⁸ who served primarily as a mother goddess and represented the freedom of the infinite heavens, gave birth to the seven Rsis, or sages, identified as the seven stars of the Dipper, and set them in the sky:

Seven regions have their several suns; the
ministering priests are seven;
Seven are the Aditya Deities — with these,
O Soma, guard thou us. Flow, Indu, for
Indra's sake (RV 9.114.3)⁸⁹

⁸⁷ Kalinath Mukherji, *Popular Hindu Astronomy. Tārāmandalas and Nakshatras* (Calcutta: Nirmal Mukherjea, 1969; rpt. of 1905 ed.): 162.

⁸⁸ She is so identified in RV 1.191.6.

⁸⁹ According to Griffith the seven regions are the four quarters of the sky plus the intermediate points, and the Aditya Deities include Varuna, Mitra, Aryaman, Bhaga, Daksa, Amsa, and perhaps Dhātār (Griffith

Elsewhere the Rsis, again as the stellar sons of Aditi, are said to be eight, including in the list now a separately identified sun deity, Mārtanda (Sūrya), whom Aditi cast "far away" from the seven stars of the Dipper, to light the sky day after day, dying and regenerating with each diurnal turn:

Eight are the sons of Aditi who from her
body sprang to life.
With seven she went to meet the gods (i.e., mounting the sky, to the pole):
she cast Mārtanda far way.
So with her seven sons Aditi went forth
to meet the earlier age.
She brought Mārtanda thitherward to
spring to life and die again (diurnally as the sun). (RV 10.52.8–9)

Consequently Varuna, consistently counted among the Rsis and therefore also the stars of the Dipper, is identified with the circumpolar region of the NCP.

Otherwise Indra is identified explicitly with the NCP through his association with the Rsis. In the passage below Indra and the Rsis are said to be gods that, knowing the priest's deserving heart, can direct Agni, Indra's aspect as the god of fire, to bestow bounty:

Fill me with splendour, Agni; give off-
spring and length of days; the Gods
Shall know me even as I am, and Indra
with the Rsis, know. (RV 1.23.24;14)

The Rsis are also known in the RV and later Vedic tradition as the Saptarsis, or Seven Sages, and under this guise they appear frequently in well-known and very apparent references to

[1896/1992]: 529n).

the seven stars of the Dipper.⁹⁰ In one instance, RV 10.82, the NCP appears as Viśvakarman, creator and destroyer, and as such is the only One valued beyond the Saptarsis', or Dipper's, seven stars:

The Father of the eye, the Wise in spirit,
created both these worlds submerged in
fatness.

Then when the eastern ends were firmly
fastened,
the heavens and the earth were far
extended.

Mighty in mind and power is Viśvakarman,
Maker, Disposer, and most lofty
Presence.

Their offerings joy in rich juice where they
value One,
only One, beyond the Seven Rsis
(Saptarsis).

Father who made us, he who, as Disposer,
knoweth all races and all things existing,
Even he alone, the Deities' name-giver, —
him other beings seek for information.

To him in sacrifice they offered treasures, —
Rsis of old, in numerous troops, as
singers,

Who, in the distant, near, and lower region
(i.e., heavens and the earth)

⁹⁰ On the use of the name *saptarsi* see Shukla (1987): 10; and Mukherji (1969): 160.

made ready all these things that have
existence.

That which is earlier than this earth and
heaven, before the Asuras and Gods had
being, —

What was the germ primeval which
the waters received where all the Gods were
seen together?

The waters, they received that germ
primeval wherein the Gods were all
together.

It rested set upon the Unborn's navel,
that One wherein abide all things
existing. (RV 10.82.1–6)

In this stellar context the Father, Maker, and Destroyer, the "only One, beyond the Saptarsis," could indicate only the NCP. In the above passage the Dipper's Saptarsis, as agents of their own creator Viśvakarman (or, elsewhere, as we have seen, Aditi, both of whom are cognate with Indra), serve as the active creators of the heavens and the earth, prior even to the Asuras and other gods.

Although many gods populate the Vedic pantheon, it is well understood that since Indra was the ultimate source and power of life, death, creation, and destruction, all such gods were mere manifestations of Indra or Indra's great germane power. Indra thus appears with most every visage, including most important for our purposes those of Agni, god of fire and light, and Varuna, lord of the night sky. We read, for instance, of Indra's manifestation as Agni, whereby he imbues Agni with the highest of powers:

Moved, Indra-Agni, by our hymn, come to
the [soma] juice, the precious dew: Drink

ye thereof, impelled by song.
O Indra-Agni, with the man who lauds you
comes the wakening rite...
Indra and Agni, ye cast down the ninety
(multitudinous) forts for which Dâsas
(non-Aryan enemies) held,
Together, with one mighty deed.
To Indra-Agni reverent thoughts go forward
from the holy task
Along the path of sacred Law...
Indra and Agni, in your deeds of might ye
deck heaven's lucid realms... (RV
3.12.1-2, 6-7, 9; 167)

Agni thus was a high power, too, for the fire, whether on the altar of the temple, in the hearth of the home, or uncontrolled by human beings in nature (i.e., in the heavens as stars and the sun or on earth as wild fire), was the highest visible manifestation of Indra's power. When the verse invites Indra-Agni to imbibe the soma of the sacrifice, it reflects the fact that as the fire on the altar that burned the oils thrown into it, by their very nature these gods already were present. However, being a universal natural phenomenon, fire in all of its forms also could be employed by the various enemies of the Vedic people, and, thus, it had to be propitiated with ritual and offerings to ensure that it sided with the Vedic cause. The same was true of Indra.⁹¹

While Agni appears most often in the RV as the sun fire itself, he also turns up as the source and nightly purifier of the sun's fire, both being manifestations of heavenly light, and the holder of the highest position in heaven and earth. In the following verse, Agni and the officiating priest converse in hymn:

⁹¹ See RV 1.131.2; 91.

Agni am I who know, by birth, all creatures.

Mine eye is butter, in my mouth is
nectar.

I am light threefold, measurer of the region
(heaven) exhaustless heat am I, named
burnt-oblation.

Bearing in mind a thought with light
accordant, he purified the Sun with three
refinings;

By his own nature gained the highest
treasure, and looked abroad over the
earth and heaven.

The Spring that fails not with a hundred
streamlets, Father inspired of prayers that
men should utter,

The sparkler, joyous in his Parents' bosom, -
-him, the Truth-speaker, sate ye, Earth
and Heaven. (RV 3.26.7–9; 172)

Considering thus Agni's apparent universal power of the sky — in both night and day — and his being the threefold light (the sun, moon, and stars?)⁹² and purifier of the sun, that is, the source power behind and to ignite all of these lights, one cannot help but believe that the hymn refers with the phrase, "By his own nature gained the *highest treasure*, and *looked abroad over the earth and heaven*" to the northern celestial pole. Elsewhere his description buttresses this sense that the hymns locate Agni's power in the celestial pole:

⁹² See also RV 5.24.1; 248: "Man's worship of the Gods hath three great lusters, and three celestial lights have they established." The three lights of the former phrase might refer to the fires of the altar, hearth, and stove. The latter three seem to indicate the sun, moon, and stars, though differing interpretations of both phrases have been offered.

The summits of the heaven are traversed
through and through by the Immortal's
light, Vaisrâvanara's (Agni's) brilliancy.
All creatures in existence rest upon his
head...
Vaisrâvanara, who measured out the realm
of air, Sage very wise who made the
lucid spheres of heaven,
The undeceivable who spread out all the
worlds, keeper is he and guard of
immortality. (RV 6.7.6–7; 287–8)

While one might construe this still to refer to Agni as the sun, it is apparent, rather, that this laud's subject is Agni's power to light the sun, and this involves the summits of heaven — heaven's pole. Elsewhere Agni is associated explicitly with "the pole":

Well kindled, nobly fed; heaven's Lord,
Celestial Priest, who labours at the pole
where deeds of might are done. (RV
2.2.1; 131)

Agni, thus laboring at the pole at the summit of the heavens, seems very clearly to be identified with specifically the NCP. It is also possible that this reference to the pole, where the Celestial Priest, heaven's Lord, labors and where deeds of might are done, constitutes a double entendre. It might refer metaphorically not only to the celestial pole around which the heavens spin but also the shaft tying the Wagon to the steeds at the pole, that is, the celestial arm of the Dipper, composed of the four stars Megrez, Alioth, Mizar, and Alkaid.

We read further of Agni's identification with "the loftiest heaven," i.e., heaven's summit, that,

That Agni, when in loftiest heaven he sprang
to life, guardian of Holy Laws, kept and
observed them well.

Exceeding wise, he measured out the
firmament. Vaisrâvanara attained to
heaven by mightiness.

Wonderful Mitra propped the heaven and
earth apart, and carved and concealed the
darkness with his light. (RV 6.8.2-3;
288)

This confirms that Agni originated in the highest heavens and thereafter laid out the sky, wherefrom, overseeing all below, as guardian of the Laws of existence, he ensured the appropriate functioning of the universe. The only single point in heaven that differs from all others, of course, is the pole; this is also the point that appears to reside at the summit and origin of heaven, as the hub around which all revolves. In a metaphoric sense, such is universal Law. These verses, then, seem to identify once again Agni and the highest powers that he possesses with the celestial pole.

It is important to bear in mind that the hymns of the RV repeatedly emphasize particularly Agni's manifestations of Indra's power. Invoking Agni to worship Indra was natural, since Indra's power was ever- and omnipresent, in all manifestations:

They call him Indra, Mitra, Varuna, Agni,
and he is heavenly nobly-winged
Garutmân (the celestial bird).

To what is One, sages give many a title: they

call it Agni, Yama, Mâtarisvan. (RV 1.
164.46; 113)

RV 6.8.2–3, quoted previously, describes the god Mitra as having propped up the heavens. As we are aware, Mitra, the sky-supporting sky god of the day, was paired with his natural counterpart, Varuna, the presiding sky god of the night. Varuna, identified as we have seen as the leading divinity among the seven Rsis, or Saptarsis, that form the Dipper, identifies himself, much as Agni does, as the highest power in the universe:

I am the royal Ruler, mine is empire, as mine
who sway all life are all immortals.
Varuna's will the Gods obey and follow. I
am the King of men's most lofty cover.
I am King Varuna. To me were given these
first existing high celestial powers.
Varuna's will the Gods obey and follow. I
am the King of men's most lofty cover.
I Varuna am Indra: in their greatness these
the two wide deep fairly fashioned
regions,
These the two world-halves have I, even as
Tvastar knowing all beings, joined and
held together...
All this I did. The Gods' own conquering
power never impedeth me whom none
opposeth. (RV 4.42.1–3, 6; 228)

Like Agni, here Varuna, identifying himself with/as Indra, claims highest and first existing celestial powers. Thus the consistent thread of identification in the RV that ties together all of the

night sky and its lord, who (1) has been located in the Dipper near the pole, (2) possesses highest and first celestial powers, (3) labors at the pole, (4) is king of the most lofty cover (the heavens), (5) is located at the summit of the heavens, (6) is the origin of and oversees universal Law, (7) is the source of all light and life, and (8) is creator and overlord of the universe, point to a source energy beginning with and continuing at the celestial pole.

Often both Mitra and Varuna receive praise and oblations together, as in the following hymns:

Guardians of Order, ye whose Laws are ever
true, in the sublimest heaven your chariot
yet ascend...

Your magic, Mitra-Varuna, resteth in the
heaven. The Sun, the wondrous weapon,
cometh forth as light. (RV 5.63.1, 4; 272)

Three spheres of light, O Varuna, three
heavens, three firmaments ye
comprehend, O Mitra.

Waxed strong, ye keep the splendour of
dominion, guarding the Ordinance that
lasts forever. (RV 5.69.1–2; 274)

Here representing both the day and night skies, Mitra-Varuna manifest once again their embodiment of the ultimate power, that of Indra. Telling is the reference to comprehension of (i.e., fluidity through and control over) the "three spheres of light," or "three heavens," or "three firmaments." Taken together, these three descriptions recall the three concentric sky-god-governed celestial rings of the Sumerian-Babylonian-Assyrian Great Star Lists, *Enuma elis*, the Three Stars Each astrolabe lists, and the ^{MUL}APIN astronomical texts treated previously, and in light of the other similarities in religious and astronomical systems already identified above,

most likely the Vedic trio derived from the Mesopotamian division of the firmament. Further, the mention of Mitra-Varuna's *chariot* or *wagon* quite apparently identifies the Dipper and also then further demonstrates the Mesopotamian influence on early RV IA culture. This reference also further confirms the identification of high divine power in RV IA culture with the Dipper and its circumpolar region of the night sky, if not the NCP itself.

Many hymns of the RV reference the stellar and otherwise skyborne chariot/wagon and steeds that convey the gods, and particularly those of Indra and Agni, but also those of more obscure or workhorse gods such as the Rbhus (the artificers of the universe, being also dwellers of the sky). In many cases, such references to a chariot, steeds, and the pole by which the steeds pull the chariot clearly indicate the celestial polar region and, in particular, the Wagon, with which name we are familiar from our review of both Mesopotamian and Greek references to the Dipper.

To the Asvins (godly chariot & steeds) themselves the hymns call out,

Yonder goes up that light: your chariot is
yoked that travels round upon the summit
of heaven...

Stripping the covering from the surrounding
gloom, and spreading through mid-air
bright radiance like the Sun...

The rays advancing nigh, chasing with day
the gloom, spread through the firmament
bright radiance like the Sun;

And the Sun harnessing his horses goeth
forth: ye through your Godlike nature let
his paths be known.

Devout in thought I have declared, O
Asvins, your chariot with good steeds,
which lasts forever. (RV 4.45.1, 2, 6–7;

230)

This immortal chariot that revolves endlessly around the summit of heaven really could be no other than the circumpolar Wagon/Chariot/Dipper. As the celestial conveyance in the daylight hours it draws the sun over the sky, but the Asvins are not the sun or merely its dedicated conveyance (note that their radiance is *like the Sun*, not *of the Sun*). Rather, the Asvins constitute the conveyer for all of the heavens. The source of conveying might, of course, lies in the hub of the turning wheel.

Our final verse, below, demonstrates even more clearly that the early-Vedic source and center of belief, Indra, was the NCP itself. In fact this verse, addressed generally to the Visvedevas, or "all of the gods" universally, but also in the quoted section below to particularly Agni, seems to outline the foundation of Vedic and later Indian belief systems, the *cakra*, or wheel of existence, which accounts for all time and space in all of its various facets:

Formed with twelve spokes, by length of time,
unweakened, rolls round the heaven this wheel
of during Order.

Herein established, joined in pairs together, seven
hundred Sons and twenty stand, O Agni.

They call him in the farther half of heaven the Sire
five-footed, of twelve forms, wealthy in watery
store.

These others say that he, God with far-seeing eyes,
is mounted on the lower seven-wheeled, six-
spoked car.

Upon this five-spoked wheel revolving ever all
living creatures rest and are dependent.

Its axle, heavy-laden, is not heated: the nave from
ancient time remains unbroken.

The wheel revolves, unwasting, with its felly: ten
draw it, yoked to the far-stretching car-pole.

The Sun's eye moves encompassed by the region:
on him dependent rest all living creatures. (RV
1.I.64.11–14; 110)

This passage is rich in celestial imagery and metaphor. The twelve-spoked wheel of time rolling round the heavens identified in the first stanza very obviously is the calendrically ordered ideal sidereal year, taking the celestial pole as its center (it could not have been the tropical year in a time in which recognition of the obliquity of the sun's path had not yet occurred in this or any other known civilization). This is confirmed by the final three stanzas, which return to the macroscopic topic, the wheel, to describe the imaginary staff of the celestial pole piercing the hub and around which the entire heavy burden of existence revolves.

These verses otherwise further confirm securely their reference to the pole-centered heavenly sphere: (1) the 720 sons in pairs, that is, 360 pairs, obviously refer to 360 24-hour night-day cycles of the ideal year (as we have seen, 360 days was the typical length of the ancient ideal year in many civilizations across the world); (2) commentators believe that the alternate name "the Sire five-footed" refers to the five seasons of the year, reduced from the normal Vedic six seasons by combining two of them,⁹³ but it seems far more likely that these five in the *farther half of heaven*, i.e., that part far from the pole, refer to the naked-eye-visible planets of Mercury, Venus, Mars, Jupiter, and Saturn. The "farther half" seems to indicate the east-to-west arc of the ecliptic that the planets travel across the sky. This appears to be, then, another metaphor for the starry canopy's annual 360° circulation during a sidereal year; (3) "the lower seven-wheeled, six-spoked car" surely indicates the seven astral phenomena, i.e., the sun, moon, and the five planets, and the six annual seasons that they create; Agni/Indra rides this car, overseeing the workings of the system and thereby ensuring their regularity; and (4) according to this hymn, relying on this firmament the sun traverses it in diurnal mini-cycles and thereby gives

⁹³ Griffith (1896/1992): 110, n. 2.

life to all below the heavens. Much of this imagery is therefore repetitive, employing layered metaphors to denote the most salient astral phenomena that were thought or known to affect the mechanistic operation of the universe.

Finally, the centrality of the Dipper and NCP in the creation and sustenance of the universe is underscored by yet another RV IA tradition associated with the Dipper. This is the tradition whereby the Big Dipper was known as Riksa, the Bear. In one instance we learn that Riksa bore its son Arksa, the Little Dipper, where Arksa is otherwise identified as Srutarvān, "one who knows the Sruti (the Vedas)," i.e., Jupiter.⁹⁴ Normally the Big and Little Dippers are identified in the RV IA tradition as simply the Riksas:

These Riksas (Bears), placed on high, which are visible by night, and go elsewhere by day, are the undisturbed holy acts of Varuna; (and, by his command,) the moon moves, resplendent, by night. (RV 1.24.10)⁹⁵

Here the Riksas are described as "the undisturbed holy acts of Varuna." That is, the Bears are the progeny of Varuna. Varuna we have identified in the RV tradition already with the NCP, and so a Rg Vedic Indo-Aryan cosmology is apparent in which the NCP bears the Bears and the Bears in turn perform other acts of creation.

The tradition of identifying the Dipper as the Bear we know was shared in the slightly later-attested ancient Greek tradition. Therefore we understand that this tradition originated in the PIE/IE continuum in the Balkans prior to the dispersal of not only the Indo-Iranians but also the earlier-dispersing Greek speakers. Indeed terms phonetically and semantically related closely to RV IA *rikṣa* (and *arkṣa*) and meaning either/both bear and/or north appear in Greek (*arktos*, meaning both bear and north, the Dippers being *arktos megale* and *arktos mikra*), Latin (*arctos*,

⁹⁴ RV 8.63.4; 447.

⁹⁵ RV 1.24.10. Tr. modified slightly from H. H. Wilson, *Rg-Veda Sanhita, A Collection of Ancient Hindu Hymns of the Rig-Veda, The Oldest Authority on the Religious and Social Institutions of the Hindus, Vol., I, The First Ashtaka* (New Delhi: Cosmo Publications, 1977; rpt. of 1850 ed.): 63.

again meaning both bear and north and referring often to the Dipper[s]), and Indo-Iranian (*rksah*).⁹⁶ On the basis of the appearance of *arctos* in Latin and its metaphoric reference to the Dippers as being (1) northerly, and (2) bears, one should not jump to a preliminary conclusion that the tradition of the Bear (*rksah*, *rikša*, *arktos*, *arctos*) dates back in the PIE/IE continuum to before the splitting off of the Latin-speaking peoples, since *arctos* in Latin and the tradition of applying it to the Bears, as well as the related Latin tradition of identifying in purely Latin phonetics the Bears as Ursa Major and Ursa Minor, very well could have been inherited from the Greeks through known extensive Greek-Latin contacts that occurred during the 1st millennium BC.

It has been suggested that the Bear tradition as it appears in Greek culture originated in Northern Europe and perhaps among Finno-Ugric speakers.⁹⁷ Indeed the Dipper bear lore appears widely among Finno-Ugric-speaking cultures, attesting to its early dissemination among them, but the geographic range of origin of the Dipper's bear myth must be expanded beyond Northern Europe to parallel the early geographic range of Finno-Ugric speakers during the 4th–2nd millennia BC, which range included Eastern Europe and the Asiatic Russian forests and plains north of the Pontic-Caspian.⁹⁸ The combination of the meanings of north and (brown) bear in the Greek *arktos* indeed points to such an origin, particularly since the brown bear is a northerly creature and would have impacted Northern Europeans and inhabitants of the northern steppe significantly.

In fact, the origins of not only the bear but also the RV IA seven sages/brothers lore necessarily both long predate specifically Finno-Ugric-speaking cultures and must be located further north and east of the ancient Finno-Ugric dialectical range. The astral folkloric traditions

⁹⁶ For cognates of the many names of the *rksa(s)* among several IE and other ancient languages, see Mukherji (1905/1969): 160–1. On Indo-Iranian *rksah* see Michael Witzel, "The Pleiades and the Bears Viewed from Inside the Vedic Texts," in *EJVS* 5.2 (1999).

⁹⁷ E. C. Krupp, "Bear Country," in *Sky & Telescope* 95.5 (1995): 94–96.

⁹⁸ See William Gibbon, "Asiatic Parallels in North American Star Lore: Ursa Major," in *The Journal of American Folklore* 77.305 (Jul.-Sep. 1964): 236–50.

that associate with the Dipper both the bear and the seven sages/brothers appear to originate in Palaeolithic and Mesolithic Siberia. Both traditions, naturally varying in specifics, surface in widespread distributions across northern Asia and North and South America.⁹⁹

Yuri Berezkin has identified particularly the seven brothers Dipper lore with three encompassing variants across northern, central, and eastern Eurasia and the Americas of a larger mythic theme that he has identified as the "cosmic hunt motif." In the first variant, the Dipper's three handle stars are hunters and the bowl their hunted game; Alcor, a dim companion star to Mizar on the Dipper's handle, is identified as either the hunters' dog or their cooking pot. In the second and third variants, the hunters and hunted have been displaced to Orion, with various sets of stars in that constellation serving as hunter and hunted. The hunted animals include deer, elk, antelopes, mountain sheep, and, of course, bear. In some cases the hunted animal, the bear, is identified as the complete Dipper.¹⁰⁰

Very apparently, as the combined import of both Gibbon's and Berezkin's work (as well as many others' work on which Gibbon and Berezkin relied) shows, the cosmic hunt myth involving Orion and the Dipper, variations of which identified the Dipper with a bear or the bear's (or another animal's) hunters, and also as seven brothers (from their association as

⁹⁹ Gibbon (1964) carefully traced the bear and seven brothers lore associated with Ursa Major across Siberia and the Americas. See also Gibbon's later "Asiatic Parallels in North American Star Lore: *Milky Way, Pleiades, Orion*," in *The Journal of American Folklore* 85.337 (Jul.-Sep. 1972): 236–47. Curiously, Gibbon considered this lore to have originated with the Mongols of the 2nd millennium AD, when clearly it had to have originated among Siberians some 12,000–25,000 years (or more, allowing a lengthy time for the development and spread of the lore in Siberia before it traveled to the Americas with Siberian migrants c. 18,000–12,000 BC) before their time. Geoffrey Ashe picked up on Gibbon's work and suggested the earlier Palaeolithic Siberian origin (1977: 95–203). Yuri Berezkin has further followed up on Gibbon's and others' work, providing additional details of patterned variations and helpful maps showing known locations of the appearance across Eurasia and the Americas of particularly the seven brothers, or what he understands correctly as the broader cosmic hunt, lore, in "The Cosmic Hunt: Variants of a Siberian-North American Myth," in *Folklore* 31 (December 2005): 79–100 (<http://www.folklore.ee/folklore/vol31/berezkin.pdf>). Both the great breadth and depth and the patterning of the spread of the bear and seven sages/brothers/hunters Dipper lore throughout the Americas demonstrate beyond any doubt that the lore long predated in the Americas the arrival of Western Europeans in the late 15th century. I am indebted to Victor Mair for bringing Gibbon's and Berezkin's articles to my attention.

¹⁰⁰ Berezkin (2005): 79–100.

hunters) originated in Siberia and spread across the Bering Strait (and later, with the Inuit, by sea) with the earliest Siberian-American human migrants between, inclusively, 20,000 and 8,000 years ago. At the same time, several versions of the myth spread westward, as well, eventually to Finno-Ugric speakers, from whom the bear and seven brothers variant further disseminated to Indo-European speakers in the Balkans or Pontic region at a time just prior to when the early Greek speakers hived off from this continuum and then, slightly later, when Indo-Iranian speakers moved eastward from the same ever-evolving PIE/IE-speaking continuum.

Some of the variant forms of the myth found among Turkic and Mongolian peoples of Central, Inner, and Siberian Asia probably arrived with eastward migrating Indo-Iranians beginning c. 3500, and, as such, constitute a superstratum of the myth that mingled with the older, Palaeo- and Mesolithic substratum(-a), versions of the myth that had been transmitted locally through the millennia. In the earliest written versions of the myth, that is, those found in the early Greek, Iranian, and Indic literature, many of the forms, such as the bear and the seven brothers/sages motifs, mingle with myths or motifs originating from other, accreted, cultures, such as the wagon/chariot/cart motif developed from early Mesopotamian invention and use of this conveyance. As that conveyance became, in turn, vital to Greek and Indo-Iranian cultures, its symbolism became superimposed on the older substratum bear/brothers myth that had been inherited from a different and earlier source. As we shall see in the next chapter, it becomes apparent that these myths similarly made their way to China, probably in several waves from the Palaeolithic and Mesolithic and on, to be jumbled or woven together in local hero mythology.

Pre-urban, non-urban, and early-urban ancient folk appear to have projected their godhead onto the only natural skyborne phenomenon that did not move and around which the entire gargantuan universe seemed to revolve, the northern celestial pole. In some cases, as in Egypt, the pole was believed to serve as the seat of immortalized and apotheosized leaders (pharaohs), while in others, such as in Mesopotamia and India, the pole represented not only high gods who were probably, like the pharaohs, apotheosized former leaders, but also the font of the universe's creation and continued governance. In the following chapter we shall see that China was not exceptional to either tendency.

Chapter 3: The Celestial Pole and Its Gods in Ancient China

Like other early civilizations of Eurasia, the earliest verified organized polity in China whose name is known and which kept written records, the Bronze Age Shang (1545–1045 BC), took note of its celestial surroundings and organized its calendar. The Shang did so on the basis of both the sun's and moon's cyclical movements, in ten-day weekly cycles, or *xun* 旬.¹ This decimal luni-solar calendrical system is of the same sort used in ancient Mesopotamia and Egypt, and this fact strengthens further the case for a West-to-East Eurasian transfer during the 2nd millennium BC.²

According to many scholars the Shang were aware of the workings of their nocturnal celestial canopy,³ though no explicitly organized written statements from any Chinese or proto-Chinese culture or civilization earlier than the Zhou (1045–249 BC) exist, primarily because earlier, i.e., Shang, texts existed only in the form of cryptic oracle-bone divination records, or oracle-bone inscriptions (OBIs), that did not lend themselves to detailing astral events.⁴ But in this

¹ On the Shang calendar see Chang Zhengguang 常正光, "Yinli kaobian" 殷曆考辨, in *Guwenzi yanjiu* 古文字研究 6: 93–122. For only the briefest review of this system in English, see David N. Keightley, "The Shang: China's First Historical Dynasty," in Michael N. Loewe and Edward L. Shaughnessy, eds., *The Cambridge History of Ancient China* (Cambridge: Cambridge UP, 1999): 249–51. Otherwise see below this chapter for works by Keightley and K. C. Chang that treat the calendar amid other religious-oriented elements of the Shang civilization.

² On the Egyptian *decade* see Neugebauer and Parker (1969): *passim*; van der Waerden (1949): 7; and E. C. Krupp (1984): 294. For both the Shang calendar and the argument that it derived from the Southwest Asian calendar, see Needham and Wang (1959): 231, n. g, as well as above, Chapter 2, and below, this chapter, and Volume III.

³ See, for instance, Rao Zongyi 饒宗頤, ed., *Jiaguwen Tongjian* 甲骨文通檢, vol. 3, "Tianwen qixiang" 天文氣象 (Hong Kong: Chinese University Press, 1995). In English see also Richard S. Cook, "The Etymology of the Chinese 辰 Ch'en," in *Linguistics of the Tibeto-Burman Area* 18.2 (1995): 1–232. For other sources, see below, this chapter.

⁴ The Shang are known to have been aware of the importance of Antares, the Fire Star, and its significance in marking the seasons, as well as the constellation Bird (Niaoxing), which later came to be known as the Vermilion Bird constellation and was associated with the southern sector of the heavens. For early written sources of astronomical observation, the data that they can provide, and an interpretation of that data see (1) Needham and Wang (1959): 242–252; (2) David W. Pankenier, "Astronomical Dates in Shang and Western Zhou, *Early China* 7 (1981–2): 3–37;

study we are interested mostly in reflections, apparent in proto-Chinese and early Chinese (i.e., Neolithic through Han) cultures, of the northern celestial pole as it occupied the center position in these cultures' religious beliefs and polity-making efforts. Much of this evidence, particularly for the Neolithic and early Bronze periods in China (i.e., to c. 1300–1200 BC), is artifactual and thus pictorial, though I will show how it appears that the Shang recorded their observations and concerns centering on the pole in not only pictorial but also written form. These, however, are concerns for Volume II, below. This chapter introduces evidence that indicates clearly that we are not amiss in directing our attention to the northern celestial pole to explain early Chinese gods and religious concepts.

The Celestial Pole

Historians of astronomy have known for a long time that Chinese astronomical observation from very early on concentrated on the celestial pole.⁵ Indeed, throughout Chinese imperial history, that is, from c. 221 BC and on, to draw stellar charts with the approximately 30°-radius circle surrounding the northern celestial pole, that is, the circumpolar region of the sky, occupying the center position within the greater circle that represented the complete northern hemispherical heavens remained standard cartographic methodology.⁶ This concentric-circle design recalls the

and (3) idem, "Mozi and the Dates of Xia, Shang, and Zhou: A Research Note," in *Early China* 9–10 (1983–1985): 175–183. See also the forum that resulted in part from Pankenier's articles, in *Early China* 15 (1990): 87–196, involving David S. Nivison, Kevin D. Pang, Huang Yi-long, John S. Major, David Pankenier, and Zhang Peiyu. Pankenier's work subsequent and relevant to this forum is cited below. Finally, for later and more developed Chinese astronomical sciences see Christopher Cullen's study of the *Zhou bi suan jing* (ca. 1–200 AD) in his *Astronomy and Mathematics in Ancient China: The Zhou bi suan jing* (Cambridge: Cambridge University Press, 1996). See also Ho Peng Yoke, *Chinese Mathematical Astrology — Reaching out to the Stars* (London: Routledge/Curzon, 2003).

⁵ See Needham and Wang (1959): 232–241.

⁶ See the many historical Chinese star charts collected in Chen Meidong, ed., *Zhongguo guxingtu* 中國古星圖 (Shenyang: Liaoning jiaoyu chubanshe, 1996): 210–317; see p. 13–14 (Figures 1–9 & 1–10) for a map drawn from a 10th-century tomb, dated 942, showing this inner circle of the heavens. On this celestial circle, named Ziwei Gong, Ziji Gong, etc., see also Bo Shuren 薄樹人, ed., *Zhongguo tianwenxueshi* 中國天文學史 (Taipei: Wenjin chubanshe,

earlier Babylonian three-ring Three Stars Each astrolabes, which once again strengthens the case for continuous Eurasian West-to-East communication during the 2nd and 1st millennia BC. (It may also be that the later-attested Chinese tradition of the Three Heavens (*santian* 三天), most closely associated with the developing Daoist religion c. 100–600 AD, originated ultimately in the Babylonian three-ring system.) At any rate, either this central circle, considered the highest of the heavenly spheres, or at other times the stars within this circle, has been named variously Central Palace (Zhong Gong 中宮), Palace of the Azure Tenuity (Ziwei Gong 紫微宮), Palace of the Azure Extremity (Ziji Gong 紫極宮),⁷ Altar of Azure Tenuity (Ziwei Tan 紫微壇),⁸ Heart (or Mind or Center) of Heaven (Tianxin 天心), and Pivot of Heaven at the Northern Extremity (Beiji Tianshu 北極天樞).⁹ **Figures 1a-e** reproduce several depictions of the Ziwei Gong dating to the 16th–17th centuries AD. Throughout Chinese imperial history this central stellar ring was treated as the seat of the highest gods of heaven, and it formed the centerpiece of many religious observances among Daoists and practitioners of popular religion and arts, such as the fortune-telling art known as *Ziwei dou shu* 紫微斗術, or “Arts of the Dipper of the Azure Tenuity,” which magical arts purport to draw power from the Dipper of the polar region.¹⁰ Therefore, that the northern celestial pole formed for the ancient historical and later Chinese the center or pivot of the universe should not be in question.

1996): 97–103; as well as Needham and Wang (1959): 259. See also Ho (2003): 36–82.

⁷ These two names became interchangeable during the Tang, after the year 743. See John Didier, “Way Transformation: Universal Unity in Warring States through Sung China — The *Book of Transformation* (*Hua Shu* 化書) and the Renewal of Metaphysics in the Tenth Century” (Princeton University Ph.D. dissertation, 1998): 603, n. 2. One of the star charts recovered at Dunhuang and dating to c. 900–940 labels this inner circle Ziwei Gong, which is typical of the Tang period. For color reproductions of the Dunhuang star charts, see *Zhonghua wuqiannian wenwu jikan, tianwen pian* 中華五千年文物集刊, 天文篇 (Taipei: Zhōnghuá wǔqiān nián wénwù jīkān, tiānwén piān, 1988): plates 26 & 29.

⁸ For use of this name see *Haotian chuixiang tu* 昊天垂象圖, dated to 1585, as reproduced in Chen Meidong (1996): 247–248.

⁹ For this usage see Chen Meidong (1996): 162, 177.

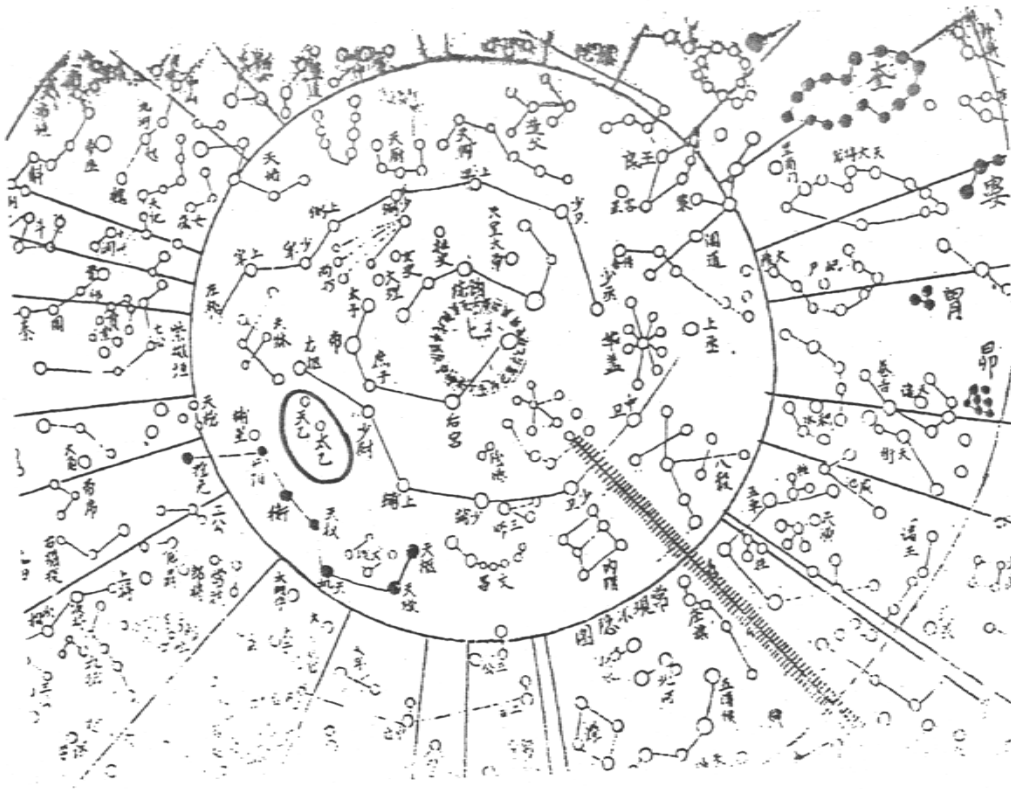
¹⁰ On such systems and their development from c. the 4th c. AD and on see Ho (2003): *passim*.

In fact the Chinese penchant to focus their skyward attention on the Dipper seems to originate from long before the organization of any kind of Chinese state. From early lore that remains recognizable in texts of all periods of organized Chinese political history it appears that at least as early as the 2nd millennium BC, and probably much earlier, the proto-Chinese absorbed the influence of the astral myth of the cosmic hunt, in both of its bear and seven sages/brothers/hunters manifestations, that we reviewed in the final section of the preceding chapter. In Han-period (202 BC – AD 220) and later retellings of ancient myth, parts of both lineages of the foreign folkloric traditions surface.

In Sima Qian's 司馬遷 account in his *Shiji* 史記 of the origins of Chinese culture and civilization, written c. 100 BC on the basis of classical accounts found in the *Shang Shu* (*Book of Documents*), *Shi Jing* (*Book of Odes / Songs*), and other early writings (including many of the sources also informing the compilation of the *Liji*, or *Record of Rites*), he described the mythical early leaders and "emperors" or "sovereigns" of the Chinese folk who, step by step over something like 1400 years' time (c. 2900–1500 BC if we reconstruct the vague chronological hints that Sima provided in his account and align such a reconstruction with currently accepted chronology for the establishment of the Shang/Yin in c. 1545 BC), defeated rival peoples and introduced elements of civilization to the common folk in order to improve their lives and educate them in the ethics of civilized supra-tribal cooperation.¹¹ In Sima's account and some later commentary emended to it we find traces of both of the originally Siberian bear and seven sages/brothers/hunters lore.

¹¹ Sima Qian 司馬遷, *Shiji* 史記 (Taipei: Dingwen, 1987; hereafter *SJ*) 1:1–10.

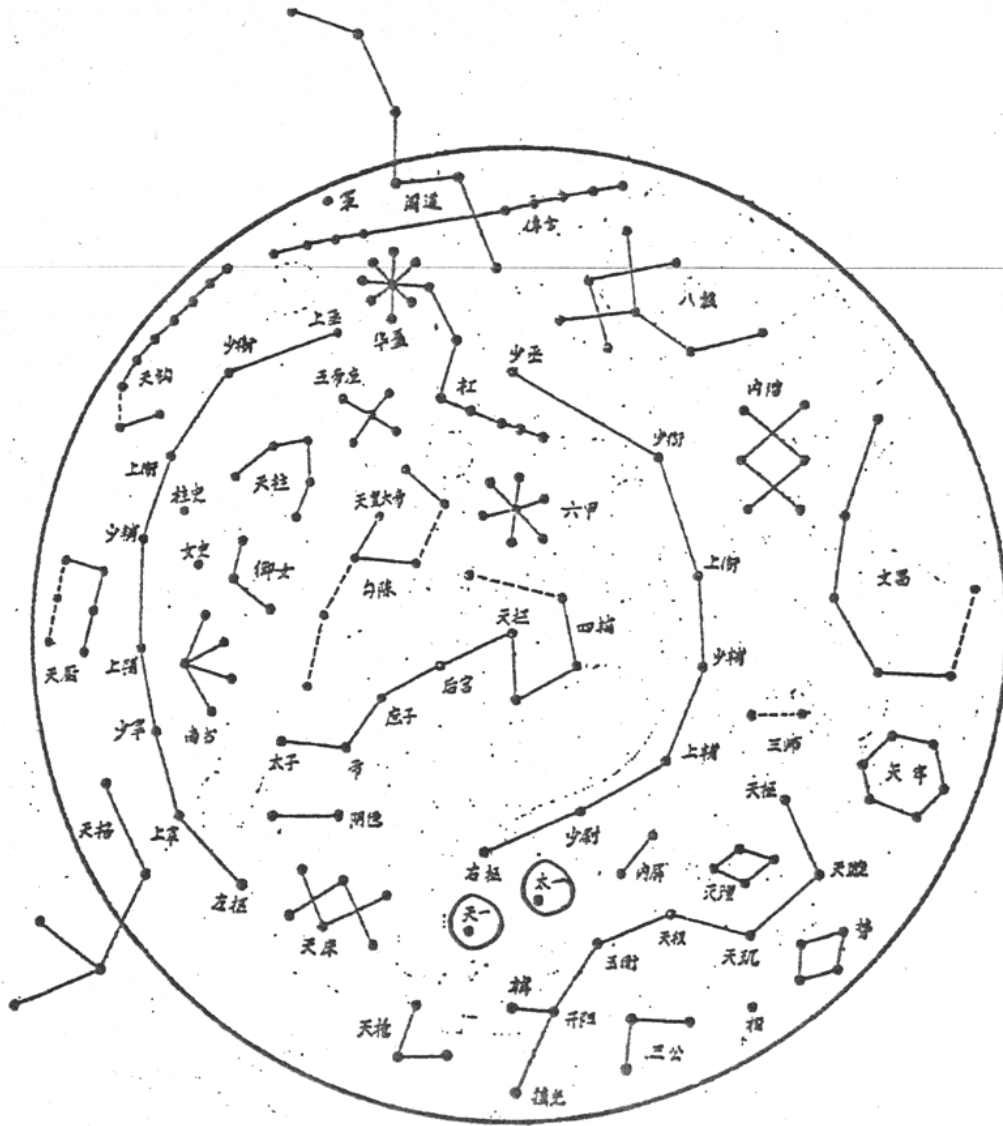
Figures 1a-e. All five stellar maps shown in Figures 1a-e date from the Ming period (specifically 1540s–1640s), and all show the celestial polar region (Ziwei tan or Ziwei gong). In each map, Taiyi and Tianyi, invariably placed at Thuban and 10 Draconis, are circled. From Chen Meidong (1996): 37, 39, 116, 162, and 177.



1a



1d



1e

For one thing, we note that the first of the Five Emperors and Three Sovereigns of this mythical developmental period of Chinese civilization, the Yellow Emperor, Huangdi 黃帝, was the son of Shaodian, the ruler of the Youxiong 有熊, or *Bear*, state.¹² Furthermore, a 6th century

¹² *SJ* 1: 45. Sima Qian remarked in conclusion to his first chapter on the mythical period of the Three Sovereigns and Five Emperors that, "From Huangdi [all the way] to Shun and Yu, all belonged to the same clan but chose differing names of their kingdoms in order to manifest clearly the [nature of their] inherent power (*de* 德). Therefore, [the kingdom of] Huangdi (The Yellow Emperor) was [known as] Youxiong 有熊, [the kingdom of]

tale reports regarding Huangdi’s miraculous birth that his mother, Fubao 附寶, is said to have gazed at the Dipper’s “*shuxing*” 樞星 star through a great cloud that encircled it and, in response, became pregnant with Huangdi, who was born after a twenty-four month gestation period.¹³ While this tale of Huangdi’s mythical descendance from the Dipper is a late emendation in the written record of Huangdi mythology, its existence at all in the early-imperial period, when much of the ancient lore was still being passed orally and only gradually being written down, and otherwise much of the early literature had been lost and become once again orally transmitted to be recorded again only fairly late in the literary tradition, is highly suggestive of a very early mythological connection between Huangdi and the Dipper Bear. This is so particularly considering the early lore of Huangdi’s having emerged from the Bear clan / kingdom. It is even more compelling when considering the possibility that the name of the star of the Dipper, *shuxing*, recorded to have impregnated Huangdi’s mother Fubao, referred to Alioth, the very center of the Siberian bear / seven hunters (etc.) myth.

During at least the past millennium or so the first star on the Dipper’s bowl, that is, the star defining the outer rim of the bowl, has been named *tianshuxing* 天樞星, or “Celestial Pivot.” In the West the name of this star is Alpha Ursae Majoris (α UMa), or Dubhe. It is the star that marks the outer lip of the bowl of the Dipper. Unfortunately, we cannot really know what this star was named in the 6th century AD or earlier; the name *tianshuxing* cannot be identified with this star at so early a date (see below, this chapter, for a discussion of the broken transmission of ancient stellar cartography during the period of roughly 100 BC – AD 700).

Further confounding any secure identification of the star to which our story’s *shuxing*

Emperor Zhuanxu was [known as] Gaoyang 高陽, [the kingdom of] Emperor Gu was [known as] Gaoxin 高辛, [the kingdom of] Emperor Yao was [known as] Taotang 陶唐, and [the kingdom of] Emperor Shun was [known as] Youyu 有虞. [The kingdom of] Emperor Yu was [known as] Xiahou 夏后 but he had a different family name, and his clan [was known as] the Family of Si (姓姒氏). Qi’s 契 kingdom was [known as] Shang 商, of the Clan [known as] the Family of Zi 子 (姓子氏). Bian’s 弁 kingdom was known as Zhou 周, of the Clan [known as] the Family of Ji 姬 (姓姬氏).” *SJ* 1:45. In this context the contemporary meaning of the prefix *you* in *youxiong* 有熊 is unknown. It may have been a phonetic whose original form or meaning simply cannot be guessed.

¹³ *SJ* 1:2. The Tang-era *Shiji zhengyi* 史記正義 commentary reports that the *Yudizhi* 輿地志, a geographical work written during the early to middle 6th century AD by Gu Yewang 顧野王, recorded this tale.

might refer, several other stars in the region of the northern celestial pole have been named using the suffixal binome *shuxing*, and there is in the polar region yet another star named precisely *tianshuxing* (stars whose names employ the binome *shuxing* include *youshuxing* 右樞星 [the latter-day name of ϵ Draconis, Thuban, the pole star of c. 4500–1000 BC], *zuoshuxing* 左樞星 [Edasisch, or Iota Draconis / ι Dra], as well as the second polar-region star named *tianshuxing* 天樞星, which is HIP 62572, between Polaris and the Dipper).

In the 6th century story, the immaculately impregnating star is referred to as *beidou shuxing* 北斗樞星, or “pivotal star of the Northern Dipper.” In this context *shu* 樞, “pivot” or “pivotal,” appears thus to be not a part of the proper noun *tianshuxing*, “Celestial Pivot,” and thus not indicative of the star α UMa (Dubhe), but rather a descriptor indicating instead “the pivotal star of the Dipper.” This pivotal star would be none other than Alioth, or Epsilon Ursae Majoris (ϵ UMa), the second star of the Dipper’s handle from the inside lip of the Dipper’s bowl and indeed both the geometrically (in its central station) and visually (in its brightness — it is the brightest star of the entire polar region) pivotal star of the Dipper. This connection between Huangdi’s parentage / birth and Alioth then would offer a very likely echo in the Huangdi mythology of the Siberian bear and seven sages/brothers/hunters myth that otherwise Huangdi’s belonging to the Bear clan / kingdom would suggest. Though we cannot be certain that *beidou shuxing* refers not to *tianshuxing* (Dubhe) but rather Alioth, even if the star named in the story were not Alioth but instead α UMa (Dubhe), the combination of an early and germane connection with bears in Huangdi’s myth and the existence of the 6th-century story of Huangdi’s parentage that identifies a star of the Dipper to have been the source of Fubao’s immaculate conception of Huangdi, strongly supports the position that the Siberian lore of the bear and seven sages / brothers / hunters entered the northern proto-Chinese civilizational sphere at a very early date to become intertwined with more local traditions. There thus is sound and believable, though of course not unquestionable, cause to suggest the origins of the lore of Huangdi and his clan in the foreign and, ultimately, Siberian myths of bears and gods involving the stars of the Dipper.

Further evidence from the *Shiji* strengthens yet more the connection between Huangdi and the Siberian bear / hunters myth. In Sima’s retelling of the Huangdi myth, Huangdi, originating in the region of the middle Yellow River valley in the North (from which surely his sovereign title

derived), was responsible for having defeated the troublesome Flaming Emperor, Yandi 炎帝,¹⁴ who in other ancient lore appears consistently as the high divinity of southern Chinese cultures known in the Zhou period collectively as those of Chu. Indeed, Yandi was known as the emperor of the southern sector of the sky, associated with the constellation Vermilion Bird; his counterpart in the northern sky was Huangdi's grandson and Emperor Yu's grandfather, Emperor Zhuanxu, who was the emperor of the northern sky and associated with none other than the pole stars.¹⁵ In just these elements of the tale we see already on the one hand a connection between a northern people, their cultural hero, the Dipper, and the bear, and on the other hand the defeat of a southern people and their leader by this northern group associated with the northern Dipper and bear. This recalls several variations of the Palaeolithic-Mesolithic Siberian-American lore of the hunt that Yuri Berezkin reconstructed: (1) the hunters and animal game constitute the Dipper, or the variant by which the Dipper's seven stars are identified as seven hunters/brothers; (2) the Dipper in its entirety forms the hunters' game, i.e., the bear, itself; and (3) the hunt occurs between the hunter and hunted as dramatized by or among two groups of prominent stars in the heavens, Orion (south) and the Dipper (north). Sima's account then seems to reconstruct an earthly variant version of the astral hunt whereby now the seven hunters of the northern Dipper hunt and kill the game identified in the sky as the southern (ecliptic or zodiacal) constellation Orion. The identification of Huangdi's clan as the bear clan, and his apparent immaculate conception from the parentage of the Dipper star Dubhe or Alioth, strengthens the argument for the likely Palaeolithic or Mesolithic Siberian origin of this Chinese myth.

This early connection between Siberian and Chinese myth also explains an odd statement that long has perplexed readers of the *Huainanzi* (139 BC; hereafter *HNZ*). In *HNZ* 4 ("Topography of Earth") it is stated cryptically that, "The number three governs the Dipper; the Dipper governs the dog."¹⁶ From the Siberian story of the hunt associated with the Dipper, we now

¹⁴ *SJ* 1:1.

¹⁵ *Huainanzi* (Zhang Shuangdi, ed., *Huainanzi Jiaoshi* [Beijing: Beijing daxue chubanshe, 1997; hereafter *HNZ*) Chapter 3 ("Heavenly Patterns"): 263. For more on Yandi and his southern symbolism, see below, Volume III.

¹⁶ *HNZ* 4: 462.

can understand that the number three appears to refer to the three hunters who, hunting the game (bear, elk, etc.) that is portrayed by the four stars of the Dipper's bowl, are represented by the stars of the handle of the Dipper (as we shall see below, since the Warring States period indeed the Dipper's handle has constituted for the Chinese the lead apparatus of the Dipper, serving as the pointer of the heavens), while the dog apparently adverts to the dim star Alcor that closely neighbors the middle star of the Dipper's handle, Mizar (on Alcor and Mizar and their roles in the Siberian Dipper lore, see above, Chapter 2). Alcor is the hunters' dog that accompanies them on the hunt. Thus, "three governs the Dipper; the Dipper governs the dog."

Second, in the Chinese origins lore there are altogether eight mythical great cultural heroes, i.e., those identified as the Three Sovereigns and Five Emperors. Seven of the eight descend through various lineages singly from the first hero, Huangdi. We note as well from this myth that the founders and thus the dynastic royal lineages of all three of the early Three Dynasties, i.e., the Xia, Shang, and Zhou (the Xia still being unknown historically) likewise descended ultimately from Huangdi.¹⁷ Furthermore, in what appears to be a shadow of a very ancient myth of the high god of creation generating the universe, *Shiji* 1 slips up in this ostensibly earth- and human-bound origins myth by stating that, after Huangdi had vanquished Yandi he completed the creation of all things in the world, including the sun and moon.¹⁸ Various statements about Huangdi in the *Huainanzi* of 139 BC confirm Huangdi's having early on been a cosmogonic god responsible for the creation of the universe.¹⁹

This motif by which a superior set of seven is borne of one ultimate and original cosmogonic source (those seven of the eight Three Sovereigns and Five Emperors created by the grand progenitor Huangdi) seems to draw on the same tradition that informed the Dipper lore of both the Iranian myth of the Amesha spenta and especially the associated RV IA motif of Adita, daughter of Dyaus, and her seven Aditya offspring who populated the Dipper as its seven stars (the eighth son being the cast-off Mārtanda, the god who represents the sun). We further recall from

¹⁷ See all of *SJ* 1, 2, and 3.

¹⁸ *SJ* 1: 6.

¹⁹ *HNZ* 6: 677; 17: 1747.

Chapter 2 that the Aditya were also, in a way that finds similarity with the Chinese origins myth, transformed in the RV-IA traditions into the seven Rsis gods and, ultimately, Saptarsis sages, and that the Dipper's seven stars were, throughout the RV, associated with not only the highest gods Dyaus, Indra, and Varuna, but also specifically with the creation of levels of the universe subsequent and inferior to themselves. The Aditya, Rsis, or Saptarsis therefore sustained both stellar creative and human culturally procreative roles. The parallels that the eight cultural heroes of early Chinese myth, involving one creator/progenitor and seven offspring, share with the RV IA Dipper lore, are instructive.

According to the Huangdi et al. myth, not only all eight of the early heroes but in fact all imperial houses through 221 BC originated in the procreative and civilizationally developmental activities of Huangdi. Then this facet of the Chinese myth, too, attributes creation of the world (here transformed to constitute most emphatically not the physical but rather the cultural / civilizational world, though we need to bear in mind that Huangdi was also said to have created the universe — see above) to the Dipper, just as in the RV IA lore of the Aditya.

We must not forget either the other side of the Dipper myth associated with Huangdi and his clan, that of the bear. In addition to Huangdi's origins as the son of the human ruler of the Youxiong, "Bear," clan / kingdom and his true father having been either of the Dipper stars Alioth / Dubhe or the collective stars of the Dipper, there is the fact that his progeny, the eighth or last of the mythical emperors and sovereigns, Yu 禹, in the myth Huangdi's great-great-grandson and the founding scion of both the Si 姒 clan and the Xia dynasty, evinces further direct and intimate connections with both bears and the Dipper. In one early element of the ancient lore surrounding Yu, his father, Gun 鯀, transformed in death into a yellow bear, whereafter a magician resuscitated him.²⁰ In another clearly telling story, when tunneling through mountains to relieve the flood waters and organize the earth's peoples, Yu turned into a bear; his wife, Nujiao of the Tushan peoples, discovered him as a bear and, not recognizing him, ran; Yu, still in the form of a bear, chased her. When he had nearly caught her, she turned to stone, whereafter, from within her stone

²⁰ *Tianwen* ("Questions of Heaven"; *Tianwen Tiandui zhu* [Shanghai: Shanghai renmin chubanshe, 1973]): 37–38.

womb their son Qi 啟 ("Split Apart") was born. Qi succeeded Yu as emperor of the Xia realm that Yu had established.²¹

It is also a fact that the later-attested sympathetically magical dance known as the Pace of Yu (Yubu 禹步), which was among the astral rituals associated with the earliest of organized Daoist religious sects or traditions, the Correct One (Zhengyidao 正一道) or Celestial Master (Tianshidao 天師道), that originated in the Southwest (Sichuan) in the 1st and 2nd centuries AD, involved the Zhengyi magician priest's retracing in his liturgical gait of the seven-star Dipper with the purpose of sympathetically invoking the assistance of the gods of the Dipper to battle demons on earth that caused for people sickness and misfortune (**Figure 2**).²² In Yu, then, we find again a pivotal relationship with both the bear and the Dipper itself.

²¹ See Yan Shigu's commentary in which he retells this story, in Ban Gu, *Han Shu* 6:190 (n. 2). Yan cited his source for this story to be *HNZ* (139 BC), which in his time must have transmitted the story, but that is no longer the case.

²² **Figure 2** shows the Pace of Yu as depicted in the later Zhengyi text *Taishang Zhuguo Jiumin Zongzhen biyao* 太上助國救民總真秘要 compiled by Yuan Miaozong 元妙宗 in 1127 AD (found in *Daozang* 986–7). Yuan was compiling earlier records and traditions inherited specifically from the 10th century Zhengyi priest/magician Tan Zixiao, for whose activities, including his pivotal role in the transmission of Zhengyi liturgical and magical traditions, and a reconstructed biography see John Didier (1998): 956–1017; and idem, "Messrs. T'an, Chancellor Sung, and the *Book of Transformation (Hua Shu)*: Texts and the Transformations of Traditions," in *Asia Major*, 3rd Series, XI:I (1998): 99–151.

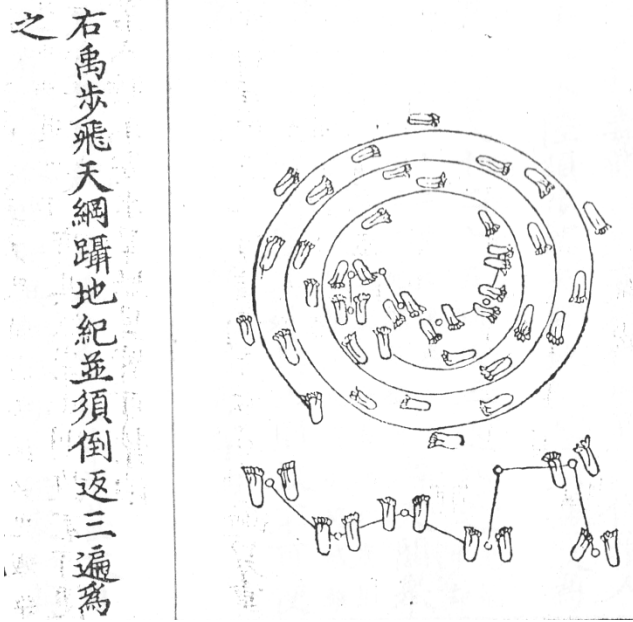


Figure 2. Portrayal of the Yubu (Gait of Yu) through and around the Dipper. From Yuan Miaozong, *Taishang zhuguo jiumin tianxin zhengfa* 太上助國救民天心正法 (*Daozang* 987), 8:3b.

Yu and his entire clan lineage thus enjoy clear associations with the magical potency and ursiline symbolism of the Dipper that hark back to the earliest human religious impulses of which we have record. The myths of the ursiline Dipper as reflected in the Huangdi-Yu lineage therefore shed light directly on the earliest levels of Chinese religious mythology, which in turn reflect Siberian and Iranian influences from as early as the end of the last great glaciation through the period of Iranian migration into Inner and northern East Asia down through the 2nd millennium BC.

Consequently, it seems clear that from as early as Palaeolithic but probably also in Mesolithic times as well as through the later eastward movements of Indo-Iranian and Iranian cultures and peoples during the 4th through 2nd millennia BC, the proto-Chinese and Chinese of the Yellow River corridor, who anyway were derived genetically in the Palaeolithic from Siberian stock,²³ have, as a result of their absorption (or indigenous transmission) of Siberian and later

²³ See Stephen Oppenheimer, *The Real Eve: Modern Man's Journey Out of Africa* (NY: Carroll and Graf,

Indo-Iranian mythology surrounding the Dipper (and Orion), looked to the Dipper as a central focus of their organizational and developmental mythology.

The High Gods Di and Taiyi, and their Relevance to the Pole

Aside from the penumbra apparent in *Shiji*, *Liji*, *Tianwen*, and *Huainanzi* of ursiline Dipper gods of very early Siberian origin (i.e., Huangdi and his mythical sovereign progeny), in all accounts treating early Chinese gods, the god that appears to have been the high god of the Shang, Di, has been considered the earliest known high divine power in China. In most of the discourse on Di written during the past several hundred years, this power has been assumed to be a singular high "God," although some scholars have questioned this notion.²⁴ Di's identity and nature have been elusive, because extant inscriptional and epigraphical evidence seems to suggest that the Shang never developed a direct cult of sacrifice or worship to Di.²⁵ Whatever Di was, it *seems* to have presided as the highest power in the spiritual realm amid a coterie of lesser spirits and gods to whom the Shang kings divined and sacrificed in order that they might receive information and other favors.²⁶ In the present study I propose that not only Di, but also its Neolithic predecessorial

2004): 224–235.

²⁴ In his article "Was There a High God *Ti* in Shang Religion?" (*Early China* 15 [1990]: 1–26) Robert Eno attempted to show that Di (Ti) could have been a corporate term denoting any number of high deceased ancestors serving as high gods. The likelihood of Di's multiplicity will be explored in Volume II, Chapters 3–5, below.

²⁵ On the other hand, Shima Kunio 島邦男 has attempted to show that the evidence is inconclusive in this regard and that Di perhaps did enjoy direct sacrifices. See his *Inkyo bokuji kenkyû* 殷墟卜辭研究 (Tokyo: Daian, 1959/1967): 188–216; see also below, Chapter VII. Robert Eno sought to refute Shima's arguments, but while Shima's arguments were weak, his point was good, and as few scholars have ventured into this arena the issue remains wholly unsettled. See Eno (1990): 7–8.

²⁶ For broad treatments of Shang religions see, for instance, David Keightley, *Sources of Shang History: The Oracle-Bone Inscriptions of Bronze Age China* (Berkeley: University of California Press, 2nd ed., 1985); idem, "The Religious Commitment: Shang Theology and the Genesis of Chinese Political Culture," in *History of Religions* 17:3–4 (Feb.-May 1978): 211–224; and, most recently, idem, *The Ancestral Landscape. Time, Space, and Community in Late Shang China (ca. 1200–1045 BC)*. Berkeley: Institute for East Asian Studies, University of California; Center for

high powers, were heavenly and centered in the northern pivot or pole of the sky. We will take up the issue of the specific identities of Di and other ancient Chinese high powers in Volume II.

The idea that Di was the high *sky* god is not new. After all, at the transition from Shang to Zhou in the middle to late 11th century BC, the conquerors consciously equated their high god Tian, "heaven(s)" or "sky," with the high Shang power, Di. Again these high gods were equated during the Former Han (220 BC–9 AD), until 5 AD, as imperial ritual took as its first priority the propitiation of both Di, in order for the throne to avail itself of the Shang royal prerogative,²⁷ and also Tian, thereby invoking the power of both the heavens and the Zhou royal house's historical connection with it.²⁸ In addition, around 100 BC, when Sima Qian denoted the Dipper (*dou* 斗), which, as we know already, at that time and for thousands of years before had circumambulated the celestial pole, to have been "Di's chariot," he thereby indicated that the polar region of the night sky was both the source of Di's power and Di's residence.²⁹ In this he also demonstrated the influence of Mesopotamian / Indian / Iranian / Greek visions of the Dipper as both (1) a cart, wagon, or chariot and (2) residence of polar high gods of contemporary, if not much earlier, Chinese religious concepts surrounding the high god(s). Confirmation of Sima's report of the Dipper having served as Di's chariot is found in a stone relief that originates in the shrine of the

Chinese Studies, 2000. See also K.C. Chang, *Art, Myth, and Ritual: The Path to Political Authority in Ancient China* (Cambridge: Harvard UP, 1983), and idem, *Shang Civilization* (New Haven: Yale UP, 1980).

²⁷ By this time there were, as well, five subordinate Di to whom Emperor Wu of Han (Wudi, r. 142–87 BC) and, 100 years before him, Qin Shihuangdi offered ritual oblations. These were directional lords (of the four quarters and center) of the sky, identified by the five colors (green, red, white, black, and yellow, corresponding respectively to the Five Processes et al. values of Warring States/Qin/Han correlative cosmology) who had developed during the late Spring and Autumn (721–481 BC) and subsequent Warring States periods as local alternatives to the royally controlled "High Di" (Shangdi 上帝). See *SJ* 28: 1386, 1393; and Michael N. Loewe, "The Religious and Intellectual Background," in Denis Twitchett and Michael N. Loewe, eds., *The Cambridge History of China, vol. 1, The Ch'in and Han Empires, 221 BC-AD 220* (Cambridge: Cambridge UP, 1986): 662.

²⁸ See *ibid.*: 661–663.

²⁹ *SJ* 27: 1291. See also Chen Jiujin, *Tianwen lifa juan* 天文历法卷 (Guangxi kexue jishu chubanshe, 1996): 14–15; and Zhou Jixu's collection of Zhou-period texts that evince clearly the skyborne nature of the high god Di during the Zhou period ("Old Chinese '*tees' and Proto-Indo-European '*deus': Similarity in Religious Ideas and a Common Source in Linguistics," *Sino-Platonic Papers* 167 [December 2005]: 1–5).

Latter Han period official Wu Liang (d. 151 AD). **Figure 3** reproduces a rubbing from this relief.



Figure 3. Eastern / Latter Han (c. 151 AD) representation of Di touring the heavens in the chariot of the Dipper. This illustration demonstrates the widespread distribution of the Mesopotamian/Greek/Indo-Aryan/Iranian motif of the Dipper serving as the cart/chariot of the gods. Needham & Wang (1959): 241.

Sima Qian's comment reflects that, aside from what we already know was a very early Siberian / Iranian influence whereby the earliest mythical and historical civilizational founders (and, in Huangdi, a creator god) were associated with the Dipper and the northern celestial pole, in addition, a long tradition of a stellar polar high god called Di existed in China by 100 BC. Our awareness of such a tradition then recommends a search for further evidence of it in earlier records, pictorial or textual, from any period.

In this light it is particularly noteworthy that Liu Che, the Han Emperor Wu (Han Wudi, r. 142–87 BC), or the Martial Emperor, established as his central state cult the worship of the god Taiyi 太一, Great One, whose physical referent was a star in the region of the northern celestial pole. Liu did not invent the worship of Taiyi but only reinstated what he was told was an ancient, early-Zhou, state cult. A man from Bo named Miu Ji 繆忌 told Liu Che that in ancient times the Zhou Son of Heaven (the King) had performed sacrifices to Taiyi, "the most revered of the spirits of the heavens," at the Southeastern Suburban Altar in the spring and autumn (likely at the

equinoxes, we may note). Thereupon Liu established two altars in succession over some 20 years at which he devoted ritual oblations most importantly to the Sanyi 三一, or "Three Ones," which included Taiyi 太一 (Great One), Tianyi 天一 (Heavenly One), and Diyi 地一 (Earthly One), as well as to Taiyi's immediate skyborne assistants, the Five Di of the Five Directions, and other lesser but ranking spirits. That the Five Di, directional spirits each of whom oversaw his fifth of the heavens (of the four directions and the one center), were Taiyi's assistants demonstrates that Taiyi enjoyed an association with the northern polar region. This association is confirmed by the fact that at the later altar that Liu Che had built within the Ganquan (Sweet Spring) Palace, the topmost deck of three, which was dedicated to the worship of Taiyi, was called Zitan 紫壇, or Azure Altar, a name that, as we have seen, identifies the altar to have been dedicated to the celestial polar region.³⁰ In addition, the libationer officiating at the sacrifices to Taiyi wore an azure robe, thus confirming specifically Taiyi's direct association with the Ziwei, or northern polar, sector of the sky.³¹ In fact, in 139 BC, prior to Liu Che's adoption of Taiyi as the object of worship of the central state cult, the *HNZ* already had identified Taiyi specifically with the Zigong (Azure Palace) of the circumpolar heavens.³²

Therefore, we know that during the Han Taiyi was a celestial polar god. This is significant, for during the Han Taiyi was also clearly identified with the traditional high god Di, as in the *Zhengyi* commentary to *Shiji*, which states that, "Taiyi is an alternative name of the Di of the heavens (*tian* 天帝)." ³³ The text of the *Shiji* that describes the development of Liu Che's system of ritual propitiations to the heavens confirms their identity: the occasion of the emperor's

³⁰ *SJ* 28: 1386, 1392–1395. See also a more extensive review of these matters in Li Ling, "An Archaeological Study of Taiyi (Grand one) Worship," in *Early Medieval China* 2 (1995–6): 2–3.

³¹ *SJ* 28: 1394.

³² *HNZ* 3: 264–5.

³³ *SJ* 27: 1290. On identifying Taiyi with Di see also John Major's translation of *Huainanzi* 3, "Treatise on Heavenly Patterns" (*Heaven and Earth in Early Han Thought. Chapters Three, Four, and Five of the Huainanzi* [Albany: SUNY, 1993]: 106–7); and Pankenier (2004: 218). Pankenier cites the work of Li Jianmin and Jiang Xiangnan, who during the 1990s argued for the identity of Di and Taiyi. Earlier, Donald Harper had assumed the identity of Di and Taiyi. See his "The Han Cosmic Board (*Shih* 式)," *Early China* 5 (1979): 2.

performance of a solstitial sacrifice to Shangdi, or High Di, on December 25, 105 BC in the Hall of Luminance (Mingtang) at Fenggao below Mt. Tai provides the clearest confirmation of the identity of Taiyi and Di. In his ceremonial meditation directed to the divine recipient, Liu Che thanked not Shangdi, the named recipient of the sacrificial ceremony, but Taiyi, for bestowing the next year's calendar on him so that he could continue to order the world.³⁴ Given both gods' placement in the northern celestial polar region, their association or identification with each other is unsurprising.

Li Ling 李零 traced quite convincingly the existence of a cult of worship of the god Taiyi back to the 4th century BC,³⁵ but in fact we can trace it back even further by considering both additional evidence pertaining to the cult of Taiyi and the changes that occurred in the northern celestial pole due to the precession of the equinoxes between c. 3000 and 100 BC. In 2800 BC the only pole star of the preceding 5000 years or so, Thuban (11 Draconis), sat virtually spot on the pole. After about 1000 BC Thuban had moved far enough away from the pole such that until Polaris edged into that spot after about 1600 AD the world was without a star precisely at or very near the northern celestial pole (**Figure 4**).³⁶

While many have reported that *Shiji* 27 identifies the star Kochab to be "the regular lodging of Taiyi,"³⁷ in fact Sima Qian wrote in *Shiji* 27 only that,

³⁴ *SJ* 28: 1401.

³⁵ Li Ling (1995–6): 1–39. See also Li Ling, *Zhongguo fangshu kao* (Beijing: Dongfang chubanshe, 2000): 207–238.

³⁶ Prior to Thuban the last stars to occupy the pole position were the Herculean trio of Tau Herculis, Phi Herculis, and Upsilon Herculis; they moved out of the pole after about 7500 BC.

³⁷ See Christopher Cullen, "Some Further Points on the *Shih*," *Early China* 6 [1981]: 41, n. 1; Li Ling (1995–6): 10, as well as Donald Harper, "Warring States Natural Philosophy and Occult Thought," in Loewe & Shaughnessy (1999): 869, and Pankenier (2004: 218). Pankenier, citing both John Major (1993) and Li Ling (1995–96), has identified Kochab to have been the seat of Taiyi in the Han; he also interpreted *tianjixing* to be a proper noun meaning "North Pole asterism" (p. 213). For Major's discussion of a portion of the statement on Taiyi's stellar residence, which he also understood to have been Kochab, see Major (1993): 107.

Of the stars at the extremity of the heavens in the Central Mansion (i.e., the polar region), the brightest is the constant abode of Taiyi. *Zhonggong tianjixing, qi yimingzhe, taiyi changju ye*. 中宮天極星其一明者太一常居也.³⁸

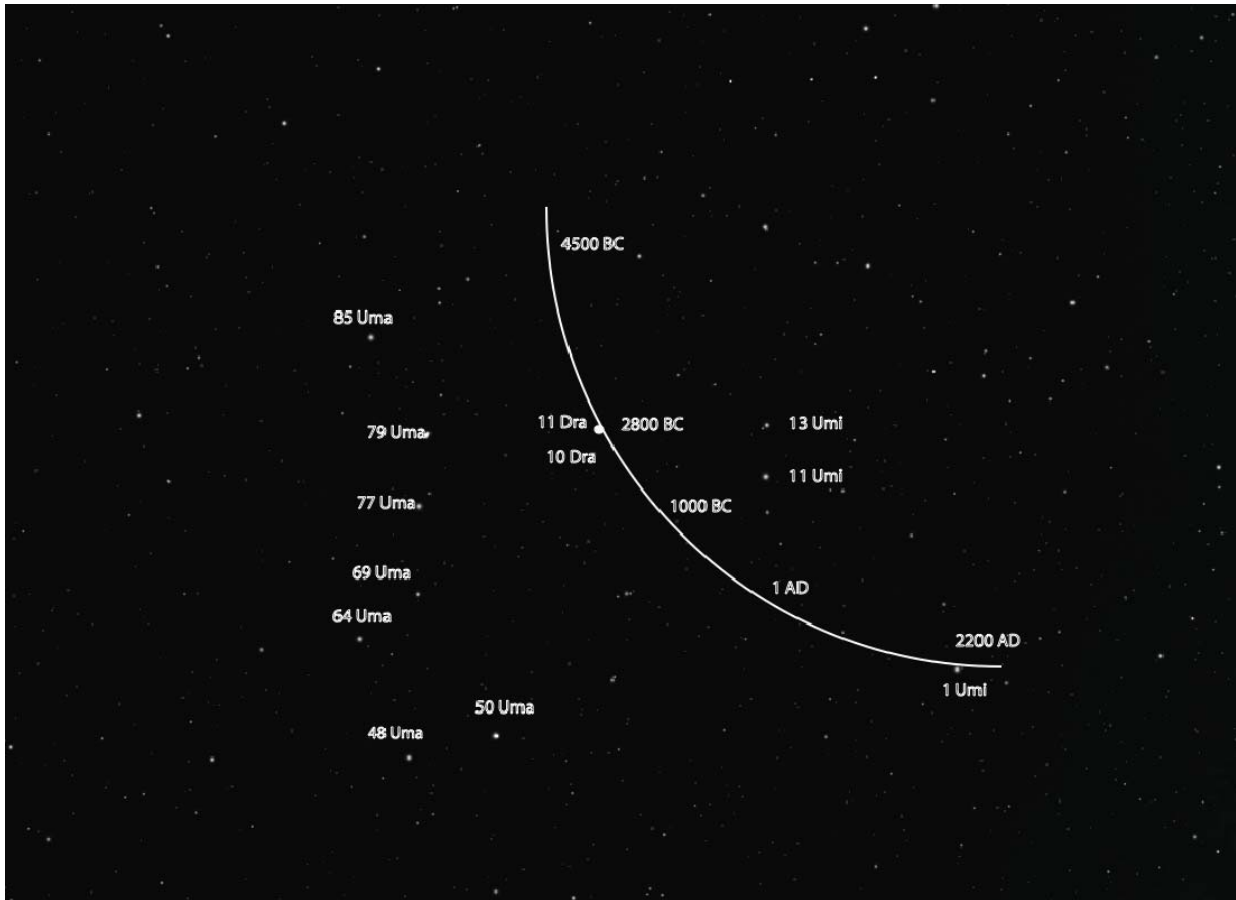


Figure 4. The precession of the northern celestial pole c. 4500 BC – AD 2200, as viewed from 34° N, 113° E, 2800 BC. 1 UMi is Polaris; 11 Umi is Kochab; 13 Umi is Pherkad; 11 Dra is Thuban; 64 Uma is Phecda; 69 Uma is Megrez; 77 Uma is Alioth; 79 Uma is Mizar; 85 Uma is Alkaid.

Modern scholars' identification of Kochab to have been the seat of Taiyi during the Warring States and Han periods likely results from their holding a preconception that the seat of

³⁸ SJ 27: 1289.

Taiyi must have been the actual pole star or the star that at the time sat closest to the pole and thus was recognized to be the objective pole star. Even the editors of the modern standard Zhonghua shuju typeset edition of *Shiji*, wherein *tianjixing* 天極星 was underlined and thus misidentified to be a proper noun, misread this phrase. Such readers appear to have misunderstood *tianji* to mean specifically *beiji*, or the Northern Culmen asterism, which did later become the name of an asterism near the pole that in some recreations of Han stellar cartography has included Kochab (my own reconstructed version of Han asterisms c. 1 AD can be seen in **Figure 5**). Others have, apparently unconsciously based on a presumption of the necessary identity of the god Taiyi with the actual objective pole, in their reading of the statement in *Shiji* 27 explicitly but mistakenly replaced in the text *tianji* with *beiji*, thus further confusing a very critical distinction that must be maintained.³⁹

It is true that in 100 BC, at a distance of approximately 7.5° from the actual pole, Kochab was the brightest star closest to the pole (but not much closer than 11 and 10 Draconis), and this Needham and Wang some time ago noted correctly, though they identified the star 4339 Camelopardi to have been the pole star employed in the Han to measure angular distances — in which conclusion they appear to have been mistaken.⁴⁰ Perhaps following Needham and Wang, some have identified Kochab to have been closest to the pole and thus the most logical choice for understanding what star during the Han served as the pole star, but they have made an unjustified leap in taking the contemporarily recognized objective pole star to be necessarily Taiyi's lodging place. Sima did not write that the star closest to the actual polar pivot was the seat of Taiyi. It should not be assumed that Taiyi referred at this time necessarily to the objective pole star or its

³⁹ Sun Xiaochun and Jacob Kistemaker made the mistake of reading *tianji* as *beiji* and thus incorrectly identified Taiyi's celestial residence to be "*Beiji*, the North Pole Office, just as the *Tianguan shu* (*Shiji* 27) said." (Sun Xiaochun and Jacob Kistemaker, eds., *The Chinese Sky During the Han — Constellating Stars and Society* [Leiden: Brill, 1997]: 123). The problem here is that, as we have seen, *SJ* 27 does not say *beiji* but rather specifically *tianji*, and the two cannot be assumed to have been identical in Sima's time. Christopher Cullen also specifically misread *SJ* 27's *tianji* to be *beiji* (see Cullen [1981]: 41, n. 1) and thus did not see that Sima was not identifying Taiyi with the astronomical pole (between Kochab and Thuban) but rather the astrological pole, which was Alioth.

⁴⁰ Needham and Wang (1959): 261.

closest approximation. As the lord of the heavens, Taiyi was simply the representative of the Zigong, the circumpolar region, and of course the owner of such an exalted pantheonic position would, in the eyes of Han observers of the heavens who were privy to an understanding of the cult of Taiyi, be assumed to be located in the brightest star of the pivotal region of the heavens. It further should not be assumed that in *Shiji* 27 the term *tianjixing* was employed as a cognate or synonym for the later-attested *beiji* asterism.



Figure 5. Asterisms drawn in the northern polar region, viewing from Zhengzhou, China, 1 AD. Key: 1 = Thuban; 2 = 10 Draconis; 3 = Nei Chu (內廚); 4 = Dipper; 5 = San Gong (三公); 6 = Tian Lao (天牢); 7 = San Shi (三師); 8 = Ziwei Youxian (紫微右線); 9 = Bei Chen (北辰); 10 = Beiji Tianshu (北極天樞, Polaris); 11 = Si Fu (四輔); 12 = Tian Qiang (天槍); 13 = Shaowei (少尉, Kochab); 14 = You Shu (右樞, Pherkad). Reconstruction my own, based on comparing accounts in *Shiji* and Tang-period star charts (for which see below, this chapter).

Both the grammar of and the historical commentary accompanying the text of *Shiji* 27 regarding the residence of Taiyi make it clear that *tianjixing* is not a proper noun but simply a

modified plural noun meaning "the stars at the extremity of the heavens," since it is modified by both the term *zhonggong* ("Central Mansion") and the phrase *qi yi ming zhe* ("the brightest among them"). This produces the meaning of "The brightest among the stars in the polar region at the extremity of the heavens is the one in which Taiyi constantly resides." David Pankenier read this to mean that Taiyi's nature is protean, that is, that while stars pass through *tianji*, which he misread as *beiji*, Taiyi does not, and that therefore Taiyi forever remains at or near the pole as its abodes come and go. Such a reading suggests that Sima was aware of the precession of the equinoxes. Perhaps he was, but this statement in *Shiji* 27 on Taiji's lodging does not reflect it, because reading this sentence to suggest that Taiyi moves his abode to whichever star is momentarily the brightest in the polar region fails to account for the critical character *chang* 常, "constant," in the binome *changju*, "constant abode." With *chang* appropriately considered, then we understand that, according to Sima Qian, Taiyi's constant, unchanging abode was the brightest star appearing in the approximately 30°-radius circumpolar circle of the Zigong. Although Kochab, of magnitude 2.06, is fairly bright, it is not the brightest star of the Zigong of Sima Qian's time. This honor belongs to Alioth, of magnitude 1.75, which is visibly much brighter than any other star in the celestial polar region. Significantly, Alioth, as we know, helps to comprise the handle of the Dipper.⁴¹

A further account in *Shiji* confirms the identification of Taiyi with the Dipper and, by extension, both its residence at Alioth and its identity with Di. In his description of the various sacrifices performed to Taiyi under the direction of Liu Che, Sima Qian recorded that in 113 BC a Numinous Banner (*lingqi*) was made to be brandished in the ritual preparations that needed to precede a planned attack on the state of Southern Yue. The banner, employed in a ritual announcement to Taiyi of the impending attack, was "embroidered with [representations of] the sun, moon, Dipper, and an ascending dragon, to symbolize Taiyi's three stars, being Taiyi's spear."⁴² The Grand Astrologer, presiding over the ritual, held the banner aloft, pointing it in the direction of Southern Yue, in an act intended to bring to bear the power of the high god of the

⁴¹ Counting inward from the tip of the handle of the Dipper, Alioth is the third star; or, measuring from the opposite direction, it is the first star out from Megrez. The latter constitutes the inside upper lip of the Dipper's cup.

⁴² *SJ* 12: 471 (28: 1395).

Dipper, Taiyi, in the Han battles against the enemy Southern Yue in order to harness and release against the enemy state the Dipper's supreme power.⁴³ Here Taiyi is represented by the Dipper itself and his spear apparently by the dragon. (It is noteworthy in passing that in both Western and Chinese traditions this line was understood to represent a serpentine creature, in the West helping to form the asterism of Draconis that included the old pole star Thuban.) Commentators have identified the three stars of Taiyi that constituted his spear to be "the three stars in the mouth of the Dipper."⁴⁴ The only three stars identifiable "in," that is, out in front of, the mouth of the Dipper run parallel to it as part of the line of stars that help to comprise the tail of the Western constellation Draconis. These stars are Kappa Draconis, Giasar, and HIP 52425 (or perhaps even 10 or 11 Draconis instead of HIP 52425 serving as the tip of the spear; but please refer to the discussion of these stars in the Appendix to this chapter). Therefore, like Di, Taiyi was identified explicitly with the Dipper. They thus seem to be the same god, or at least two aspects of the same godhead, and during the Han their location in the heavens appears to have been the Dipper itself.⁴⁵ It might be pertinent to note that here, unlike his cognomenic Di, for whom the Dipper served as conveyance in the context of a civic tour, Taiyi's association with the Dipper involves its use in an attack. We will return to this issue of Taiyi's disposition in Volume III, Chapters 3 and 6.

What those identifying Kochab, on the basis of the statement in *Shiji* 27 about the location of Taiyi's residence, seem to have overlooked is that Sima was not pinpointing astronomically observed and measured stellar positions but rather identifying astrologically significant locations in the heavens. That to any sane observer of the heavens in 100 BC the Dipper, circling the pole from a distance of approximately 20°–30°, could not possibly have constituted the astronomically observed and mathematically measured true celestial pole, appears to have been neglected. As in the case of early Babylonian astronomical observation, the most significant observations were made not for mathematical precision but for astrological meaning. Therefore, we find in *Shiji* 27

⁴³ *SJ* 12: 471 (28: 1395).

⁴⁴ *SJ* 12: 471 (28: 1395).

⁴⁵ Further evidence of the identity of Di and Taiyi during the Han can be found through their very apparent interchangeability in the text of *SJ* 28.

immediately following the statement cited above about the residence of Taiyi a section on the Dipper in which Sima identified that asterism clearly as the pivot of the heavens:

The seven stars of the Northern Dipper constitute what is called "the pivot of rotation (*xuanji*) and jade measure (*yuheng*)" that assorts appropriately the seven affairs of governance.... The Dipper is the chariot of Di, rotating in the center, approaching and regulating (i.e., pointing to and thereby governing) the four provinces [of the sky]: it [thereby] distinguishes *yin* from *yang* [in their waxing and waning with each rotation of the stellar canopy], establishes the four seasons [by pointing in a given direction heliacally at the turnings of the seasons], balancing the five processes, [thereby] shifting the sections and degrees [of the sky] (i.e., overseeing the measurable shifting of the heavenly canopy and thus establishing the system by which humans divine a calendar), and setting the various epochal periods (on which the Chinese calendar was based).⁴⁶

Two observations about this statement and its placement in *Shiji* 27 are noteworthy. First, its close proximity to the statement on Taiyi suggests that Sima intended to identify with one another the positions in the heavens of Taiyi and the Dipper. Second, it makes very apparent that the Dipper was considered subjectively to serve as the pivot of the heavens, despite the fact that objectively of course it was already somewhat distant from the pole. Again, the purpose of the subjectively recognized pivot was religious or astrological, not mathematically astronomical. I do not know of any instance in which anyone during the 2nd century BC bothered to mention the stellar population of the actual or objective pole, and this simply is because it was not significant to the religious potency that had developed for probably thousands of years already around the Dipper and its proximate stars such as 11 Draconis (Thuban) and Giasar.

The *HNZ*, presented to Liu An in 139 BC, some forty years before Sima wrote and just

⁴⁶ *SJ* 27: 1291.

prior to when Liu Che established his first sacrifices to Taiyi southeast of the capital, helps us to confirm with evidence outside the *Shiji* the identify of all of Di, Taiyi, and the Dipper and thus also to demonstrate how Sima in fact followed a very well established tradition when he identified them and placed them together at the subjectively recognized astrological pole. The third chapter in the *HNZ*, which concerns heaven's patterns, adumbrates Sima when it states that, "Di extends over the four cords [holding together the heavens], revolving through them using the Dipper, monthly moving one chronogram."⁴⁷ *HNZ* 3 further states that, "Taiyi holds court in the Taiwei; Taiyi resides in the Zigong,"⁴⁸ explaining later in the text that (1) the Taiwei, one of six sectors of the heavens, is centered in the asterism Vermilion Bird, which means that it is a sector associated with the southern-southwestern region of the sky, while (2) the Zigong is, as we know, the northern polar center of the heavens, which here is identified to include the stars of the Dipper and all others between it and the pole, i.e., stars within what at that time was a 29°–30°-radius circle surrounding the pole. Similar to the *Shiji*, here in *HNZ* 3 the Dipper is said to be the tool of Taiyi as he makes his tour of the sky and holds court in the Taiwei.⁴⁹ This section of *HNZ* 3 demonstrates both (1) the intimacy of the Taiyi of *HNZ* 3 with the Taiyi/Di of Sima by indicating their identical role as master of the heavens as they make inspection tours throughout the night sky, and (2) the identical

⁴⁷ *HNZ* 3: 340.

⁴⁸ *HNZ* 3: 264.

⁴⁹ *HNZ* 3: 264–5. Commentators have disagreed about the meaning of the first phrase, with some declaring that this section is corrupt. Such commentators argue that Taiyi should read as Tianzi, Son of Heaven (the emperor), and that thus Taiwei is the palace on earth, mirroring the Taiwei in the heavens, in which the emperor holds court with the feudal lords. But this section clearly refers in its entirety to the heavens, not heaven-mirroring political structures and activities on earth, and we need to take heed of this.

There is further disagreement about the identity or location of the heavenly Taiwei: although the text clearly identifies it to be the region in which the southern Vermilion Bird lies, some have apparently taken its meaning of Grand Enclosure to suggest that in this text it refers to the enclosure surrounding the Zigong (see Major [1993]: 81). Taiwei later was consistently considered to be the southern stellar court among the five that together comprised the heavenly canopy (see Sun and Kistemaker [1996]: 124–8). While some in later times apparently referred with the name Taiwei to the larger circle encompassing the entire circumpolar region, the text is very clear and explicit about its identity here. In both cases, we need to follow the text as it is written.

association with and employment by both Di and Taiyi of the Dipper to be their chariot, pointer, and/or weapon.

Thus far we have confirmed through associations with Di and the Dipper (1) Taiyi's identification with the Dipper and thus also (2) Sima's intent to locate Taiyi in the brightest star of the Zigong, Alioth, that helps to comprise the handle of the Dipper. Evidence external to both *Shiji* and *HNZ* confirms that Alioth was understood in the 2nd century BC to be the seat of Di/Taiyi. This is the fact that Alioth lay at the very center of the Han dynasty geomancers' divining wheel or cosmic model (*shi* 式, or *shipan* 式盤) recovered from a grave in Anhui that dates to 165 BC, which was employed to divine astrologically the movements of cosmic forces in time and space relative to the human physical and spiritual contexts in order to identify auspicious and inauspicious moments in which to engage in certain affairs.⁵⁰ Other Han-period *shi* likewise locate the very center of the cosmos at Alioth. (**Figures 6ab**)

⁵⁰ Illustrations of the *shi*, the diviner's board or cosmic board that shows, on the Dipper's handle, the star Alioth at the very center of the heavens (the perceived celestial pole), are found in many publications, including originally Yan Dujie, "Guanyu Xi Han chuqi de shipan he zhanpan," in *Kaogu* 1978.5: 340, but also in Harper (1979): 5; Cullen (1981): 35; Major (1993): 42; and Li Ling, *Changsha zidanku zhongguo boshu yanjiu* (Beijing: Zhonghua, 1985): 13. This particular board was recovered from the tomb of the second Marquis of Ju Yin and has been dated to 165 BC. John Major reproduced a depiction of this board, as well, in Major (1993): 43.

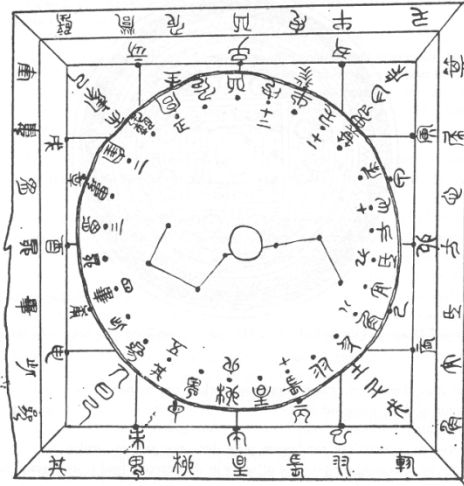


Figure 6a

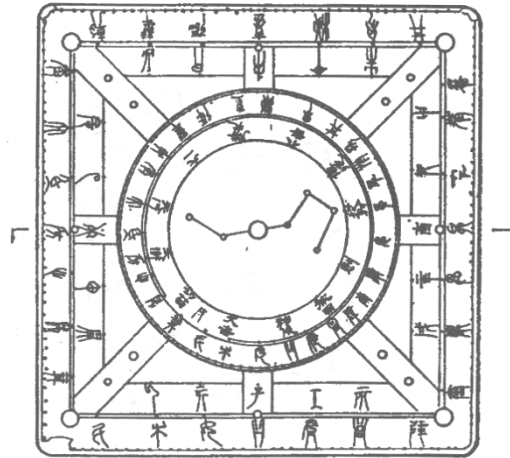


Figure 6b

Figures 6a and 6b. Han dynasty *shi* diviners' or cosmic boards. 6a shows a board recovered from a tomb in Anhui province that dates to 165 BC. From Yan Dunjie (1978): 340. 6b shows a board recovered from a grave in Gansu province dating to the early 1st c. AD. From Li Ling (2000): 95.

In addition, the so-called lodge dials recovered from the same grave in Anhui, which represent actual instruments by which real locations of celestial phenomena could be ascertained, also place the Dipper, and particularly Alioth, in the very center of the cross-hatch that marks the pivot of the heavens.⁵¹ (Figure 7)

As Figure 6b represents, other *shi* invariably also place the center directly at or near Alioth on the Dipper's handle.⁵² We may recall that Sima, in his statement in *Shiji* 27 concerning the Dipper, remarked that its stars constituted "the pivot of rotation and jade measure." Christopher Cullen has pointed out that the term "pivot of rotation" arises otherwise in Chinese stellar cartographic history as a name for specifically Alioth,⁵³ which identification makes appropriate

⁵¹ For discussion of what Cullen called the lodge dials, see Cullen (1981): 35. For his discussion of their probable use, see p. 34–6. See also Harper's description of the lodge dials, or what he called dipper dials, in Harper (1979): 5.

⁵² For more examples see Li Ling (2000): 92–97.

⁵³ Cullen (1981): 40.

sense given the evidence that otherwise has caused us to understand that the astrological heavenly pivot for Han intellectuals during the 2nd century BC was indeed Alioth. Therefore, we can conclude safely that, in Han intellectual (and certainly also popular) circles of the 2nd century BC, Alioth represented the god Taiyi and was his abode. We have further confirmed the stellar and spiritual identity of Taiyi with Di during this same period and the association of both gods' names and heavenly roles with the Dipper.

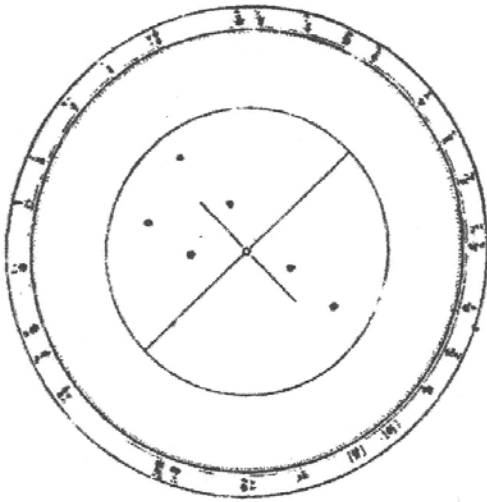


Figure 7. Lodge dial showing Alioth as its center. Recovered from a grave in Anhui; dated to 165 BC. From Yan Dunjie (1978): 340.

However, we must recall that Sima wrote c. 100 BC, after most of the records of previous periods had been lost due to the Qin's (221–208 BC) proscriptions and destruction in 213 BC of most texts not in its own possession. Sima seemed to be unsure of his identification of the abode of Taiyi, his description vague and scattered. It might be that he was uncertain of the correct radius of the Zigong, that is, whether it was inclusive enough to embrace the Dipper, which lay between 18° (to Dubhe) and 29° (to Alkaid) distant from the actual pole, and thus large enough to include the brightest star in the region, Alioth. Furthermore, from reading *Shiji* 28, the "Treatise on the Feng and Shan Sacrifices," one becomes aware of just how little Sima or any other intellectual or court official of his time understood of ancient or even fairly recent traditions of stellar divinity that had,

with unification, filtered into the Han court. In *Shiji* 28 we find Liu Che throughout the 130s–100s BC searching for effective means of offering tribute to the spirits of the heavens — and to the earth. Following his acceptance of Miu Ji's singular, unconfirmed, and vague identification of Taiyi and the ancient sacrifices performed to him at the Zhou court, *Shiji* 28 (and 12 and 27) narrates how Liu Che continued to listen to and follow the instructions of a variety of individuals claiming to possess expertise on Taiyi and other gods, and at times Liu became aware that he had been misled. He then waited for another self-identified expert to offer what to him seemed to be sound advice and instruction, and accordingly established a new altar, shrine, or sacrificial program to a given deity in order to win and maintain Heaven's favor of his rule. In short, Liu Che and his entire court were groping in the dark for any seemingly viable direction in their attempts to establish some consistent and unitary system of worship and propitiation of the stellar spirits of the heavens. Seemingly none of these courtiers really had a firm grasp on many of the diverse pre-Qin or even pre-Han traditions floating in from the old states, and they relied on what amounted to hearsay to gradually develop a coherent regime.

Even later, during the Tang, 7th-century court astrological experts informing the compilation of the *Jin Shu* (History of the Jin dynasty, 265–420 AD) still were unsure of many of Sima's identifications of either asterisms or divinities with specific stars or groups of stars,⁵⁴ even though Sima and the Tang commentators ostensibly were informed by the same three ancient stellar mapping traditions, i.e., the schools of Shi Shen, Gan De, and Wu Xian, traditions that Sima himself in *Shiji* 27 identified by name as having served as his sources.⁵⁵ The problem is that the respective reconstructed traditions ascribed to Shi, Gan, and Wu as known since the 7th–8th centuries AD cannot be believed to represent accurately these traditions as they existed either before or immediately after Sima's time during the Han.

Consequently, many asterisms and stars identified in later catalogs, including those

⁵⁴ Their commentaries have been attached to annotated editions of *SJ* and are concentrated in the astronomically directed chapters 27 and 28 (and 12, which merely repeats 28). For some such commentaries, see below the Appendix to this chapter.

⁵⁵ *SJ* 27: 1349.

catalogs and charts most recently proposed, simply do not align with those that Sima identified.⁵⁶ One reason is that only some twenty to fifty years after Sima wrote, or c. 80–52 BC, angular distances between stars, and specifically their angular distances from the pole when they were at culmination, seem to have been measured anew for stars and asterisms in the Shi Shen catalog and adjusted accordingly using apparently the first armillary sphere known in Chinese history.⁵⁷ It has been argued that such new measurements helped to stimulate a cosmographic model, the *huntian*, that was quite different from the one from which Sima may have worked, the *gaitian* (these models are reviewed below in Chapter 4 and again in Volume III, Chapters 4 and 5),⁵⁸ though this cannot be stated with any certainty and, in fact, appears to be very unlikely. Regardless, soon after Sima wrote there occurred what was perhaps the most momentous change ever to have transpired in Chinese astronomical history, and it thus would be careless to treat the later-adjusted traditions ascribed to the schools of Shi, Gan, and Wu to be identical with those from which Sima drew.

⁵⁶ Comparing Sima's descriptions of only the circumpolar stars of the Zigong with the recreated stellar cartographs produced recently by Sun and Kistemaker demonstrates that the latter, based on Tang-period reconstructions of the early-imperial star catalogs, do not coincide clearly with Sima's descriptive identifications. The case of Tianyi (see Appendix, this chapter) is an example: according to Sima it consists of three stars, probably those running parallel to the length of the Dipper and helping to constitute in the West the tail of Draconis (these probably are those that Sima otherwise identified to be "Taiyi's three stars" that comprised Taiyi's spear; see above, text, as well as below, Appendix), while in Sun and Kistemaker Tianyi is identified as just one star (and they seem anyway to have displaced it from its correct position according to the Tang Dunhuang charts at 10 Draconis to 8 Draconis). Compare *SJ 27*: 1290 with Sun and Kistemaker (1997): 134 (Fig. 6.7), and *ibid.*, "The Reconstructed Han Sky (epoch 100 BC)," p. 241 (first folding map leaf). We note here as well that Sun and Kistemaker made the mistake of reading *tianji* as *beiji* and thus misidentified Taiyi's celestial residence to be "*Beiji*, the North Pole Office, just as the *Tianguan shu* (*Shiji 27*) said." (Sun and Kistemaker, p. 123) The problem here is that, as we have seen, *Shiji 27* does not say *beiji* but rather specifically *tianji*, and the two cannot be assumed to have been identical in Sima's time.

⁵⁷ See Cullen (1981): 36, who quotes Yabuuchi Kiyoshi's 藪内清 *Chûgoku no Temmonrekihô 中國の天文曆法* (Tokyo, 1969): 46–75. A further account of the apparent use of the armillary sphere to map the stars much more accurately than before can be found in Cullen (1996): 53–65, and esp. 62. Cullen identified Geng Shouchang to have been the one, in 52 BC, who first employed in China a simple armillary sphere to measure angular distances much more accurately than ever before.

⁵⁸ See Cullen's account of how the use of the armillary sphere may have induced the development of the *huntian* cosmic model, in Cullen (1981): 38.

Furthermore, the traditions ascribed to the three schools were lost in the wars of the late-Han period (c. 180–220 AD), and their reconstructions date to a period stretching from the early-4th through early-8th centuries AD: according to the *Sui shu*, circa 310 AD the Royal Astronomer of the State of Wu, Chen Zhuo, recompiled a stellar cartograph and catalog that was said to represent the traditions of the ancient three schools of Shi, Gan, and Wu. Then in the 5th century, the Royal Astronomer of the Liang state, Qian Luozhi, mapped, on a planisphere that he created, these three traditions as inherited from Chen, marking the stars identified by each tradition using a distinct color (red, black, and white). Upon its unification of the South with the North, the Sui court (589–618 AD) then inherited the recreated traditions, and of course the Tang (618–907 AD) absorbed them from the Sui in and after 618. In 715 AD the reconstructed traditions of the Shi, Gan, and Wu schools were canonized in the compilation and printing of the *Kaiyuan Zhanjing* (Kaiyuan Period Treatise on Astrology).⁵⁹ It is the multi-colored markings that Qian Luozhi initiated in the 5th century AD to differentiate the three traditions that, transmitted thereafter, appear on the Dunhuang maps referenced and reproduced below in this chapter. The present point is that, even though the Dunhuang stellar charts constitute among the earliest extant stellar maps in the world, we cannot expect them or their associated traditions recorded in *Kaiyuan Zhanjing* to represent truly or fully the state of stellar cataloging current in Sima's time and represented by him. At the same time, we cannot entirely dismiss them, either, for at their foundations lie the remnants of ancient traditions.

From the above discussion we can draw two salient points. First, Sima himself was aware of the existence of diverse traditions, and likely he had to choose from among them to write his own account of "Heaven's Offices" (*Shiji* 27). Consequently, identifications of stars and asterisms that we find in *Shiji*, both in Chapter 27 and elsewhere, are at times naturally vague, because it is probable that Sima was unclear over which tradition to follow at any given point. Furthermore, the reconstructed stellar and asterismic identification systems now known and attributed to the ancient schools of Shi Shen, Gan De, and Wu Xian could not represent precisely the teachings of such schools in either the 2nd or 1st centuries BC, because at least the Shi tradition changed dramatically

⁵⁹ See Needham and Wang (1959): 263–4.

c. 52 BC, which change may have affected as well the other schools' traditions,⁶⁰ and, furthermore, there occurred a thorough break in the transmission of all such traditions between c. 180 and 310 AD.

There is, therefore, a degree of uncertainty in Sima's text with regard particularly to his identification of the stellar seat of Taiyi/Di, and this uncertainty is understandable. But indecision and imprecision occurring in both Sima and thus also his modern readers derives further from the fact that early-Han courtiers were grasping randomly for information about traditions regarding which they appear to have had only sketchy knowledge. The disturbance wrought by the Qin's social and military revolutions, particularly among the old elites, had created a cultural chasm between the Warring States and Han, and under Liu Che's direction to locate and embrace spiritual means to aggrandize himself and the Liu family's dynasty the courtiers very apparently cobbled together pieces absorbed from diverse ancient and more recent traditions and were uncertain of the resulting synthesis. The stories in *Shiji* 12 (28) of Liu Che's courtiers, having to improvise the Feng and Shan sacrifices to Taiyi and his adjutant Five Di on and below Mt. Tai largely on the basis of the hearsay that related the supposed sacrifices that had been performed earlier at Huangdi's and the early-Zhou's capitals, demonstrate this clearly almost to the point of humor.

The same uncertainty prevailed approximately 100 years earlier, as well, when we see Ying Zheng, the First Emperor of Qin (Qin Shihuang), similarly groping seemingly randomly for elements from which to construct a coherent system of heavenly worship, calendrical / astronomical / astrological legitimacy, and self- and imperial aggrandizement. In 212 BC, very late in his reign, Ying Zheng, never satisfied with the state of the infrastructure of his empire's political-religious system that mimicked the ways and divinities of the heavens, ordered built a new palace complex at the Shanglin Park south of the capital Xianyang. This complex he had connected with Xianyang via a covered walk that spanned the intervening Wei River. The new palace was to serve as his new court, in order to mirror how the Yingshi 營室, or Royal House (or Encampment), asterism (helping to comprise the Western constellation Pegasus), which rested,

⁶⁰ The Gan and Wu traditions themselves are reported to have been adjusted with new observations c. 74 AD. See David Pankenier, "Seeing Stars in the Han Sky," *Early China* 25 (2000): 197.

when visible, in the southern sky but particularly across the Milky Way from the northern celestial pole, represented the court of heaven at which heavenly business was administered.⁶¹ By identifying it with Yingshi, Ying Zheng was also aligning his court administration with the epochal origins of his newly imposed Zhuan Xu calendar, since that calendrical epochal origin was set at the beginning of spring (*lichun*, the fourth of the twenty-four solar terms) of the 26th regnal year of Duke Xian of Qin, or 367–366 BC. (The first day of *lichun*, or February 9, 366 BC, followed the winter solstice of December 26, 367 BC by 45.66 days; between midnight and 9:00 a.m. on this day the sun and new moon were in conjunction in the heliacally rising Yingshi asterism, marking the *astronomical*, not civil, epochal new year; thus Yingshi marked not only the new luni-solar year [spring] in any given year, it also identified the specific day of origin of the epochal beginning of Ying Zheng's new calendar.)⁶²

Here we note two items. First, Ying Zheng's new arrangement adumbrates both Sima Qian's and the *HNZ*'s descriptions of the heavenly residences of and roles played by Di and Taiyi in and outside the northern celestial pole. We recall that according to those texts, while Di and Taiyi resided in the northern polar region, they also either toured the heavens or held court in an asterism in the southern sky. However, in Sima's description of Ying Zheng's actions and goals there is no mention of either Taiyi or Di. This suggests very strongly that during the Qin and early-Han imperial periods the courts' and courtiers' understandings of the heavenly pantheon and individual divinities' roles in the heavenly canopy were sketchy and mercurial, as we have noted above. This impression might be strengthened further by the fact that even asterismic names and positions in the sky were extremely fluid during this century. This fluidity may be in evidence when we compare the positions of the courts in which Taiyi and the earthly emperor conducted their courtly business as identified differentially in *Shiji* 6 and *HNZ* 3: in the former account descriptive of Ying Zheng's activities in the Qin, the court is located in Yingshi, the celestial lodge

⁶¹ *SJ* 6: 256.

⁶² On the Zhuan Xu calendar see Christopher Cullen, "Motivations for Scientific Change in Ancient China: Emperor Wu and the Grand Inception Astronomical Reforms of 104 B.C.," *Journal of the History of Astronomy* xxiv (1993): 189–90. On the difference between the astronomical and civil years, see Nathan Sivin, *Cosmos and Computation in Early Chinese Mathematical Astronomy* (Leiden: E. J. Brill, 1969): 10, n. 1.

(which lodge is constituted of a line that in the West helps to form the constellation Pegasus) associated (in Han and later cosmographic and astronomical tradition) variably with the west-northwest or north-northwest and winter or (in the *jiuye* astral-terrestrial system of correspondence outlined in the *Lüshi chunqiu*, a Qin court product of 239 BC) due north, while in the latter, *HNZ 3*, the celestial court is located in the sector of the night sky identified as Taiwei (Great Enclosure) and associated explicitly with the southern-southwestern / summer section of the sky and calendar, the *jiuye* field of Vermilion Bird (including the lodges of Zui, Shen, and Dongjing, and spread across the Western constellations Orion and Gemini).⁶³ Furthermore, while *HNZ 3* and later tradition locates Taiwei in the south, some later commentators to that text identified it to be a greater circle encompassing the polar circle of the Zigong. Probably these commentators were attempting to coordinate the very inconsistencies between the Qin and Han arrangements and systems that we are currently reviewing.

It then is no wonder that Sima, Grand Astrologer at the Han court, seems really to have been somewhat uncertain of any of (1) what star to identify to be in his time the abode of Taiyi, (2) what was the true origin and history of the cult of Taiyi, or even (3) what Taiyi's cognomenic Shangdi, or Di, had represented in earlier times. And truly, Sima seems to have made a choice to ignore or dismiss the deepest traditions regarding Taiyi, which might have been transmitted from ancient times through one of the three stellar and asterismic identification traditions of which Sima was aware, the Gan De. As we have seen, Sima noted the authoritative traditions that existed in and before his time, including those of Shi Shen, Gan De, and Wu Xian, and he is said to have followed mostly the Shi Shen tradition, but we do not possess a contemporary catalog of any of these three main cartographic traditions.

We know of the existence of the competing ancient traditions concerning Taiyi's heavenly abode from consulting not only Sima and the *Suishu* texts but also Dunhuang and later Chinese star charts. The Dunhuang charts, the earliest dating from the 8th century AD, place Taiyi in neither Alioth, or any star of the Dipper, nor Kochab. Instead, they locate Taiyi and its companion star

⁶³ *HNZ 3*: 262. The difference may also be attributable to Qin and Han differences in calendrical systems. See Volume III, Chapters 4–6 below.

Tianyi (Heavenly One)⁶⁴ in front of (i.e., out toward the actual NCP from) the handle of the Dipper, resting along the line of stars running parallel to the Dipper's handle (the latter formed from Alioth and its neighbor Mizar). (**Figures 8 & 9**)

⁶⁴ In *SJ 27* Tianyi is apparently identified to consist of three stars that lie in front of the open bowl of the Dipper. Although in this Tianyi does not align precisely with its usual position given on historical Chinese star charts (on such charts Tianyi usually lies along the same tangent but on the other side of Thuban), it is close to that position and supports my contention that these stars, constituting the long tail of the Western constellation Draconis (including 11 Draconis / Thuban and 10 Draconis) that lies directly in front of the Dipper, helped form what for Neolithic and Bronze age peoples in China was the meridian of heaven.

For in-depth discussions of Tianyi relative to Taiyi, see all of the note immediately following; the Appendix to this chapter; Volume II, Chapter 1; and Volume III, Chapters 3–6.

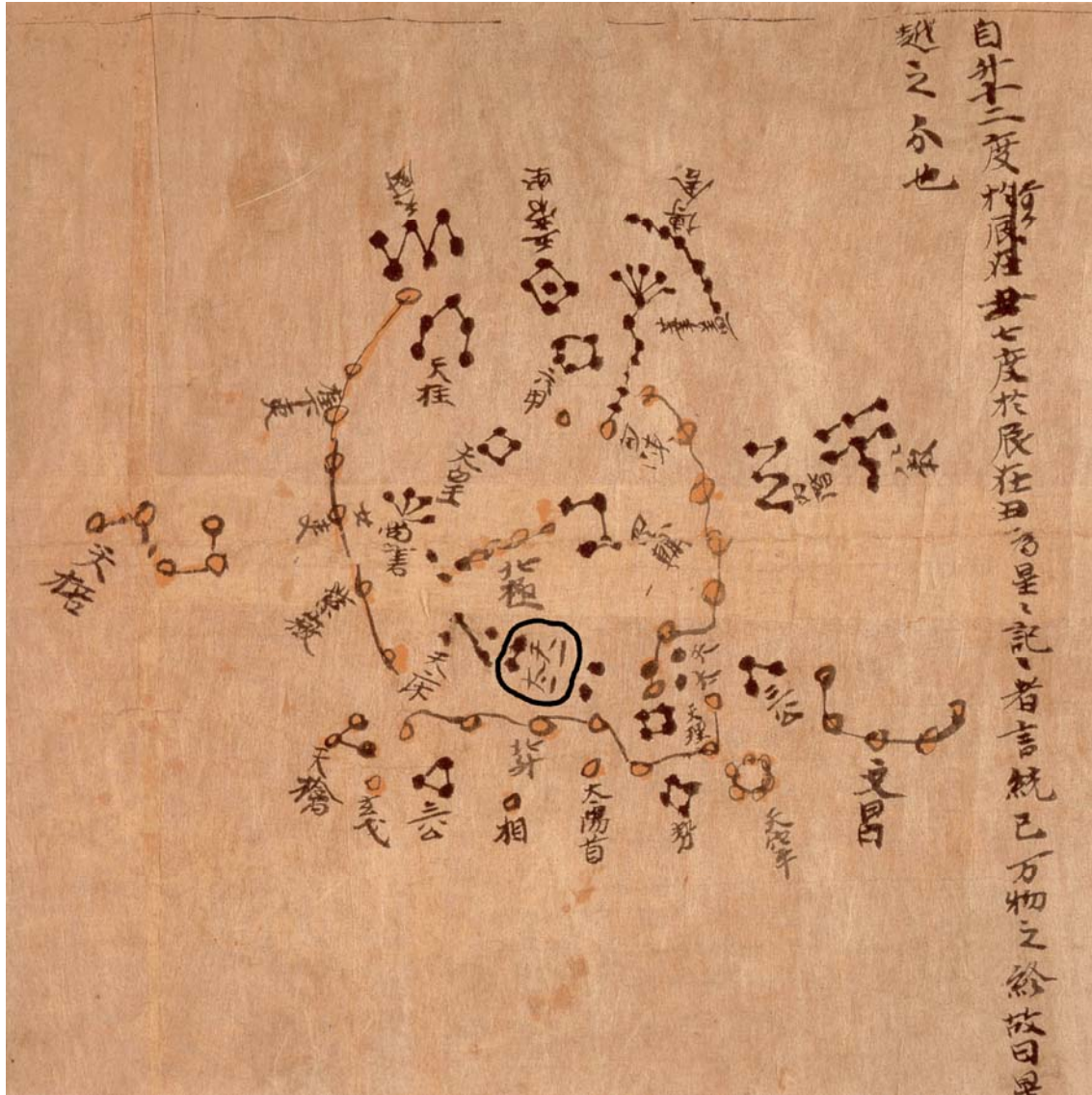


Figure 8. Dunhuang star map A, dating to c. the 8th c. AD. Taiyi and Tianyi, representing Thuban and 10 Draconis, are circled. From *Zhonghua wuqiannian wenwu jikan, tianwen pian* (1988).

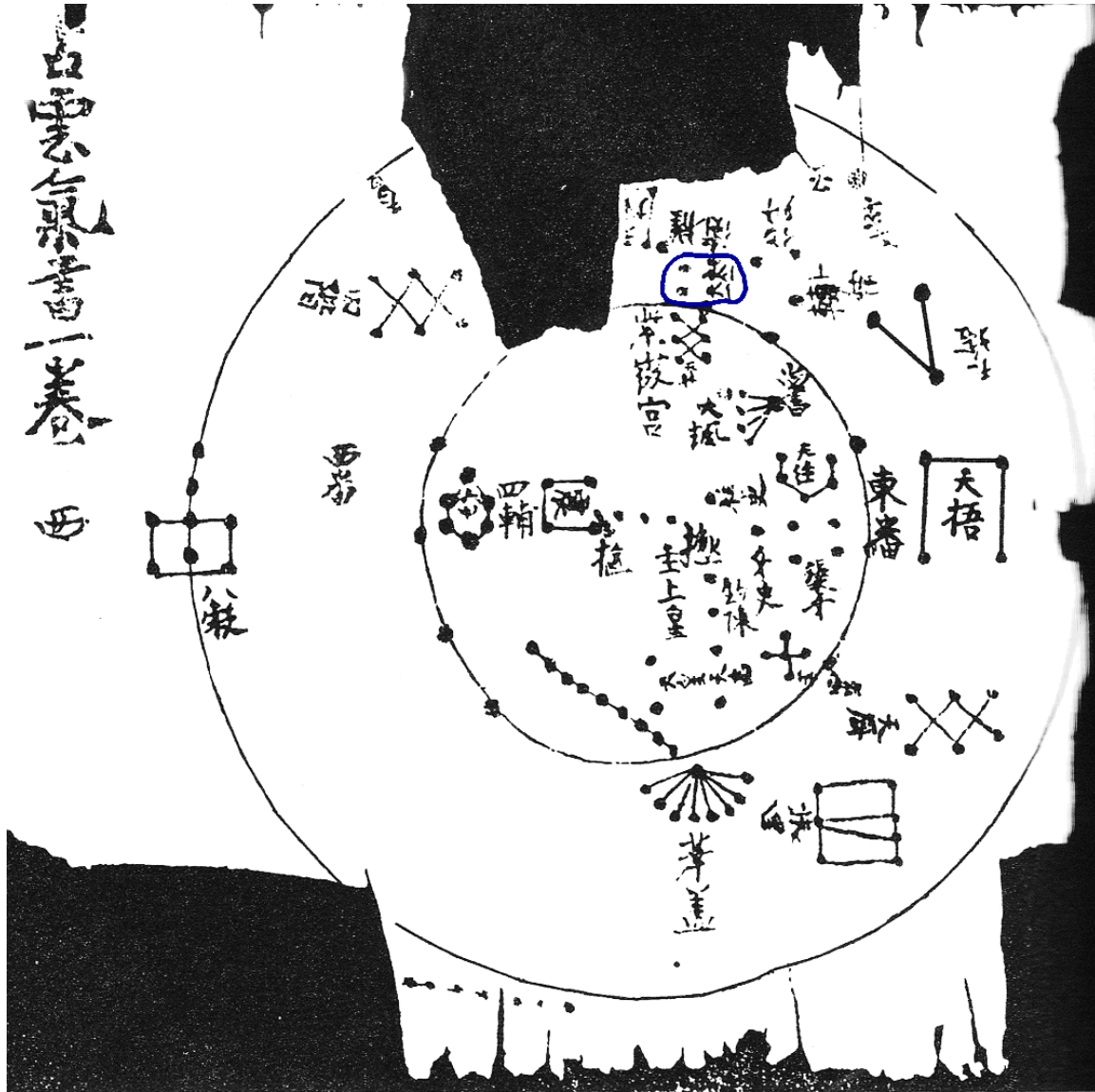


Figure 9. Dunhuang star map B. Taiyi and Tianyi, circled, represent Thuban and 10 Draconis, respectively. From *Zhonghua wuqiannian wenwu jikan, tianwen pian* (1988).

This is the line of stars that includes the three said in *Shiji* 12/28 to comprise Taiyi's spear, or the dragon represented on the Numinous Banner dedicated to Taiyi that was reviewed above. It is the line of stars that constitutes the tail of the Western constellation Draconis, the Serpent, and one to which I also refer in this study as "the meridian of heaven." Astonishingly, these stars that are identified in both the early (Tang period) and later (10th century through the Ming period, 1368–1644) stellar charts as Taiyi and Tianyi are 11 Draconis/Thuban and its dimmer mate 10

Draconis, are none other than those that sat at the pole during the 3rd millennium BC.⁶⁵ Qian Baocong noted these positions of Taiyi and Tianyi in his 1983 revision of his 1932 study of Taiyi, having benefited by 1983 from having viewed the star charts found at Dunhuang in 1907 and 1944. At the same time, Qian argued that Taiyi was a Han invention, no earlier than the 2nd century BC.⁶⁶

⁶⁵ These charts, represented here in **Figure 8**, can also be found in Chen Meidong (1996): 210–317; they have also been reproduced in color in *Zhonghua wuqiannian wenwu jikan, tianwen pian* (1988): plates 26 & 29; see also Sun and Kistemaker (1996: 28f–29f) for reduced color reproductions of portions of the maps. For black-and-white reproductions see Needham and Wang (1959): 264f–265f. The color photograph shown here as **Figure 8** is now readily available on many sites of the internet.

In the later, Ming, charts Tianyi has been moved out away from the Dipper to rest at the star 12 Draconis, or Edasich. In these maps Taiyi remains at the position of Thuban (11 Draconis) and 10 Draconis, the old celestial pole. In the earlier Dunhuang maps it is clear that Tianyi rested at either Thuban or 10 Draconis, but from both its position shown on the Dunhuang maps and its lesser historical importance than Taiyi (see the Appendix to this chapter) we can conclude with certainty that it fell on the dimmer 10 Draconis.

One of the most widely employed recently produced historical Chinese stellar charts, that prepared by Wang Li for insertion in his multi-volume *Gudai Hanyu* 古代漢語 (Taipei: Landeng, 1989), entitled "[Fulu yi] Tianwen tu" [附录一] 天文图 (Supplement 1, Star Chart), ignores Taiyi and Tianyi but places Thuban (11 Draconis) and 10 Draconis in the Chinese asterism Ziwei youyuan 紫微右垣 (Barrier on the Right of the Azure Tenuity). However, in fact these positions in this asterism belong in historical charts to the stars Pherkad and Kochab. Sun Xiaochun and Jacob Kistemaker's recently produced mathematical projections of Han dynasty identifications of stellar names and positions that support my own textual- and chart-based projections of Taiyi and Tianyi to lie independent of the Ziwei youyuan; however, in following strictly the Tang-period Shi Shen system they place them not in 11 and 10 Draconis but Kappa and 4 Draconis (Sun and Kistemaker [1997]: 70). The major trouble with Wang Li's map showing supposedly "ancient" stellar configurations is that he followed very late, Qing dynasty (1644–1910), stellar charts, in which Polaris already sits at the pole position. Wang's having ignored the effects of precession on stellar positions caused his view of them to be historically inaccurate. Wang likely followed Qing dynasty Jesuit reconstructions of Chinese astrological maps, which were based on records and charts dating to no earlier than the Song period (960–1279); see Sun and Kistemaker (1997): 42–67.

⁶⁶ Qian Baocong 錢寶琮, "Taiyi kao," in *Qian Baocong kexueshi lunwen xuanji* 錢寶琮科學論文選集 (Beijing: Kexue chubanshe, 1983): 219.

Needham and Wang also noticed that stars of the constellation Draconis (The Serpent, several of whose stars create the line of the "meridian of heaven" before and parallel to the handle of the Dipper), among them Thuban and 10 Draconis, approached the polar position, but they mistakenly projected these stars to have been too far away from the pole to have made an impression on them, and they also mistakenly projected them to have been nearest in their

Subsequently, Li Ling adjudged both of Qian's assessments to be incorrect, tracing the cult of Taiyi through recent archaeological finds (to be reviewed below in Volume III, Chapter 3) to the 5th–4th centuries BC and claiming Kochab to have been the pole star and thus the seat of Taiyi.⁶⁷ David Pankenier has more recently cited Li and indicated his agreement with both conclusions.⁶⁸ In the meantime, following Qian, Y. Maeyama has averred that the identification of Taiyi and Tianyi with 11 and 10 Draconis means that these stellar gods had to have originated during the period in which these two stars sat at or near the northern celestial polar position, i.e., the 3rd and 2nd millennia BC, but oddly and inexplicably he attributed to not Taiyi but Tianyi the role of high god, considering Taiyi to have been an adjutant and thus less important god.⁶⁹ I review Maeyama's thesis in the Appendix to this chapter.

Li was correct in pushing back to the Warring States period the span of time during which the cult dedicated to Taiyi developed, but he did not push it back nearly far enough, because like Qian he did not realize the implication of Qian's identification from star charts of Taiyi with 11 Draconis / Thuban and Tianyi with 10 Draconis. But since Thuban rested virtually dead-center at the pole between c. 3200 BC and 2500 BC, then it is apparent that the identification of Taiyi, the god of the pole, with the star Thuban had to have occurred at that time. That is, these star charts dating to the 8th through 17th centuries AD preserve a very ancient tradition that apparently survived, in what was probably the stellar cataloging tradition of Gan De to which Sima Qian

approach to the pole as late as the 2nd millennium BC, not during the 3rd millennium BC as we now know occurred (Needham and Wang [1959]: 260–261).

⁶⁷ Li Ling (1995): 10, n. 29.

⁶⁸ Pankenier (2004): 218. On p. 233 Pankenier also mentioned in passing but without developing any justification that Taiyi may have lodged during the Shang period in the star Kappa Draconis. I know of no justification for so placing Taiyi at any time. It may be that Pankenier was reading from the Dunhuang star charts and misplaced Taiyi from 11 Draconis to Kappa Draconis or followed Sun and Kistemaker in so locating Taiyi (mistakenly, I believe; compare Sun and Kistemaker [1997]: 28f and 70). On close examination of the Dunhuang and later star charts, that in them Taiyi and Tianyi were placed consistently at 11 and 10 Draconis is quite clear.

⁶⁹ Y. Maeyama, "Two Supreme Stars, Thien-i and Thai-i, and the Foundation of the Purple Palace," in S. M. Razaullah Ansari, ed., *History of Oriental Astronomy* (Dordrecht: Kluwer Academic Publishers, 2002): 3–18.

apparently did not subscribe,⁷⁰ through the late-classical and early-imperial periods. Sima was either entirely unaware of it, which seems unlikely, or he chose to ignore or dismiss it. I would venture to estimate that, since in Warring States and Han traditions the Dipper was the center of religious attention paid the heavens and consequently served as the anchor from which all religiously informed calendrical measurements of the heavens were drawn, Sima could not accommodate himself to following a tradition that placed the high god of the heavens, Taiyi — and also the traditional high god Di — in a star, 11 Draconis (Thuban), that distracted attention from the astrologically all-important heavenly pivot, the Dipper. Alioth, which lies on the Dipper's handle and was the brightest star of the contemporary Zigong, was also where we know that others had already placed the pivot of idealized, hemerologically relevant, revolution of the heavens and thus also the seat of the heavenly high power. Considering the contemporary tradition that located the heavenly pivot in the Dipper, Alioth therefore was Sima's logical choice for locating the residence of the high god Taiyi/Di.

At any rate, from these charts and an awareness of the movements of the pole through the heavens over the millennia due to the precession of the equinoxes, we now can appreciate the full implication of this finding: that the focusing of religious devotion on a star that was to become known by the name of "Taiyi," that is, what in the West is called 11 Draconis/Thuban, was by the Han a nearly 3000-year-old tradition, though of course we have no idea what names were given the god or power of "Taiyi" during the early — pre-Shang — times (for more on Taiyi and Tianyi, see the preceding notes, as well as the Appendix to this chapter, and Volume III, Chapters 3, 4, and 6). No later than around 1545 BC the Shang named this polar god something close to "Taiyi" ("Dayi") and constructed, on the basis of their observation of both inherited tradition and the geometric shapes formed from stellar patterns surrounding and involving this ancient pole god Taiyi / Dayi, a greater and complex high power, Di.

⁷⁰ See the color reproduction of one of the stellar maps of the Zigong, which is color-coded to reproduce the variant traditions of the three main schools of stellar mapping supposedly inherited from the Warring States and Han, in **Figure 8a**. From available reproductions of the map a clear determination of ink color is difficult to achieve, but the stars and star names of Taiyi and Tianyi appear to be brushed in black ink, which would indicate an origin in the Gan tradition (otherwise, yellow indicates the Shi and white the Wu tradition).

Di as the Divine Center of the Polity

We reviewed above how Di has since virtually its creation been considered a celestial polar deity. Therefore, my own position of viewing this godhead to be polar is hardly new. Nor is the idea new that Di was crucial to the human political unity: one among the earliest contiguous texts in Chinese history, the early Zhou propagandist "Duoshi" chapter of *Shangshu*, or *Book of Documents*, states that without Di's support a dynasty — i.e., a unity — could not long last: when the Xia (BC 1953?–1576?) and then the Shang each in turn ceased its reverence for Di, the text reports, then the dynasty necessarily fell.⁷¹ Archaeological evidence has borne out at least the coincidence of this *apparent* departure from Di and the fall of the Shang: it *appears* that late-Shang kings ceased to concern themselves with discerning the will of Di, thus ignoring it.⁷² According to the common scholarly interpretation of this coincidence, propitiating the diverse population of royal ancestral and nature spirits at the expense of the awe- and fear-inspiring high god, Di, who erstwhile had received at least indirect supplication and whose will had been divined carefully, was insufficient to convince the heretofore unified people of the Shang realm that the unifier maintained a monopoly on an ultimate, awesome power.⁷³ In addition, it is well known that toward

⁷¹ Bernhard Karlgren, *Book of Documents*, 55.5–10, cited in David Pankenier, "The Cosmo-Political Background of Heaven's Mandate," in *Early China* 20 (1995): 156–157.

⁷² The oracle bone record shows a sharp decline in references to or divinations to determine the intent of Di after Period I (ca. 1200–1189 BC; on periods see Keightley [1999b]: 240 [Table 4.1], 247). After the reign of Wu Ding, that is, after 1189 or so, divinations directed at discerning Di's will virtually ceased. This is most clear from Dong Zuobin, Zhang Bingquan, Yan Yiping, and Chen Mengjia's dating of the thousands of pieces comprising the most important collection of oracle bones unearthed at Anyang (for their extent and reliability). These scholars all agreed in nearly every instance that those scripts employing the character Di dated almost entirely from Anyang Period I, that is, to shortly after 1200 BC. See their assessments in Shi Zhangru 石璋如, ed., *Xiaotun yizhi de faxian yu fajue* 小屯遺址的發現與發掘 (Taipei: Institute of History and Philology, Academia Sinica, 1985–1992). It is very possible that in fact the attention offered Di during Wu Ding's reign represents a momentary anomaly in the history of Shang religion. We have no idea what practices prevailed in the period preceding the reign of Wu Ding.

⁷³ See David Pankenier's discussion of the "Duoshi" chapter of *Shangshu* and Sima Qian's assessment of the Shang demise and Zhou conquest, in Pankenier (1995): 155–161, 173–174. Pankenier interprets the late Xia and Shang kings' ritual shortcomings as reflecting a mismanagement of ritual (calendrical) time.

the end of the dynasty divinations and sacrifices directed to the ancestral spirits became rote and methodical, and, thus, we are to assume, less effective. The Zhou, then, are thought to have capitalized on these religio-psychological and political wrong turns, claiming exclusive access to Di or Tian (Heaven), and thus pronouncing reunification of the realm under themselves. What stands out from all of these negative associations, that is, each of the Xia and Shang's loss of its unity with its neglect of the high god, is that originally, then, they, like the Zhou after them, had to have begun and maintained their unification of the realm by means of the king's attendance on and relationship with this highest of gods.

Some years ago David Pankenier, while following a long tradition of seeing an imperial bureaucracy in the night sky,⁷⁴ lent greater credibility to the thesis that Di was the high god of the night sky and that belief in this high night-sky god existed throughout the early 2nd millennium BC, that is, prior to the Shang. He also suggested that the idea that a widespread human commitment to a unified realm depended on the belief that this high god had thrown in with the unifier. His most compelling evidence was that three conjunctions of the five naked-eye-visible planets (Mercury, Venus, Mars, Jupiter, and Saturn) in 1953, 1576, and 1059 BC coincided with the overthrowing of three old dynasties and their replacement with three new ones. Of course, these latter would have been the Xia, Shang, and Zhou.

While purely speculative, Pankenier's evidence and thesis are thought-provoking. Drawing on the knowledge that the Shang conceived of Five Adjutants (*wu chen* 五臣) serving Di,⁷⁵ he argued that people of the time construed the five planets to be assistants in sky/earth oversight to the high sky god of the time, whatever its name.⁷⁶ His point was that the conjunctions

⁷⁴ On this tradition see Needham and Wang (1959): 240.

⁷⁵ For the five inscriptions involving the phrase "*di wu chen*," as well as other related phrases (such as four occurrences of "*di chen*") see Yao Xiaosui 姚孝遂 and Xiao Ding 肖丁, eds., *Yinxu jiagu keci leizuan* 殷墟甲骨刻辭類纂 (Beijing: Zhonghua shuju, 1988; hereafter LZ): 421.

⁷⁶ Recall from the earlier discussion that Han Wudi 漢武帝, Liu Che, followed Zhou precedence in treating the Five Emperors of the celestial realm (*wudi* 五帝) as the assistants to Taiyi, whom we know was Di. On Zhou worship of the Five Emperors, see Loewe (1986): 662. As we shall see in Volume III, these five directional Di of the heavens were far removed from the Five Adjutants of Di that likely identified the five visible planets.

signaled to a rising competing power that the erstwhile unifiers had run their course and needed replacing. The planets were transmitting a message that the high god was displeased with the status quo below.

For present purposes two points from this are important. If the conjunctions mean what Pankenier believes they did, then belief in the high sky god among the populace at large had to have been so widespread a phenomenon that it could be manipulated to thrust someone both off and on a throne of unified rule. Second, that this belief would have existed much earlier than the 20th century BC is apparent in (1) the idea that an earlier unifier had to be overthrown in c. 1953 BC, and (2) the power of the belief in the high sky god whose might and rightness were being invoked was sufficient to not only justify overthrowing the current unifier but also muster enough support to do it. To have achieved such prominence by c. 2000 BC, these beliefs, if we can accept Pankenier's argument, would have developed prior to this among diverse peoples of what is now China for at least a millennium, or beginning no later than approximately 3000 BC. This finding, while purely speculative, coincides with our astronomical evidence cited previously that demonstrates that the Taiyi tradition identifying the god with the specific pole star Thuban has to have remain unchanged from c. 3000 BC and on, through the 2nd millennium AD.

Theories of Early Chinese Religions

While also pointing to the sky as the locus of the high god during the early 2nd millennium BC, in her important book *The Shape of the Turtle: Myth, Art, and Cosmos in Early China* Sarah Allan has, however, identified that god as the sun of the day sky. For Allan, the Xia and Shang myths of tribal origins and dynastic founding point to this conclusion. How ever intriguing her argument that the mythical ruler Yao was actually the Shang high god, one must recognize, as Allan did herself, that her conclusions were speculative and based on highly piecemeal and later-edited mythological narrative that could be interpreted in any number of ways.⁷⁷

⁷⁷ Sarah Allan, *The Shape of the Turtle: Myth, Art, and Cosmos in Early China* (Albany: SUNY, 1991):

Furthermore, the belief in the sun god as the high god would appear to be at its broadest only a local tribal custom of indistinct origin. Indeed, if Zhou and later philosophical and religious thought in any way reflects Shang and earlier thought, and it is difficult to imagine that it does not in some way do so, then the sun could not have been the highest god in the Shang and earlier pantheons.⁷⁸ And as we have seen is true of the beliefs of other early Eurasian civilizations, including even the sun-centered worship of the ancient Egyptians, the sun is secondary at best. In China, as well, the sun and its accompanying moon arise fairly late as celestial gods, only in Zhou cosmogonic sequences, and thereafter they play a subordinate — even if prominent — role in cosmologies. A glance through any number of late-Warring States and Han texts, including *Xunzi*, *Huainanzi*, the *Xici* essay of the *Zhouyi* (*Yijing*), and *Zhuangzi* and *Laozi*, verifies this.⁷⁹ The supportive or secondary nature of the sun (and moon) in ancient Chinese cosmogony/cosmology is evident as well in the processes of creation outlined in the 5th-century BC Chu Silk Manuscript of Changsha (see Volume III, Chapter 3, for both a partial translation and discussion). And, in fact, even in Shang oracle-bone records the sun (*ri* 日) was treated almost exclusively as the physical rising and setting object in the sky and not the object of propitiative ritual (see below, Volume II, Chapter 5). In no way can it be considered to have been during the Shang a high power on the level of Di.⁸⁰

19–73. Allan's argument was based on the earlier work of Chen Mengjia ("Shangdai de shenhua yu wushu," in *Yanjing xuebao* 20 [1936]: 485–576).

⁷⁸ While I believe and will demonstrate in Volume III that a significant shift in religious outlook occurred between the Shang/Western Zhou (1045–771 BC) and Warring States (453–221 BC) periods, it would be highly difficult to convince most scholars that no influence survived. At the structural level, systems of belief changed very little; I will show that it was in the *interpretation* of this fairly consistent structure that changes in belief and speculation occurred. At any rate, unless we believe that proto-Chinese and Chinese thought systems were entirely disjointed and divorced, then the later cosmogonies that date to the Warring States and Han periods demonstrate clearly and unequivocally that any of the sun, moon, and planets could not have served as the high sky god. In all cases, they have played a role subordinate to the central and high power. For arguments supporting a Shang-Zhou intellectual continuum, see Keightley (1978), as well as Wang Aihe, *Cosmology and Political Culture in Early China* (Cambridge: Cambridge UP, 2000).

⁷⁹ See Didier (1998): 30–346.

⁸⁰ For a highly tentative and purposefully daring and provocative approach to the sun as a Shang deity, see

A much more widespread theory of Shang and earlier Chinese religious belief in practice has found its most prominent and vociferous proponent in the late K. C. Chang. Chang and many others, on the basis of arguments forwarded originally by Chen Mengjia, have explained the source of Shang political power by stressing the role of the shaman in maintaining control over communication with the many natural spirits to which the unifier, the king, had to offer burnt sacrifices in order to please them. These scholars have viewed the king to be the chief shaman and thus the priest-king. Many have accepted this theory and continue to pursue its expression, although not at all convincingly.⁸¹ Certainly the role of the priest (said to be the king), if not really a shaman, was important as the vortex through which correspondence between the king and the spirits occurred. But as David Keightley and David Pankenier have reminded the field recently, there is in fact no conclusive — or, I would add, even suggestive — evidence that the Shang royal

David Keightley (1999a), "Graphs, Words, and Meanings: Three Reference Works for Shang Oracle-Bone Studies, with an Excursus on the Religious Role of the Day or Sun." *Journal of the American Oriental Society* 117.3 (1999): 517–524. For a refutation of this position, see below, Volume II, Chapter 5.

⁸¹ Though proponents of the shamanism thesis have proposed various working definitions, generally it seems that they conceive of the shaman's activities as consisting primarily of the practitioner's (1) spirit journeys, and (2) possession by a spirit.

K.C. Chang's *Art, Myth, and Ritual, passim*, is the classic statement in favor of viewing Shang religion as shamanic. More recent arguments supportive of the shamanism thesis have been forwarded by, for instance, Julia Ching in her "Son of Heaven: Sacral Kingship in Ancient China," in *T'oung Pao* LXXXIII (1997): 3–14. Another proponent of this theory is Elizabeth Childs-Johnson, who suggests that her heavily documented and highly instructive paper puts to rest any argument over the certain existence of shamanism in Shang China ("The Metamorphic Image: A Predominant Theme in the Ritual Art of Shang China," in *The Bulletin of the Museum of Far Eastern Antiquities* 70 [1998]: 5–171). However, while her paper is quite helpful in patterning and elucidating Shang bronze iconography, to reach her conclusion that shamanic magical transformation of the spirit doubtlessly describes the Shang kings' ritual experience, she asks readers to make a tremendous leap in interpreting her data, one that is not reasonable. At a crucial juncture she employs anthropologists' material evidence from outside China, on shamans' drums, to conclude that, "Evidently the displayed representation of semihuman figures in both the Chinese and Siberian contexts was a special symbol of transformation, one theoretically that endowed the ancestor with supernatural access" (p. 56). Her final conclusions drawn shortly thereafter (p. 57) rely heavily on her supposition of the congruent meaning of symbols between the Siberian and Chinese contexts. The trouble is that she has not offered any concrete evidence in the Chinese context to support this claim.

cult was shamanic at any point.⁸² Indeed, as Gilles Boileau has detailed recently in a cogent article, Chen and, after him, Chang and others, have misplaced data from the Zhou to the Shang to arrive at the shamanic interpretation of Shang religious beliefs and practices.⁸³ Specific examples of such misplacement of cultural and linguistic evidence from the Zhou to the Shang will be analyzed below in Volume II.

The shamanic theory also relies on a theoretical construct developed by 19th and 20th-century anthropologists working outside of the sphere of sinological studies who largely did not have access to many of the artifacts and much of the information that have since become available for study (and, anyway, they generally were not interested in extending their observations of shamanism to China). In addition, as Lawrence Krader suggested in the 1950s, one should not make the ahistorical mistake of thinking that cultural traits and traditions found or known to have existed at some time among pastoral nomads of Central / Northern Asia remained constant over time. The idea that they did, as Krader showed, was a mistake inherited from 19th-century historians of the steppe.⁸⁴ Therefore, while in the 19th century the pastoral nomads of North Asia reflected a shamanic bent in their religion, one can in no way assume that this had remained constant over five to six millennia. To so assume reflects the assumer's biases that result from having been acculturated in a "settled" culture, which biases, on reflection, themselves become unreasonable.

Furthermore, the theory implies too small a religious view for a large unifier. The question one must pose for the shamanic explanation is, considering that the Shang believed in the high power Di but *apparently* failed to develop a *direct* cult of sacrifice to it, was communication with exclusively these lesser spirits powerful enough to sustain in the person of the king the ability to

⁸² David N. Keightley, "Shamanism, Death, and the Ancestors: Religious Mediation in Neolithic and Shang China (c. 5000–1000 B. C.)," in *Asiatische Studien* LII:3 (1998): 762–831. See also Pankenier (1995): 150–155. See further Keightley (1999b: 262) for brief but succinct comments.

⁸³ Gilles Boileau, "Wu and shaman," *Bulletin of the School of Oriental and African Studies* 65:2 (2002): 350–378.

⁸⁴ Lawrence Krader, "Feudalism and the Tatar Polity of the Middle Ages," in *Comparative Studies in Society and History*, I (1958–1959): 76–99.

awe his non-kin subjects (or even his kin) into continued obedience? Put another way, if the shamanic role of communicating with these lesser spirits was of paramount importance in maintaining the power that enabled the unity of the realm to continue, then why, when concern with Di waned, did the Shang court fail to maintain that power? The answer to the first question is, apparently, no. The answer suggested by evidence to the second question is that the shamanic role and power, if present at all, was insufficient to the task.

Therefore, if we accept that ideology and propaganda were central to the maintenance of royal power and unity over the realm, then we must observe that there existed another, more powerful, element to the belief system that, when to non-royal court outsiders it lost its significance or centrality, much as a crumbling buttress it nudged the house of Shang toward its collapse. Evidence indicates that it may have been changes in belief in or treatment of the high god of the night sky that did this. As I will show in the remainder of these volumes, significant and varied evidence suggests strongly that the unifying theology of early unifiers — not only the Shang but their Bronze and Neolithic predecessors, as well — indeed concentrated on an awareness of, and reliance on via their manipulation of, a high power of the night sky to demonstrate and justify their power. The politically mighty employed this power to their benefit in the human realm by controlling both direct access to this power and the representation and distribution of the god's image. To the Shang this power apparently was Di, but we do not know the name attributed to it by pre-Shang peoples (though, as we know, later its central element was known as Taiyi). As we already understand from the foregoing discussion, this high power was found at the very center of the heavens, the northern celestial pole, around which the entire sky revolved. At the center was, we know, Thuban and the stellar polar patterns it helped to form. Chapter IV presents extensive evidence that supports ever more strongly and specifically the thesis that not only was the northern celestial pole central in the belief systems of proto-Chinese and other ancient civilizations but also that the divinity of the pole was conceived in real, physical, terms that were revealed literally in the shapes in which the divinities were perceived to exist.

Appendix: Taiyi and Tianyi

Y. Maeyama has followed the development of scholarship on Taiyi and Tianyi and noted the implication imposed by the Dunhuang star charts that Taiyi and Tianyi represent stellar identities established as early as c. 3000 BC.⁸⁵ But oddly Maeyama insists that the star/god Tianyi sits, and for millennia — since before the Shang — sat, singularly at the northern celestial pole, and he identifies it historically since the Shang with the Shang's high god Di. In his scheme, Taiyi becomes a star, near the pole, representative of *terrestrial* emperors. Maeyama's main evidence for these identifications is the report that he quotes from the *Jin shu*, or Official History of the Jin Dynasty (265–420 AD), in which Taiyi is said to lie "south of Tianyi." But the astronomical/astrological observances contained in the dynastic histories, and specifically the *Jin shu*, must, as Sun Xiaochun and Jacob Kistemaker have shown, be viewed as relatively late-emended notes in the context of a discussion of ancient understandings of stars, representing as they do more contemporary (post-Han) views of astronomy/astrology than the ancient and early-imperial works that they intended or pretended to quote or elucidate.⁸⁶ But Maeyama takes the *Jin shu*'s unreliable identification of the ancient Taiyi as a star lying to the south of Tianyi to mean that Taiyi has been, in Chinese historical views of the gods/stars, somehow subordinate or inferior to Tianyi. As such, Maeyama suggests, Tianyi was / is the abode of the Celestial Emperor, Di, while Taiyi was / is the representative star of terrestrial emperors. Maeyama apparently was unaware of much of the early literature pertaining to the identification of Di with particularly Taiyi and, through Taiyi, the pole. On the basis of this literature Maeyama's thesis regarding the relative identities of Tianyi and Taiyi can be understood to be inaccurate. Aside from the relatively late date of the *Jin shu* text (completed in 648 AD), Maeyama has more specifically neglected a critical problem with the report found therein: one only has to wait for the stellar canopy to rotate 180° to find Tianyi now south of Taiyi relative to the earth-bound observer.

One might cite an earlier text's report on the relative positions of Taiyi and Tianyi to

⁸⁵ Y. Maeyama (2002): 3–18.

⁸⁶ See Sun and Kistemaker (1997): 38–39.

attempt to clarify their relative positions and significance in Chinese religious and astronomical history, and this is Sima Qian's *Shiji*. Indeed, a reading of this text by the authors of the *Jin shu* "Tianwen zhi" (Treatise on Stellar Patterns") may have served as the source of the positioning by those authors of Taiyi "south of" Tianyi. In *SJ 27* we find proximate descriptions of the two stars that at first glance *seem* to correlate them north and south of one another, but both such a reading and the text itself are problematic. First, in *SJ 27* Tianyi is identified as a linear asterism consisting of three stars, not a single star as in the case of Taiyi, the Great One. Second, the *SJ 27* statement on Tianyi relative to a northerly or southerly position does not refer to the position of Taiyi but rather internally in its separate passage of text to the three stars that constitute Tianyi. Third, in *SJ 27* the name first given for Tianyi, and thus to Sima Qian its primary name, is not Tianyi at all but Yinde 陰德, or Power (or Good Fortune) of Yin. This suggests rather strongly that "Tianyi," an *yin* thing, was a late (Warring States-Qin-early Han) development created to form the supporting *yin* mate to the primary *yang* Taiyi on the basis of the correlative cosmology that evolved in this period (c. the late-4th through 2nd centuries BC). That is, Taiyi, an ancient tradition of the primal and primary power of the universe, now identified in this system suddenly as a *yang* thing (for creation / generation in correlative cosmology must emerge from *yang*), was found wanting its completion in an *yin* counterpart or mate. Yinde, or Tianyi, thus appears to be an adjunct creation of perhaps as late as the 3rd and 2nd centuries BC (but see also Volume II, Chapter 1, below, for a similar but much earlier dualism that these two stars might have stimulated, but without the late-Warring States / Han intellectual baggage of specifically *yin* / *yang* and *wuxing* correlative thinking). Finally, the instability of the text itself creates problems for the identification of Yinde/Tianyi.

All of this becomes readily apparent in a close reading of the *Shiji* text in question. Following its identification of Taiyi, which passage was translated in the preceding chapter, the text in *Shiji 27* describes first the main asterisms of the Zigong and then the stars of Yinde, or Tianyi. Beginning with the conclusion of the passage on Zigong, we read, "皆曰紫宮。前列直斗口三星隨北端兌，若見若不，曰陰德，或曰天一".⁸⁷ These phrases can be translated thusly:

⁸⁷ *SJ 27*: 1290.

Together they are called the Azure Palace (Zigong). The three stars arrayed directly before the mouth of the Dipper sharpen [to a point] in a northerly direction. As if visible but also not (i.e., very faint), they are called the Power of Yin (Yinde). Some call them Tianyi.

In interpreting this text, one problem we encounter is that we cannot be certain to which direction along the length of the Dipper the writer intended to indicate with “northerly,” since the Dipper, a circumpolar constellation, revolves its position relative to the earth constantly — diurnally “northerly” becomes “southerly,” and “southerly” becomes “northerly.” We must also note that the text itself is unstable. An appended commentarial note tells us that the character for the Dipper, *dou* 斗, in some editions reads “*bei*” 北, or “north.”⁸⁸ The characters, similar in linear construction, likely were confused at some point by a copyist. Indeed the parallel text in the “Treatise on Heavenly Patterns” of the later *Han Shu* (1st c. AD or later) here reads *bei*. Consequently we have lost our anchoring relative to the Dipper and now must consider what “north of the Zigong” would mean. Impossible to determine, we can only guess, and, therefore, we cannot pin down the position of Sima’s three stars of Yinde, or Tianyi.

At the same time, however, the text of *Shiji* 12 / 28 (*SJ* 12 simply repeats *SJ* 28, the original *SJ* 12 apparently having been lost) that describes “Taiyi’s three stars” as representing the spear of Taiyi suggests that they form a line parallel to the Dipper’s handle. In this case, then these stars could be only (1) HIP 52425, (2) Giasar, and (3) the star cluster comprised by the stars 4 Draconis, 6 Draconis, and Kappa Draconis. Significantly, this line of stars points directly toward Thuban / 11 Draconis if we take the phrase in *Shiji* 27 to read “north of the Dipper” and the handle of the Dipper to be, as it was conceived during the Han, the Dipper’s pointer (as we saw in the recounting of the creation and use of the Numenous Banner). When the handle of the Dipper points northward, indeed the south-to-north line consisting of HIP 52425, Giasar, 4 Draconis, 6 Draconis, and Kappa Draconis points northward as well as directly toward Thuban / 11 Draconis — and the illusion of their together creating a line caused them in the West to be viewed to form in

⁸⁸ *SJ* 27: 1290, n. 2.

tandem the tail of Draconis. If we take this to be the most likely solution to the conundrum, then the *Jin shu* authors' locating of Taiyi "south of Tianyi" is patently incorrect, for in the only likely reconstruction of Sima's intended identifications, Tianyi lies "south of Taiyi," just as we find has always been the case in mid-Tang and later star charts.

Most importantly, however, while Maeyama's understanding of astronomy has otherwise benefited the field,⁸⁹ he has overlooked how Taiyi has been, since before but also during and after the Qin-Han period, the central focus of Chinese religious observation of stellar and imperial powers, while Tianyi's importance always has been vague, equivocal, and seemingly undefined, as we know from the discussion/translation immediately above, or at best defined in contradictory ways by various writers. Thus, while in some cases in historical literature one might find Tianyi exalted by a certain cult or noted particularly by a given writer, there is no doubt that the vast majority of Chinese have viewed Taiyi as the obviously central figure among the two, and that Taiyi, not Tianyi, has been identified with the pole star or the pole. Even a cursory read through *Shiji* 27 and 28 (12), the chapters in which most astrological and astronomical information in that book appears, demonstrates the obvious facts that Taiyi was the most central celestial entity for ancient Chinese and that Tianyi remained murky and indistinct, seemingly a relatively late adjunct power created to fill in the blanks of celestial gods and powers according to late-Warring States and Qin-Han hemerology and *yin / yang* correlative cosmology — perhaps even to complete and justify an early celestial numerological divination system. Even the fact that *Shiji* 27 opens with its description of Taiyi, and only then continues with accounts of the stars of the Zigong and, tertiarily, Yinde, i.e., Tianyi, tells us that Taiyi was considered the abode of the central and high god of the night sky. What's more, *Shiji* 27 and 28 (12) quote or describe Miu Ji as having said as much to Liu Che (Han Wudi) and report that Liu accepted this. Ritual propitiation of Taiyi/Di then became, from the 130s and on, the primary focus of Liu's imperial cult, whether at the two altars

⁸⁹ See, for instance, Maeyama's "The Oldest Catalogue of China, *Shi Shi Xing Jing*," in *Prismata-Naturwissensch Studien* (Wiesbaden: Steiner Verlag, 1977): 211–245; idem, "The Development of the Twenty-Eight Lunar Mansions in China," in *International Conference on the History of Science in China* (Cambridge: Cambridge University Press, 1990).

built near the capital and dedicated to Taiyi or at altars to Taiyi constructed in and near Liu's Mingtang that was located below Mt. Tai in Shandong, near the village of Fenggao.

Indeed the architecture of Liu's two capital-region altars to Taiyi, the first being that dictated by Miu Ji in the 130s BC and the second being the one that Liu had erected at the Ganquan palace in 121–120 BC, proves explicitly that in the pantheon Taiyi was superior to Tianyi, for recall that the altar to Taiyi was the topmost of three ritual tiers, while the altar to Tianyi, who is in *Shiji* 28 (12) never mentioned again, rested below the altar to Taiyi and above the altar dedicated to Diyi, Earthly One.

Other Han evidence confirms this hierarchy and, further, identifies more clearly Tianyi's role relative to Taiyi. In his commentary to the apocryphal Former Han-period work *Yiwei* 易緯, or *Apocryphal Changes*, the Latter Han scholar Zheng Xuan (127–200 AD) identified Tianyi to be an alternative name for none other than Taiyi. Moreover, Zheng reported, Tianyi was the name given to Taiyi when Taiyi conducted his tour of the heavens out and away from his residence at the NCP:

Taiyi is the name of the god at the northern celestial pole. Residing in its station, it is called Taiyi. Since it constantly traverses the eight trigrams between the sun and the pole (i.e., between the solar ecliptic and the NCP, or throughout the heavens), it is called either Tianyi or Taiyi.⁹⁰

Zheng's identification of Tianyi as an alternative name of the god Taiyi when that god traverses the heavens aligns precisely with what we learned above from (1) *HNZ* 3, where it is said that Taiyi resides in the polar Zigong but holds court outside of the celestial center, in Taiwei, or the *jiuyue* heavenly field (sector) or Vermilion Bird, and (2) both *HNZ* 3 and *Shiji* 27, where the Dipper is identified to be Taiyi's chariot for use in touring the heavens.

Additional evidence found in early 2nd century BC hemerological texts uncovered in the 1960s and 1970s at Mawangdui demonstrates that indeed Tianyi toured the heavens, helping, like

⁹⁰ *Yiwei* 易緯, *Qian Zuo Du* 乾鑿度 (*Juzhen congshu* 聚珍叢書, collected in *Baibu congshu* 百部叢書; Taipei: Yiwen, 1965): 2:3b.

the time-spirit Taiyin, to indicate the beginnings and ends of temporal cycles in the heavens and thus also the astral positions of heavenly spirits throughout sixty-day cycles, years, and great epochs.⁹¹ In fact, in the astrological / astronomical system described in *HNZ 3*, Tianyi is identified clearly and specifically with Taiyin.⁹²

Divination based on the movements or locations of Tianyi in the heavens constituted a major, but now largely lost and poorly understood, hemerological system of the Qin and Former Han periods. For the present, all of this evidence tells us clearly that Taiyi was the superior polar god who was known as Tianyi (or Yinde, or Taiyin) while in his active, touring (calendrically specific) state outside of the pole and across the heavens. While Taiyi was obviously very ancient, Tianyi / Yinde / Taiyin appears to have been invented sometime during the late Warring States, its presence needed in the emerging correlative intellectual structures to fill out for Taiyi an *yin* counterpart and thus balance the forces and structures of the heavens that were perceived to operate on a binomial (on-off, *yang-yin*) basis.

A final problem with Maeyama's thesis regarding Taiyi and Tianyi is that apparently he assumed that the Chinese, from Neolithic through early imperial times, recognized and adjusted to the precession of the equinoxes, which recognition he suggested reveals itself in the shifting of stellar / spiritual inhabitants of the pole. But the Dunhuang and later Chinese star charts show that, even after Chinese court astrologers / astronomers had come to recognize the precession of the equinoxes, whenever this may have first occurred during the Han,⁹³ many or most others maintained the old central spiritual identities, such as Taiyi, in locations either at or close to their ancient stellar positions. Thus Taiyi appears in these charts not at the contemporary celestial pole but removed from it at quite some distance, at the position of 11 Draconis (Thuban), the old pole star of c. 4500–1000 BC. The positioning by the Tang (and perhaps as early as the Han) period of

⁹¹ For a brief mention of Tianyi's role as an indicator of the beginning of a new cycle or epoch, in which role the god appears in the *Yinyang wuxing* A Mawangdui text, see Marc Kalinowski, "The *Xingde* 刑德 Texts from Mawangdui," in *Early China* 23–24 (1998–99): 192–3.

⁹² *HNZ 3*: 387.

⁹³ On this see Sun and Kistemaker (1997): 37–38.

the *yin* Yinde / Tianyi at the dim 10 Draconis seems to follow from the *yang* nature of the brighter *yang* Taiyi, which requires the existence and presence of its less vigorous *yin* counterpart. This, too, is reflected in the Tang and later star charts.

Chapter 4: The Polar Center and its Mimicry on Earth

Many years ago Paul Wheatley, drawing on Mircea Eliade's thesis of the religio-political power of the center and René Berthelot's "bio-astrale" theory of human mimicking of the cosmos, developed the powerful statement that the ideal — but not necessarily actual — ancient, medieval, and early-modern city, in China and elsewhere,

was a response to the basic need... to delimit and orient an *habitabilis* in space, and was achieved with the aid of the archetypally 'natural' ('bio-astrale' Berthelot would call it) progressions of the heavenly bodies.¹

In other words, "there was thus a tendency for kingdoms, capitals, temples, shrines, and so forth, to be constructed as replicas of the cosmos."² Before Wheatley, Eliade, benefiting from archaeoastronomers' late-19th-century findings that seemed to indicate that particularly ancient Egyptian pyramids aligned with the cardinal directions,³ insisted upon the same notion, but even more explicitly so, indicating that the cosmological symbolism of the ancient city was an extension of the absolute center of heaven, hell, and earth, which is the altar in the temple in the center of the city.⁴ Eliade wrote,

The Sacred Mountain — where heaven and hell meet — is situated at the center of the world.

¹ Paul Wheatley, *The Pivot of the Four Quarters. A Preliminary Enquiry into the Origins and Character of the Ancient Chinese City* (Chicago: Aldine Publishing Co., 1971): 451.

² *Ibid.*: 450.

³ See John Michell, *Secrets of the Stones. The Story of Astro-archaeology* (Middlesex, England: Penguin Books, 1977): 18–20.

⁴ In this Eliade also drew from the centuries'-old knowledge that the Egyptian pyramids were constructed with astronomical observation in mind. See *ibid.*: 18.

Every temple or palace — and, by extension, every sacred city or royal residence — is a Sacred Mountain, thus becoming a Center.

Being an *axis mundi*, the sacred city or temple is regarded as the meeting point of heaven, earth, and hell.⁵

Elsewhere Eliade even indicated in passing the object that he believed was the absolute center of the cosmos to which the Sacred Mountain pointed and which every temple or palace recreated: the pole star.⁶

But while Eliade's work of over fifty years ago on the symbolism of the center often has been quoted and furthered by scholars in many fields, for the most part the cosmological significance of his ideas have been ignored. And although Wheatley, as we have seen, maintained an eye on the cosmos, he really was interested more in demonstrating the human applications of the cosmological model than in investigating the cosmic model itself. Even Eliade paid virtually no attention to the actual heavens, opting instead to focus on human patterns of invention that evolved on the basis of what becomes in him really an abstract sky.

Noted anthropologist Joseph Campbell also concentrated on the earth and human movements across it to explain widespread similarities in the various faces of the great god visage adorning the religious artwork of many ancient cultures (his "Face of Glory"). In rejecting prior explanations that relied on a theory of "convergence" across cultures and seeking instead a common source of similarities, Campbell took what is typically the historian's approach by seeking a "divergence," that is, a historical diasporic spreading across the earth of one ultimate earthly source of the motifs that he considered to be similar.⁷ While divergence could account for some of the similarities found in divine visages and other elements of religion in civilizations across Eurasia and the New World, certainly we cannot rely solely on this explanation, for this,

⁵ Mircea Eliade, *The Myth of the Eternal Return; or, Cosmos and History*. Tr. from the French *Mythe de l'éternel reform* by Willard R. Trask (Princeton: Princeton UP, 1971): 12.

⁶ *Ibid.*: 6.

⁷ Joseph Campbell, *The Mythic Image* (Princeton: Princeton UP, 1990): 121.

too, might be to focus too concertedly and persistently on terrestrial sources to explain religious orientation.

Similarly, C. G. Jung's search for archetypes inherent in us all that might explain away most any pictorial or mandalic expression of human inner states relies too much on just that, the human inner state. Jung claimed, for instance, that archetypes of human instinct cause, "despite external differences... a fundamental conformity in mandalas regardless of their origin in time and space."⁸ While surely humans and even many other animates share some basic internal responses to the external earthly environment, it seems virtually impossible to test accurately his theory, for any test subject will have been influenced in her/his thought structures by the order of the civilization in which s/he has been nurtured. Again we return to the external as a more likely ultimate stimulus of the mind's projection of form back into the external. That is, the dialectic relationship between the internal and external is the more likely origin of human expression. Therefore, aside from variable cultural expectations inculcated in the individual abiding in diverse cultures across the world, the concrete in the external must be the prime mover, and in the ancient period the universality of certain patterns of expression point to an external phenomenon that all across the civilizing world of the northern hemisphere could and did observe at roughly the same time.

I suggest that we look to the one possible universal external source, the sky, and not as an abstract concept that by simply being above inspired people to create images *ex nihilo*, but as a *real* and *physical* presence in ancient people's lives that literally directed the development of sacred beliefs and their expression in, by, and of the *human* sacred Center on earth: the god, altar, and temple. After all, as we have seen in the preceding pages and will witness again more specifically below, the ancients *did* pay attention to the *actual* sky and represent it in their myths, stories, and observations, in order to justify in a perfectly rational manner their very limited understandings of why and for what purpose the sky appeared and behaved in the way it did. Their mythical and religious projections of meaning onto the sky were in spirit and application no different from our own current theoretical scientific attempts to understand the nature of the

⁸ C.G. Jung, *Mandala Symbolism*. Tr. R.F.C. Hull (Princeton: Princeton UP, 1973): 4.

universe: just as they carefully observed the sky's patterns of stellar arrangement and movement in order to gain both control of their interactions with their earthly environment and power to influence the perceived mover behind such patterns, in the present so do our philosophers and scientists theorize, on the basis of what is simply a longer history of observations and their testing, and therefore from a greater and more deeply probing database, about the nature of the universe. What, after all, is, for instance, quantum physics but an imperfect and still unproven theory of how our universe operates? And what is, at any time in human history, the purpose of any such theorizing other than to gain greater control over the environment and the powers of creation and transformation, viz., to augment the human sense of security that results from an ability to understand and thus manipulate humanity's surroundings?

Represented, then, in all stages of theorizing about our universe is the dialectic interaction of the internal human and external physical states. We therefore should not exclude from our studies of patterns of ancient religious and mythical belief systems a careful observation of what Neolithic- and Bronze-age peoples witnessed of the external and how they internalized it and in turn projected meaning onto it. Therefore, while ultimately the modern earth-oriented scholars of the sky (Eliade, Wheatley, etc.) have been correct to focus their attention on the human constructs that resulted from the human interest in the sky, since ultimately the designs and motifs of the Center reflect a human mental projection onto the sky of human experience on earth, the framework within which those projections could take form were established by the patterns or the superstructure apparent nightly in the sky in the form of the stars whose angular distances forever remained stable. Most stable of all, of course, and whose stability all ancient civilizations seemingly observed, was the NCP.

In the framework that they provide, star clusters, constellations, and asterisms stimulate the mind observing them to find in them pattern, to project from the mind's storehouse of remembered experience a predefined outline that renders what otherwise would be random and unintelligible, and therefore at some level foreign and threatening, rather familiar and therefore understandable and thus emotionally reassuring. The experience so projected of course often sources in the physical world, but it also originates in the human social, cultural, political, and emotional milieu. An observer's understanding of the sky's visible patterns is therefore not

limited to the empirical but includes as well the subjective and, thus, fanciful. As Nathan Sivin averred,

What we know of living cultures indicates that their knowledge of the sky is never merely empirical. Behind patterns of data lie metaphysical abstractions that point to a coherent physical reality, or concrete metaphors that tie sky-order to social order.⁹

We can expect that the people of any ancient civilization projected their familiar experiences onto the patterns provided by the stars, but we surely should not expect the fully drawn images that result from human reabsorption of the stellar outlines (i.e., motifs of ancient religious art) to represent exactly the "forms" visible in the sky. Nor should they necessarily resemble one another closely. We have already seen in Chapter 2 that the observation from distinct cultures of identical star clusters often resulted in differing pictures that the mutually distant observers created from them, as in the example of the Dipper, whose distinctive outline appeared to some to resemble a wagon or cart and to others a plow, and to still others an ox, bull, bear, or dipper or ladle. The cause of such differential constructs is simply the tendency for human beings to project onto the unknown patterns from the familiar: what is most salient among my remembered internal, social, or physical experience will influence significantly what my mind unconsciously taps into internally to project pictorially onto the patterns that I see surrounding me not only when I look at the night sky but whenever I look anywhere about me, at any time. That is, we are preconditioned by our lived experiences to project certain forms or interpretations onto our external environments. The absorption, recognition, use, and reprojection of patterns developed for a specific written scriptal system is an example of this phenomenon: ingrained habit informs our perception of and reprojection onto anything external.

What frightens us when we're surprised by a sudden and loud noise in a dark and visibly impenetrable surrounding is simply our inability, for lack of data on which to project, to conjure

⁹ Nathan Sivin (1989): 57.

up a familiar and treatable picture of what it is that might be accosting us. We seek the familiar to assure ourselves of our safety, or at least of our ability to respond effectively, and so we project what is familiar onto new visual (or, more broadly, sensory) data whenever we can or need to do so. To explain this psychological phenomenon Thomas Kuhn observed,

The experiments of modern Gestalt psychology demonstrate a universal need to discover familiar patterns in apparently random groupings, a need that underlies the well-known "ink-blot" or Rohrschach tests.¹⁰

However, the Rohrschach tests employed by Gestalt psychologists differ in both their intent and process from the simple projection of stored experience onto the external environment that we are describing here. The tests themselves project a pattern of human psychologies that the psychologists impose on the subjects, and, since they are thus plotted and prepared, the psychologists imposing them on subjects are then cognitively subjective in their projection of expectations onto the test subjects. Furthermore, the subjects cognate that they are sitting for a test and that the testers have certain expectations for the results in mind and on which basis the subjects will be fit into a predetermined pattern of psychologies, with the result that the subjects' responses may well then be affected by this knowledge. This process already has skewed the data. Moreover, Gestalt expectations seek clues to witnessing and understanding psychoses germane to the individuals tested and not the cultural or empirical experience that naturally would inform a subject's projection of images or ideas onto an inkblot or other random, unpatterned or patterned, object. In this sense, then, the intent again has altered the observation of the subjects' responses, once more warping the data and/or its interpretation. Thus, while Kuhn's point that human (and, I would add, other) creatures share a universal need to "discover familiar patterns in everyday random groupings," the example of the Rorschach test of Gestalt psychologists does not fit the pattern that he was attempting to make familiar to his readers.

Kuhn continued,

¹⁰ Kuhn (1957): 14.

If we knew more about their historical origin, the constellations might provide useful information about the mental characteristics of the prehistoric societies that first traced them.¹¹

The irony of Kuhn's statement is that we *do* know something of the historical origins of the constellations and asterisms, and part of that knowledge derives from the constellations and asterisms themselves as we are able to reconstruct them on the basis of observing archaeologically recovered artifacts in tandem with inscriptional, epigraphical, and textual references to stellar objects. This task of reconstruction we have already begun in a general sense in Chapters 2 and 3, but presently we will return to the quest in order to determine more precisely just what experiences and expectations informed ancient observers' projections of meanings onto a specific star pattern, that at the northern celestial pole.

The Polar Rectangle

While we expect to and do find diverse artistic responses to the sky on ancient artifacts, really the archaeological record shows a remarkably consistent pattern of observation of what appears to be the quadrilateral at the celestial pole occurring across many early Eurasian and even American civilizations. In the 19th and early-20th centuries several generations of scholars of the budding field of archaeoastronomy demonstrated that ancient peoples across the world tended to orient the foundations of the central physical structures (temples, palaces, astrolabes) of their civilization toward astronomically significant directions, which often were the imperfectly defined cardinal directions, a certain star or asterism, or the solstitial or equinoctial points. Paul Wheatley, following their lead, reviewed a good deal of the remnants of the urban and sacred centers of these civilizations and came upon the square as their quite common form of idealized and symbolic ritual space, or *axis mundi*, as Eliade liked to call it. Wheatley wrote that,

¹¹ *Ibid.*: 14.

The palace of the Chinese emperor... [and] the heart of the South Indian temple-city... each symbolized an *axis mundi*, an *omphalos*, about which their respective kingdoms revolved. Similarly, whereas in these cultures cardinal orientation involved the positioning of the sides of a square or rectangle so as to face the cardinal points of the compass, in ancient Mesopotamia it was normally the corners of the enceinte which were directed in this manner. But in both instances the *principle* of cardinal orientation was strongly developed, the four compass directions were the reference points by which the sacred enceinte of the city was located in the continuum of profane space.¹²

Forms of the sacred square seemingly oriented on the four-square cardinal compass axes occurring in ancient architecture across the world include the Egyptian Old Kingdom pyramids, temples, and obelisks of the 3rd millennium BC (the former being tombs and all three being examples of Wheatley's *omphalos*), the Mesopotamian ziggurat temples of the 4th–1st millennia BC, the pyramidal temples of Meso and South America (Mexican, Mayan, and Andean), South and Southeast Asian temple-mountains, and early Chinese cities.¹³ We may add to this list of square or rectangular sacred structures many more that do not align with the cardinal directions, as, for instance, the Greek Parthenon and various Greek altars and temples dedicated to many gods, including those to Hera at Paestum and Zeus at Pergamum, as well as Roman temples to Jupiter, Juno, and other gods.¹⁴ The list could go on and on.¹⁵

¹² Wheatley (1971): 451.

¹³ See *ibid.*, Chapter 5, and esp. p. 423–436.

¹⁴ For depictions of the Roman temples to Jupiter and Juno, see Simon Hornblower and Antony Spawforth, eds., *The Oxford Companion to Classical Civilization* (Oxford: Oxford UP, 1998): 286.

¹⁵ For tens of examples of ancient or premodern world civilizations' having projected onto the northern celestial pole a central religious significance see Ed Krupp, "The Top of the Sky, the Center of the World, and the Road Between," in *Griffith Observer* 60.12 (December 1996): 2–18; idem, "Climbing the Cosmic Axis," in *Griffith Observer* 61:1 (January 1997): 2–8.

Wheatley searched for the meaning of the square *axis mundi* in the murky internal transformations occurring within the urbanizing society. He viewed the emerging symbolic center as expressing the changing community's need to organize the disordered earthly / human world on the model of the divinely ordered cosmos.¹⁶ Probably he was correct that the increasing size of the urban environment stimulated the construction of monumental symbolic architecture of the center, but we need to note otherwise that the impulse to create a symbolic center was pre-urban; sacred centers — originating in such simple gathering places as the community fire pit-turned-altar — only increased in size and sophistication with the growth of the community and its resources. Regarding Wheatley's identification of the divinely ordered cosmos to have been the model on which the sacred center was constructed, we must ask, what was this divine order of the cosmos? Did the ancient designers of the four-square *omphalos* conceive of the cosmos as being square? Did they in fact measure the cardinal directions and conceive of them as four points or four sides of a square?

In fact, cardinal orientation often was not the plan on which a city, temple, or altar was aligned. To raise only a few examples, while Egyptian temples of the Old Kingdom tended to be aligned with the cardinal directions, many New Kingdom sacred sites were apparently aligned with one or the other of the winter solstitial rising sun in the southeast, the Nile River, and other temples or sacred sites.¹⁷ Neither do 1st-millennium-BC Babylonian world maps align with the cardinal directions, as we shall see below. Furthermore, like the Egyptian New Kingdom sites, the European Neolithic megalith of Stonehenge was not built aligned with the cardinal directions. In addition, many other Neolithic European megaliths, such as those at Newgrange, Ireland and in the Alentejo region of Portugal, though not built on a square, were, like Egyptian New Kingdom sites and in conception similar to Stonehenge, oriented toward southeast in the

¹⁶ Wheatley (1971): 471ff.

¹⁷ Ed Krupp, "Light in the Temples," in C. L. N. Ruggles, ed., *Records in Stone: Papers in Memory of Alexander Thom* (Cambridge & NY: Cambridge UP, 1988): 473–99.

direction of the winter solstitial sunrise.¹⁸ Finally, as we shall review more closely further below, Bronze-period Chinese cities, temples, and tombs tended consistently to be oriented slightly askew cardinal north.

The essential reason for the variability in the respective orientations of many ancient sites is that the object of mimicry was the *sky*, not the earth. Cardinal directions on earth are not readily apparent, and the sky does not lend itself easily to the demarcation of clear and concrete directions. If we may take Mesopotamia as an example, for many relatively sophisticated urban or urbanizing ancient folk there were no exact cardinal directions from which to infer either a cardinally oriented cross, from which axis one might imagine a square, or a square itself: in Mesopotamia the four so-called cardinal directions were not aligned with our exactly measured cardinal directions but rather were vague regions identified with distinctive earthly topographical features in the general regions of the cardinal points, but certainly not precisely perpendicular or linear with due north. Thus, for instance, "south" included southwest, south, and southeast together, and as such it overlapped indistinctly with both the directions of "east" and "west."¹⁹ Earthly determined cardinal directions did not form an axis from which ancient monumental orientation was conceived.

Second, the ancient incipient urbanites surely were concerned very much with ordering their world, as Wheatley rightly observed, but abstractly conceived directional orientations, even if based on a simple alignment with the celestial pole and therefore also north, would have held very little real value in the religiously oriented socio-political organization and activities of these people. Rather, the regular — and irregular — behavior of the sun and moon as they cycled in their trajectories across the sky demanded understanding and concrete anchoring in a stationary referent. Understanding was found in tracing the sun's and moon's ecliptics according to the fixed points on the horizons at which they attained their extreme northern and southern limits and their mid-points between the extremes (in the case of the sun, these were, of course, the

¹⁸ Clive Ruggles and Michael Hoskin, "Astronomy Before History" in Michael Hoskin, ed., *The Cambridge Concise History of Astronomy* (Cambridge: Cambridge UP, 1999): 2–4.

¹⁹ Wayne Horowitz, *Mesopotamian Cosmic Geography* (Winona Lake, IN: Eisenbraun's, 1998): 197–200.

solstices and equinoxes). Without a compass, the discovery or invention of which in the ancient period was yet thousands of years distant (the earliest confirmable use of a compass occurred in China c. 1000 AD), the only way that ancient people could have aligned their sacred sites with consistent (although generally crude) accuracy was through their observation and rough mapping of the stars, and the only region of stasis in the stellar canopy that would have enabled the unsophisticated ancient observers to align their sacred sites fairly consistently with the desired, which during the Neolithic-Bronze periods only sometimes were also cardinal, directions was the northern celestial pole. Establishing north through observation of the northern pole star(s) anchored subsequent measurements of other directions on the horizon. (**Figure 1**) But if the pole was the anchor of directional orientation on earth, why were the sacred sites so anchored square or rectangular?

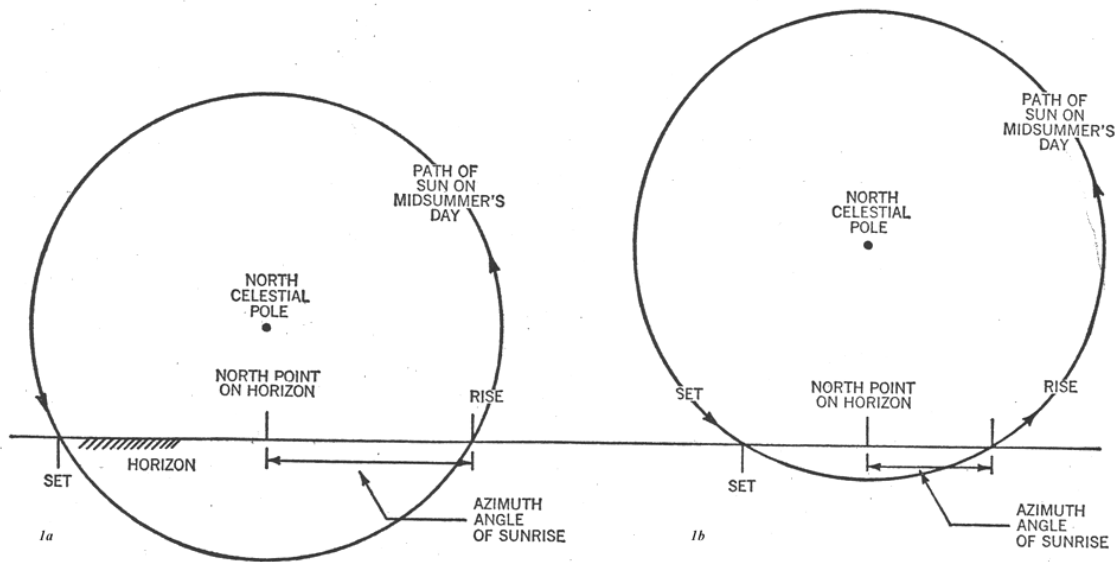


Figure 1. Diagrams of the arcs of the sun's ecliptic as viewed from earth at latitudes 40° North (1a) and 60° North (1b), showing how the northern celestial pole serves as the central pivot of the observation and measurement of such an arc. From Hawkins (1965): 9.

We might conjecture that the square-designed ancient architecture oriented with corners pointed toward the solstices and equinoxes was drawn imaginatively by connecting the four points using straight and perpendicular lines. That is, the square or rectangle defined an “ideal

plane" formed from connecting the four points on the horizon that demarcated the sun's solstitial and equinoctial risings and settings. But why would anyone have done this? Drawing a square or rectangle from these points would not have been a natural inclination, for parallelograms do not appear visibly in natural settings on earth, and the points on the horizon marking the solstitial and equinoctial solar events do not from an earth observer's perspective appear to form a square or rectangle — rather, their being defined by the apparent circle of the horizon on which they fall, they would more naturally be connected in the mind or eye of the observer by arcs. And truly, while the parallelogram does not appear anywhere in human-eye-visible natural earthly settings, a circle, circular form, or globe does so ubiquitously (e.g. the apparent dome of the sky, the sun, the moon in full phase, fruits, seeds and seed clusters, flowers, drops of water, ripples formed from a single disturbance in still water, water-worn rocks, geodes, and so on). Why, then, would not geometrically uninitiated people have developed circular rather than four-square sacred enclosures and sites on the basis of their observations of the solstitial and equinoctial points or phenomena in the natural world? Prior to the advent of the milling of lumber and/or the construction of blocks, making a square / right angle would not have been an obvious choice in the construction of sacred — or any other — architecture.

Many in fact did recreate the natural circular design, and we have discussed at least two examples in the first chapter above (both the steppe *kurgans* and the BMAC Indo-Aryan and Iranian fort enclosures were circular). And we can postulate further that in addition to taking inspiration from the circular form ever-present in the natural world, the builders of such circular sites simply built according to the most efficient design that exists in the natural macrocosm and the one that therefore required the least amount of resources and effort to construct. We may note that, prior to the milling of lumber from large logs, which made straight lines and right-angles the natural choice for any construction project, the circle or ellipse would have been the natural shape in which to construct any structure. Why, then, in urbanizing and urbanized settings from about 3500–3000 BC, prior to the milling of lumber, do we find the square dominating the design of sacred sites?

Indeed, why, further, within the square and rectangular designs of the urban or megalithic sacred structures themselves, did there stand rectangular or square altars that represented literally

the innermost sanctum of the religious space, Wheatley's *omphalos*, connecting earth and humans to the god(s) in the heavens above? Even further, why was this sacred shape carried into the relative microcosm when pendants and symbols literally mobilized the sacred power of the stationary axis such that people could enjoy its protection when away from that place? Why did these people across the world so emphatically emphasize the quadrilateral shape in their religious architecture?

Above in Chapters 1 and 2 already we have described such mobile square and rectangular axes of the sacred that offered protection and good fortune to both humans and their possessions, in the case of the Harappan seals. As we have seen, many scholars studying the seals believe that both the beasts and most of the inscribed signs found on the seals represent depictions and names of gods, respectively. Attached to a person's sash or belt, or lashed as seals to packages containing goods to be shipped in trade, the tablets appear to have served not only as tags identifying the owner but also as protective amulets, extending to their bearers the protective and assistive powers of the gods they represented through those gods' pictorial and scriptal depictions on the tablets. It is, once again, significant that virtually all of the thousands of such tablets that have been uncovered are rectangular or square in shape. Why?

Again, there is no naturally occurring square or rectangle on earth, and the cosmos was not ordered on a square. The cosmos appears to be rather circular, and to most people of the ancient world the cardinal directions on earth were not critical. The square thus seems to have represented for ancient people not an *earthly* construct of sacred space representing an *abstract* cosmological principle delineated according to the vaguely observed cardinal directions or solstitial / equinoctial points on earth, but rather a simple physical rectangular/square entity that *itself* was thought to possess thaumaturgical powers. That is, the square appears to have not only *symbolized* the crux of the high god's/gods' power, it *was* the crux of the god's/gods' power and thus also was the high god or gods it or themselves. It is the immediacy of the ancients' representation of the square and their personally intimate association with it, such as we find embodied in the personal rectangular amulets worn by the people of the Harappan civilization, and the near universality of the square's expression across the ancient Bronze-period world, that tell us that the ancients seem to have discovered their square in the abode of the gods, in a

specific place in the *physical* heavens above. But the heavens were and are not square. Wherefrom in the heavens, then, may have come the stimulus for the sacred four-square design?

The source of the rectangular/square design on earth seems to have been the perceived source of the superhuman and supreme potency of the heavens, and this itself was a rectangle formed from five very bright, obvious, and noticeable stars that appeared very near or at the northern celestial pole from the 5th through the end of the 2nd millennia BC. The rectangle's constituent stars include

Mizar (Zeta Ursae Majoris), on the Dipper's handle

Alioth (Epsilon Ursae Majoris), on the Dipper's handle

Pherkad (Gamma Ursae Minoris), across the rectangle's length from Mizar

Kochab (Beta Ursae Minoris), across the rectangle's length from Alioth

Thuban (11 Draconis), in the center of the length between Mizar & Pherkad

Figure 2 depicts the appearance of the polar rectangle c. 2800 BC. It is important to bear in mind that, with the pole star Thuban lying at the center point of one of its lengths, this quadrilateral spun a full 360° in the center of the heavens and thus dominated the geometry seen at the pivot of the ancient sky.

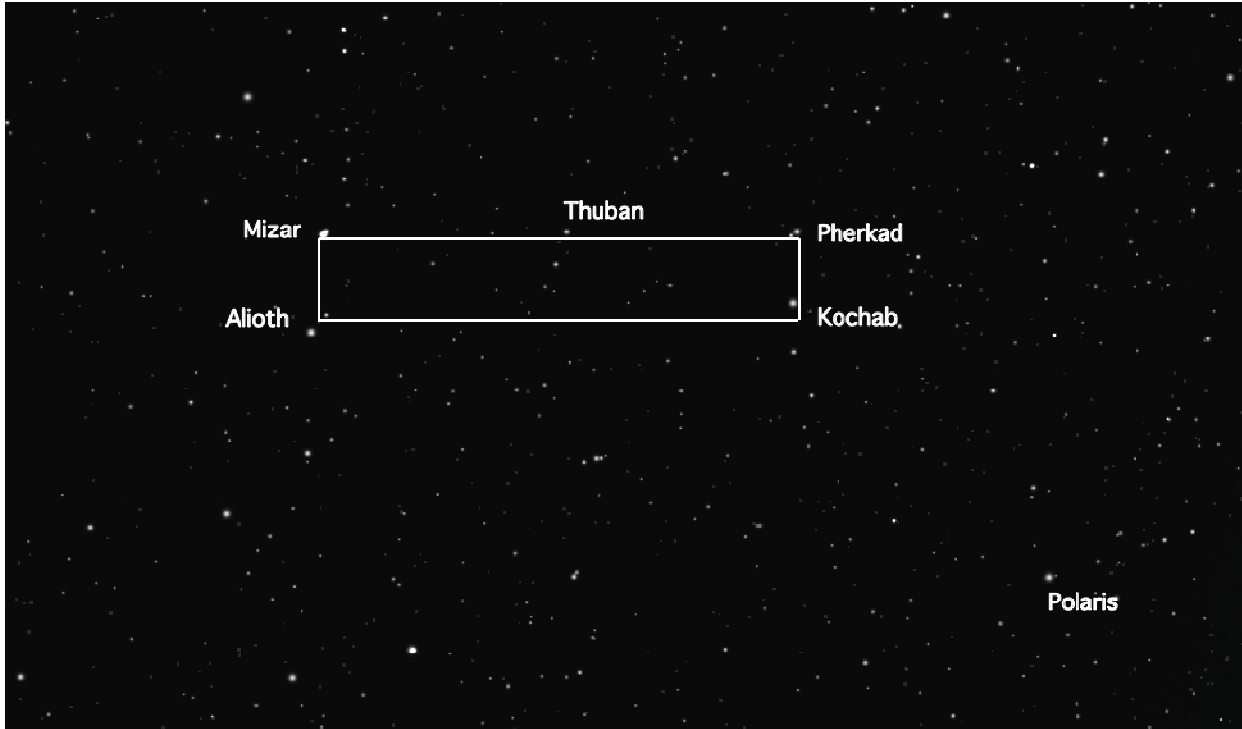


Figure 2. Quadrilateral at the ancient northern celestial pole, with Thuban showing the precise location of the pole in 2800 BC. Viewed from Zhengzhou, Henan.

Below we will review specific examples drawn from ancient Egypt, Mesopotamia, India, Anatolia (Turkey), America, and China that demonstrate how peoples of ancient developing and urbanizing civilizations appear to have modeled their rectangular and square sacred architecture and design on earth on the ancient polar rectangle. Often the polar rectangle appears as just that, a rectangle, but it also becomes modeled, schematized, or coded in art, architecture, and script to achieve both the square and cross designs. Schematization as a process seems to have been natural and ubiquitous among ancient human populations and explains the development of simplified and even geometricized designs of human religious, artistic, architectural, and scriptal expressions. Thus that the rectangle could and did appear also as a square or even a cross is unremarkable.²⁰

²⁰ On the coding or schematization that appeared already in designs of Neolithic Chinese artifacts see David N. Keightley, "Marks and Labels: Early Writing in Neolithic and Shang China," in Miriam T. Stark, ed., *Archaeology of Asia* (Malden, MA: Blackwell Publishing, 2006): 177–201, and particularly p. 180.

Ancient Designs Employing the Polar Quadrilateral

To demonstrate the significance of the quadrilateral design in religiously potent architecture and design in the ancient world, mention may be made briefly again of the square, pyramidal design of the Mesopotamian ziggurat temples dating to the late-4th through the 1st millennia BC. Their shape is very suggestive of the polar quadrilateral, particularly given that they served as both the religious centers of ancient Mesopotamian cities and the direct model for 3rd-millennium-BC Egyptian pyramids. Further, one Egyptian pyramid in particular, the Great Pyramid at Giza, completed in the 26th century BC, provides a crucial illustration of ancient rulers' having focused religious attention concertedly on the polar quadrilateral and its central pivot, the pole star Thuban, and then having devoted enormous energy to recreating and attempting to reach it.

In this pyramid two shafts ascend at acute angles from the pharaoh's burial chamber in the center of the pyramid, one leading to the north face of the pyramid and the other to the south. Most Egyptologists once believed these to be air shafts. Egyptologists also had known for some time that most of the pyramids and temples of 3rd-millennium BC Egypt were aligned virtually precisely with the north-south axis of the earth because the Nile runs south-north and the monuments had been aligned with its course. However, in 1964 Egyptologist Alexander Badawy discovered that the Great Pyramid at Giza aligned with true north not because this axis lay virtually parallel with the course of the Nile, but because the northern shaft pointed upward at a 31° angle to Thuban, the star that as we know lay almost precisely at the northern pole when the pyramid was built. The southern-pointing shaft, Badawy discovered, targeted at a 44°5' angle the meridian crossing of the central star of the belt of Orion, Alnilam, which was the celestial seat of Osiris. **(Figure 3)** While Osiris / Alnilam, since it set and rose diurnally, governed renewal and resurrection from death, Thuban, because it never set, served as the immortal governor of heaven

that supervised the revolutions of the sky. Thuban and Alnilam thus were the targeted destinations of two aspects of the pharaoh's departed but immortal soul.²¹

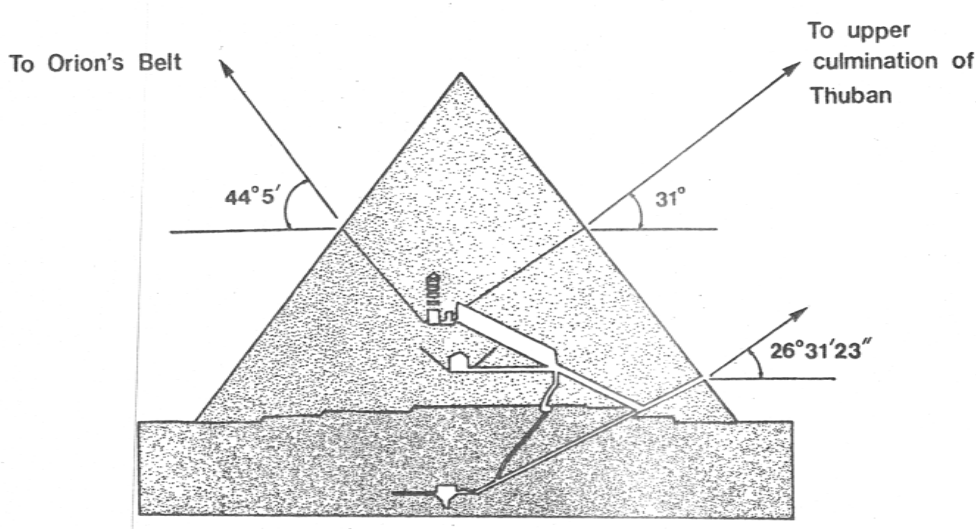


Figure 3. Diagram showing altitudes of two shafts exiting the pharaoh's burial chamber, Great Pyramid of Giza. The northern shaft pointed directly to Thuban (11 Dra), while the southern shaft pointed to Orion. In both cases, the stellar targets were locales in the heavens where the pharaoh was thought to enjoy aspects of his immortality. From Krupp (1984a): 304.

The square base of the pyramid then appears to recreate the polar quadrilateral, while the peak of the pyramid probably symbolizes the pole star that was also both pivot of the quadrilateral and the destination of the pharaoh's spirit, Thuban. In passing we may note that this Egyptian formulation of belief centering on the pole is remarkably similar to Shang Chinese conceptions of the high god Di and Shang kings' relationship with it. Incidentally, this brings to mind the probably related northern Taiyi and his southern Tianyi aspect housed in Taiwei, as well as the apparent recreation of this bifocal identity of Taiyi / Tianyi in the relative positioning of the early-imperial Chinese capital city and royal palace that both Ying Zheng (Qin Shihuangdi) and

²¹ Alexander Badawy, "The Stellar Destiny of Pharaoh and the So-Called Air-Shafts of Cheops' Pyramid," in *Mitteilungen des Instituts für Orientforschung*, Band X (1964): 189–206.

the Martial Emperor (Wudi) carried out in the construction of their royal / ritual centers in the late-3rd and late-2nd centuries BC.

Moving back to ancient Mesopotamia, we may note that on Akkadian-period (c. 2400–1940 BC) cylinder seals there frequently occurs a complex religious motif that displays prominently what appears to be the polar rectangle. The scene depicted on the seals, which is often called the “bull and winged gate” motif, shows two anthropomorphic gods (or a god and an attendant) stationed on either side of the rectangle that stands vertically between them (**Figure 4**).



Figure 4. Detail drawing from a “bull and winged gate” cylinder seal of the Akkadian period. From Black and Green (1992): 47.

From the upper portion of the rectangle’s vertical lengths emerges a series of stacked horizontal or otherwise upward-slanted lines that in some cases have been developed into full-fledged wings. Directly beneath the rectangle lies a bull, such that the bull supports on its back the rectangle, and in fact the bull’s back forms the lower short length that completes the rectangle. In some renderings of this motif one of the humanesque figures holds in her/his hand a lead rope that is connected on the other end to a ring in the bull’s nose. In other versions each of the two humanesque figures holds one end of the lead rope that stretches between them through the middle of the vertically standing rectangle. From my own interpretation, the bull and winged

gate motif appears to depict the scene from *Gilgamesh* wherein An/Anu gives the Bull of Heaven to his daughter Inanna (Ishtar) so that she can employ it to destroy Gilgamesh's city, Uruk.

In Chapter 2 we were able to identify An clearly with the power concentrated at the northern celestial pole, the center and pivot of the cosmos, and the Bull of Heaven with the Dipper. This is significant in that in the scene the bull's back constitutes one of the end lengths of the vertically standing rectangle, which is precisely the role that a length of the handle of the Dipper plays in forming the real polar rectangle (specifically, two stars of the Dipper's handle, Mizar and Alioth, constitute two corners of one of the short ends of the polar rectangle). Most interesting beyond simply helping us to confirm that in the Mesopotamian civilization divine power was attributed to the pole and its stellar occupants is the appearance of the lead rope held between An and Inanna that passes through the middle of the lengths of the rectangle. This line reflects a truly visible asterism that bisected the polar rectangle and in fact split the rectangle in two through its meridian. This meridian, which counts among its member stars what are the two pole stars of the 3rd millennium BC, Thuban (11 Draconis) and its dimmer twin 10 Draconis, is the tail of the Western constellation Draconis, the heavenly serpent — in Han China it also formed the spear of Taiyi, as we discovered in Chapter 3 above. The "bull and winged-gate" motif, which probably should be reconceived to be the "An Gives to Inanna the Bull of Heaven" motif, thus seems to provide a contemporary illustration of the Mesopotamian myth that imbues the northern celestial pole and its inhabitant rectangle with the highest cosmological significance and potency.²²

²² For several examples of the bull and winged-gate motif see B. Buchanan, *Catalogue of Ancient Near Eastern Seals in the Ashmolean Museum*, Vol. 1 of *Civilizations of the Ancient Near East* (Oxford: Clarendon, 1966): 63–64, nos. 337–41; 72, nos. 397–400. For a brief review of the bull and winged-gate motif, see Jeremy Black and Anthony Green, eds., *Gods, Demons and Symbols of Ancient Mesopotamia* (Austin: University of Texas Press, 1992): 47–8. Albert R. W. Green examines only very briefly this motif in the context of bull iconography of Mesopotamia during the 3rd and 2nd millennia BC, in his *The Storm God in the Ancient Near East* (Winona Lake, IN: Eisenbrauns, 2003): 18. Green identifies the main god in attendance throughout the many various bull motifs as the storm god Adada. However, in doing so Green seems to wish to synthesize a unity from all of the many distinct iconographic appearances of the bull, and we must remain aware of the diversity of expression of religious belief across Mesopotamia and, in particular, also the enormous changes that occurred in religious belief over the period in question.

Another apparent example of ancient people's targeting the rectangle of the northern celestial pole with their projections of celestial divinity occurs on many of the tablets uncovered from sites of the 3rd-2nd-millennia-BC Indian Harappan civilization, that is, sites roughly contemporaneous with and slightly later than the Great Pyramid of Cheops at Giza. In viewing these particular *rectangular* and *square* tablets we note the appearance time after time of, once again, the bull, and here it is accompanied again by (1) the previously mentioned *square* altar or similarly potent censer that stands at the nose of the god-beast, and (2) a character that consists of a four-point square within which stands an odd ribbonish or looped character possessing two "arms" held out at a downward angle from the middle of the loop and with the ends of the loop forming the legs. (**Figure 5**)

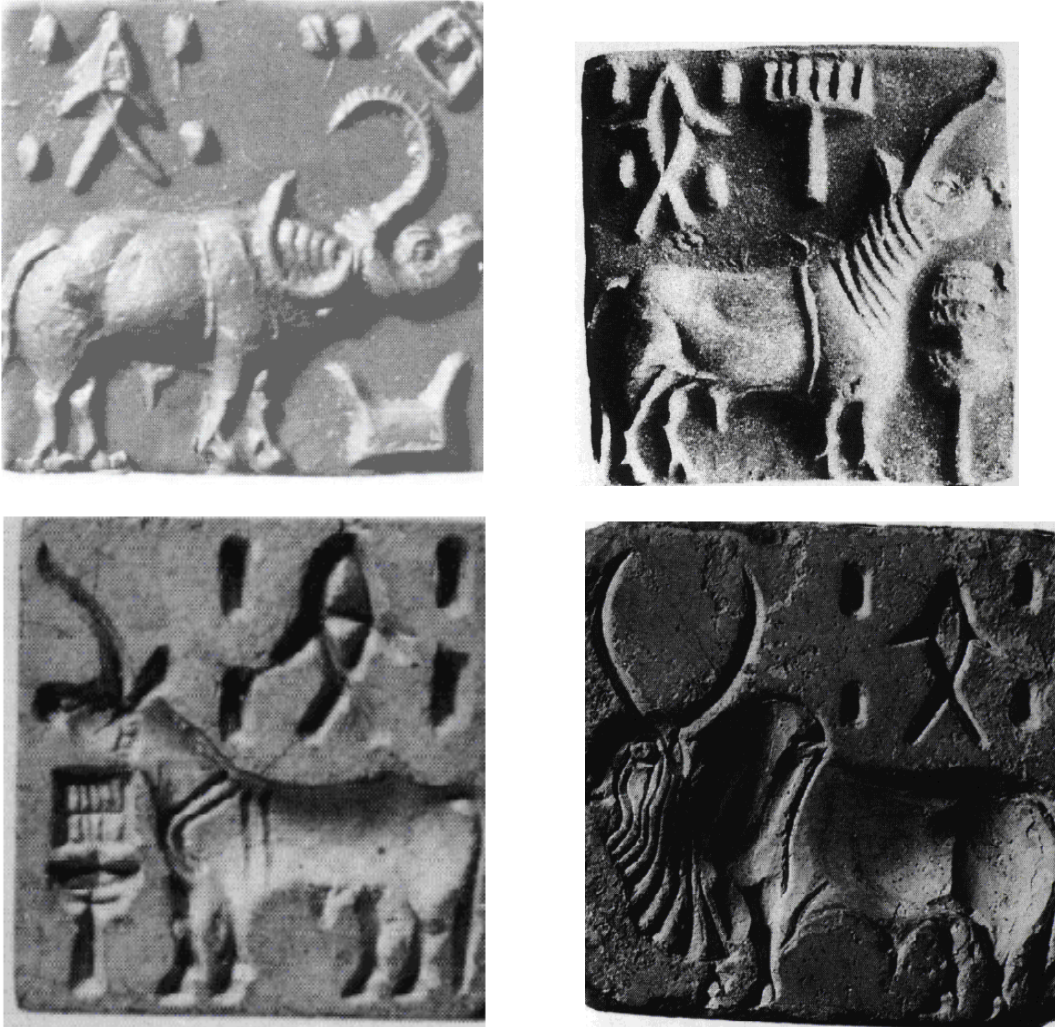


Figure 5. Indus tablets showing four-point square with loop-figure in center, above bull and square censer/altar. Images downloaded from <http://www.harappa.com> on December 15, 2002.

Scholars attempting to decipher the Indus script long have identified the armed loop or ribbony character that on these particular seals stands within the four-dot square to represent a fish, which, due to the creature's central importance to the people of the Harappan civilization as a food staple, likely was also a high god, if not *the* high god. The "arms" thus would actually represent fins and the two ends of the loop at the bottom of the figure the outline of the fish's tail. The appearance on the square seals of this figure of a fish within a four-dotted square and alongside the religiously potent symbols of a bull and a *square* censer or altar bolsters the argument for this character's having represented a divinity, particularly when we bear in mind

the significance of the influence of Mesopotamian culture on the development of the Harappan civilization and most specifically the divinity of the bull in both Mesopotamia and Egypt.²³

Intriguing in this light is the fact also that, in his study attempting to demonstrate that the Indus script was based on a Proto-Dravidian (PD) dialect, in the 1950s Father Henry Heras identified (1) the basic fish design to represent the PD word *mîn*, meaning "fish" (cf. Sanskrit *mina* = "fish"), and pictorially slightly variant fish characters to mean (2) "shining" or "glittering" (PD *min*, with a single extra hash mark appearing in the center of the character's loop), and (3) both "star" and the proper name/title of a king (PD *min*, with two additional upward-pointing arms added to the loop's sides above the downward-pointing arms already present on the original *mîn* character meaning "fish").²⁴ Heras's postulation of related meanings for these few closely related graphs of fish, glitter / shine, star, and king (a position of high leadership) stimulate a deeper interest in the fish-in-square graph that obviously, for its frequent occurrence on the square tablets, related among people of the Harappan civilization some essential meaning.

Asko Parpola proposed that the fish character, since in one variant form or another it accounts for 10% of all signs appearing on seals, perhaps began as a basic sign that, when the characters of the script needed to be increased, acted as a phonetic rebus, and that the variant forms of the fish sign thus might represent different meanings but the same or a similar phonetic. He also raised the possibility that the source meaning of the PD *min* was "glitter" or "sparkle," and that since both stars and fish glitter or sparkle they thus derived their phonetic value from

²³ Asko Parpola differentiated seals on the basis of size and motif, positing probably correctly that those larger and and/or including a representation of particularly a bull belonged to high elites and royalty. Parpola noted that on a series of particularly large seals appeared a representation of the humped bull, thus indicating to him that the bull symbolized the majesty and probably the royalty of the seal's owner (Parpola, 1994: 116). I have noted as well that in the inscriptions appearing on all of these seals the ribbonous or loop character currently under discussion also appears.

²⁴ Henry Heras, *Studies in Proto-Indo-Mediterranean Culture I* (Bombay: St. Xavier's College, Studies in Indian History of the Indian Historical Research Institute, 1953): 99f: 59.

their possession of this attribute.²⁵ In the end, however, Parpola argued that the development of the fish character paralleled the evolution of the use of the term and character of *dingir* in 4th-3rd-millennia BC Mesopotamia. As we saw in Chapter 2, *dingir* had originally denoted the high god of the Mesopotamian pantheon, An / Anu, through An's existence as a star. However, the symbol written to represent *dingir* / An, which is a simple multi-line drawing that, representing a star, resembles an asterisk (✳), was borrowed for use in the scripted names of other gods of the pantheon to identify them as "gods," since all pantheonic gods were identified with and as stars. Parpola suggested that similarly the fish character of the Harappan script originated as the scriptal representation of the name of the high stellar god of this civilization, which was the fertility god that took the form of a fish, and that its meaning, like that of *dingir*, was generalized to serve as a titular prefix identifying any god of the Harappan pantheon as such.²⁶ Thus it came to mean both "star" and "god," and, ultimately, the sign was combined with numerical symbols to denote certain constellations consisting of varying numbers of stars.²⁷ Parpola also identified the fish fertility god with the RV IA high night-sky god Varuna, invoking textual sources that show a link between Varuna and fish or sea creatures, as well as the Mesopotamian god Enki who, like Varuna, was god of both the waters and, through the fertility that water engenders, creation.²⁸ We know from Chapter 2 that Varuna was identified closely with the northern celestial pole. Parpola further connected the fish symbol with the RV IA Seven Sages, i.e., the Saptarishi,²⁹ which, again we know already from Chapter 2 above, were identified with the Dipper at the northern celestial pole.

Therefore, evidence developed both within the current manuscript and independently in Indus scriptal and iconographic studies supports the likelihood that the fish sign may be read to

²⁵ Parpola (1994): 181.

²⁶ *Ibid.*: 183-6.

²⁷ *Ibid.*: 194-5.

²⁸ *Ibid.*: 188-90.

²⁹ *Ibid.*: 190-195.

represent a, or the, high stellar divinity of the Harappan civilization and that this divinity resided at the celestial pole. Augmenting this position's supportive evidence further is the four-dot square mentioned above that encompasses the fish character on several seals that also portray a bull and a censer, which square may represent the polar quadrangle.

Additional evidence that supports reading these signs to represent the name or identity of the Harappan-Indus high god is found on one particular square seal, where there appears, along with all of the fish-in-square, bull, and censer, a square turned 45° to stand on its point, i.e., a squared diamond, that within it holds a multi-spoked wheel pivoting on a hub resting in the center of the squared diamond. (**Figure 6b**) The spoked wheel turns up again and again over either a Shiva-like figure (**Figure 6c**) or a bull and censer (**Figures 6ab**).



Figure 6a.



Figure 6b.



Figure 6c. The spoked-wheel motif on Harappan seals. Figures 6a-c from <http://www.harappa.com>, downloaded December 15, 2002.

Since this seal was produced before the spoked wheel is known to have been invented, this symbol could represent only an abstract concept of revolution derived from something that spins on a hub. The model most likely to have inspired this symbol was the rectangular heavenly hub of the northern celestial pole itself. This interpretation is strengthened further by the fact that the spoked-wheel symbol originated in Mesopotamia during the 3rd millennium BC and denoted royal, and therefore first and foremost heavenly and divinely derived, authority and power.³⁰ Both the Mesopotamian and Harappan uses of the hubbed and spoked wheel may in fact constitute the origin of the RV IA metaphorical description of the revolving northern celestial pole as a multi-spoked wheel (see Chapter 2) that served as the seat of the high god Indra and his nocturnal manifestation, Varuna, and later developed into the concepts and symbols of the *cakra*, universal authority, and *samsara*, the circulating time process, or wheel of existence.

Given the associations reviewed above between the stellar pole and the many motifs of the divine appearing on the seals, we can posit that the four-dot square character represents the four stars that in the 3rd millennium BC constituted the corners of the rectangle at the NCP, i.e., the rectangle outlined by the stars Mizar, Alioth, Pherkad, Kochab, and Thuban. We can

³⁰ *Ibid.*: 59.

postulate further that the fish character that appears on Indus seals within the square is an asterism that we should be able to locate approximately in the actual polar rectangle, recognizing that some modeling of the source in the pole occurred as its recreation was developed for standardized graphic reproduction on the seals. Indeed we can locate this graph in the northern celestial pole, as shown in **Figure 7**.

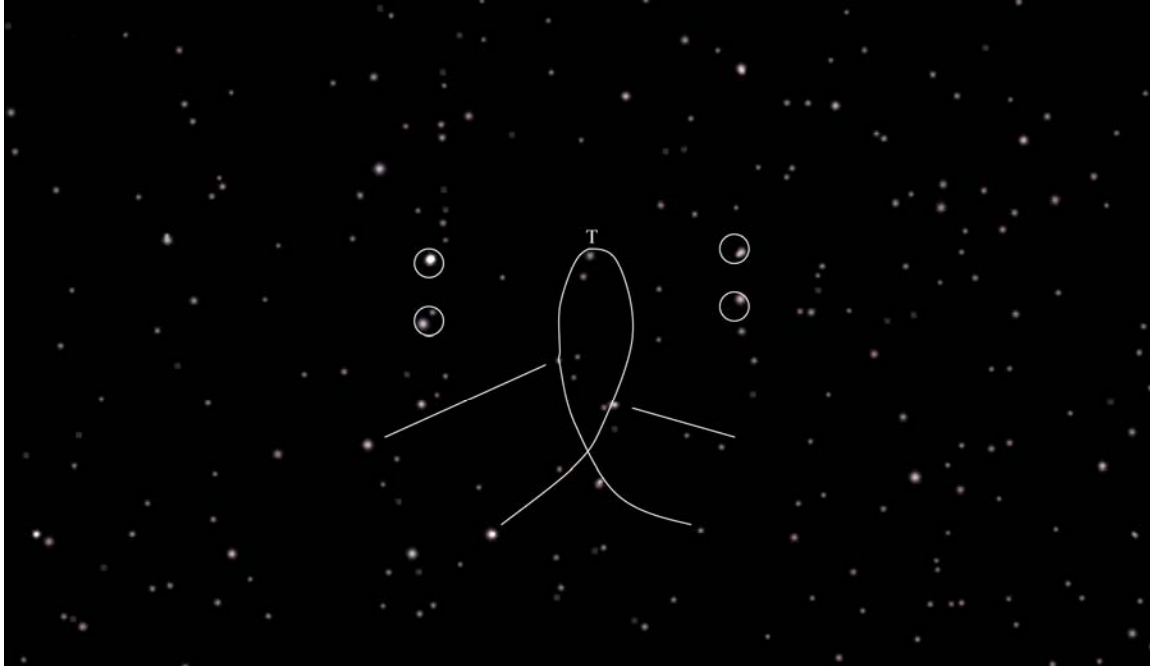


Figure 7. Drawing of shapes formed or suggested by the stars at the northern celestial pole of 2800 BC that appear to find reproduction in Indus seals from the 3rd millennium BC. "T" identifies the pole star Thuban at the top of the loop figure, while the circled stars are those that comprise the polar quadrangle.

One may question the validity of underscoring the present thesis in part with evidence pertaining to Father Henry Heras's and Asko Parpola's Dravidian-based interpretation of the Indus-Harappan pictographs, given that in Chapter 1 we reasoned that an Austro-Asiatic dialect such as Munda more likely served as the central dialect spoken among the elite of the Indus-Harappan civilization and thus underlay any possible linguistic foundation of the graphs. However, the matter of the base language is irrelevant, for several reasons. First, Dravidian

languages surely were spoken in parts of the Harappan civilizational realm and thus would have influenced whatever language(s) formed the linguistic base of the civilization. Second, we do not have to accept the Dravidian fish / star rebus argument to acknowledge the significance of what Heras and Parpola have proposed to our attempt to locate high divinity across the ancient world in the northern celestial pole. While we certainly understand that Heras's and Parpola's Dravidian-based interpretations of certain Harappan graphs were purely speculative, the fact that both scholars, and particularly Parpola, saw in the graphs representations of stars that served the civilization as its high divinities, and that they further connected the high stellar divinity as illustrated in the "fish-star" graphs with known projections of high divinity onto the northern celestial pole in both the Harappan and subsequent RV IA civilizations, demonstrates that high-calibre scholars have, independently, through their reading of evidence entirely unique from what has been presented in this study, recognized the penchant in ancient civilizations to attribute high divinity to the stars and in particular the stars at the northern celestial pole. Finally, we must recall that the Harappan characters probably cannot be understood to constitute a script. They are not based on syntax nor necessarily even lexicon, but only perhaps proper nouns (i.e., names of divinities and individuals), and therefore the identity of the base language of the culture is not truly germane to the discussion. The Harappan symbols seem to represent in a linguistically transcendent way a simple cultural iconography, and it would not be surprising if the symbolic representation of an animal so critical to the health of the civilization, the fish, would be treated as a high god of the culture and therefore projected onto the stellar patterns rotating at that time at the pivot of the sky.

In later Indian astronomical tradition the square or rectangular shape turns up again in a way that suggests strongly that classical Indian astronomers continued to observe or were silently influenced by the polar rectangle long after it had already drifted out of the polar center. C. P. S. Menon noticed that, unlike other ancient civilizations that developed astrolabes depicting the divisions of the year that, as we saw in Chapter 2, employed a circular enclosure, Indian classical tradition rather depicted the heavens and its twelve divisions (apparently thus expressing a twelve-month charting of the luni-solar tropical-sidereal year's heavenly movements) via two concentric squares, the twelve divisions also being squares formed by carving up in twelve equal

shares the circumferential square (or the outer among the two concentric squares).³¹ They thus seem simply to have extended the polar quadrilateral outwardly to maintain symbolically the power of the pole in all of its spatial and temporal (cosmological) manifestations. In Volume III, Chapters 2–6, we shall see that the Zhou- and Han-period Chinese did very much the same thing.

Finally, we return to Mesopotamia to review one last artifact that, dating to the 23rd century BC, seems to demonstrate royal recognition of the supreme divine might of the pole star Thuban and, likely, the high god An who inhabited it. This artifact is the well-known Victory Stele of Naram-Sin, commissioned by the self-apotheosized king of the Akkadian Third Dynasty of Ur, Naram-Sin (r. c. 2254–2218). (**Figure 8**) Naram-Sin had himself depicted on the stele as a god climbing in triumph to the top of a temple or mountain (Eliade's sacred mountain and center?) over both of the relatively diminutive recently defeated enemy and Naram Sin's own loyal troops. The only skyborne gods shown in this portrait are two stars, which we note are depicted in a way that mimics closely the graph that we know meant at this time both "star" and "god" (An / Anu), i.e., *dingir* ✨. Naram-Sin seemingly has invoked the power of these star gods to carry out his victories on earth, since they apparently were depicted in this scene to demonstrate their observation and approval from on high of the lesser divinity, the king, as he ascends to bask in their refulgence.³² On the basis of our understanding of contemporary artistic technique whereby, in order to depict a time lapse the sun sometimes was represented in the sky twice in one scene, we could discount the appearance of the two stars on this stele and consider them time-lapse depictions of the sun. However, three considerations cause us to interpret these stars not at all as time-lapse depictions of the day star, the sun, but rather as nocturnal stars. First, one star is smaller than the other, which suggests that they are two distinct objects, not two

³¹ C.P.S. Menon, *Early Astronomy and Cosmology* (London: Allen and Unwin, 1932), cited in Needham and Wang (1959): 239, n. d. Menon thought that the twelve divisions could be assumed to be divided further by a factor of four to produce the twenty-eight lunar mansions, which is reasonable, and it likely was assumed by the creators of the square calendar.

³² For a print reproduction of this stele, see William H. Stiebing, Jr., *Ancient Near Eastern History and Culture* (New York: Longman, 2003): 68–71.

phases of one. Second, the scene depicted on the stele is not time-lapsed but a freeze-frame of one moment's action. Third, in contemporary Akkadian art stars were depicted as we see here in the stele, i.e., as modeled forms of *dingir*, while the sun was represented as a disc in relief, with wavy sun rays emanating from a central circle etched into the otherwise smooth round relief. Nocturnal stars, conversely, were depicted as they appear on the Victory Stele of Naram-Sin. Consequently, we may safely posit that these stars can only be nocturnally visible stars and that the religious tradition of Mesopotamia that, as we have witnessed, places the highest divine power at the northern celestial pole, thus directs us to interpret the two stars to be the bright, and thus larger-appearing, pole star, Thuban, and its dimmer, smaller, and proximate companion, 10 Draconis.



Figure 8a. *Victory Stele of Naram-Sin*



Figure 8b. *Detail of stars.*

Figures 8ab. Stele (7a) shows Naram-Sin under what are most likely the two contemporary (23rd century BC) pole stars, Thuban and 10 Draconis. Figure 7b shows detail. From terraeantiquae.blogia.com.

The Square-in-Circle Motif Across the Ancient World: A Vision of Cosmic Design

Beyond the recreation on earth of the bare polar quadrilateral itself people of many ancient cultures appear to have expressed the power of the polar quadrilateral as occurring directly within a circle. At times this circle appears to recreate the domical cosmos, while in

others it might reflect a circular stellar pattern surrounding the rectangle at the ancient pole. In many cases the origin of the encasing circle is ambiguous and might reflect an ancient people's awareness of both encompassing, concentric, circles — one surrounding the pole and one circumscribing the momentarily visible earth at the horizon.

One example of the sacred square-in-circle design is found in the ritually and cosmologically oriented *kivas* at Casa Rinconada, Yellow Jacket, and other religious sites of the Pueblos (Anasazi) in the American Southwest, as we have seen in the Introduction to this study and volume (Introduction, **Figure 1**). No one can be certain of the precise original religious meaning of any of the *kivas* or their composite significance in the related but independent communities of the Pueblos in the American Southwest from c. 950 to 1450 AD, but that the geometry of the *kivas* and the carefully built highways that connected many of them contributed to form a cosmologically pregnant network of belief that centered on the sky and tribal ancestors is not in doubt.³³ The *kivas* of any given community formed part of a greater network of associated great houses and *kivas* belonging to many Puebloan communities. The overall organization of the string of Puebloan communities emphasized emphatically a greater imperfect north-south axis. Such a nearly cardinal orientation betrays an attempt to anchor a cosmology in the northern celestial pole.

In many *kiva* circles a quadrilaterally shaped raised pit was installed along the north-south (whether true north-south or slightly askew it) cardinal axis, slightly north or south of the center of the circle. Although it is known that the raised rectangle or square played a functional role in the ritual architecture of the *kiva*, its being set consistently just north or south of the center of the cosmological (heavenly or horizontal) circle indicates that it might also represent the rectangle appearing at or near the NCP during the 4th through 2nd millennia BC.

In at least one instance, as well, the quadrilateral set along the north-south axis of the *kiva*

³³ On the network of which Chaco Canyon served as center, see Stephen H. Lekson, *The Chaco Meridian. Centers of Political Power in the Ancient Southwest* (Walnut Creek, London, and New Delhi: Alta Mira Press, 1999). For a very balanced review of the scholarship on Chaco Canyon, including the religious significance of the *kivas* and the road networks connecting them, see Brian Fagan, *Chaco Canyon. Archaeologists Explore the Lives of an Ancient Society* (Oxford: Oxford UP, 2005).

has been transformed into a cardinally set raised cross the ends of whose four arms are punctuated by raised circles. Once again, in this Mound of the Cross, as archaeologists have anointed it, we witness the centrality to an early-urbanizing civilization of the shapes of the square (here in the form of a cross, which can be considered either a square whose corners have been removed to leave the crosshatch defining its center and cardinal axes, or a combination of two intersecting rectangles — it may be that like others across the world, the Puebloans recognized both the square of the ancient pole and the cross formed from the intersection of the two perpendicular lines that meet at Thuban, i.e., one the line connecting Mizar, Thuban, and Pherkad and the other the line constituting the tail of Draconis and Taiyi's spear, i.e., what I have termed the meridian of heaven) set amid a circular design — here the circle has been miniaturized and multiplied into four, but still circles surround the quadrilateral design. As we have noted above and shall see again below in this chapter, the cross shape is indicative again of the stellar formations appearing at the northern celestial pole of circa the 4th through 2nd millennia BC.³⁴ Furthermore, the north-oriented cardinality of the Mound of the Cross, as well as of the *kivas* in general, suggests strongly that the square or cross resting at the centers of these circle-encompassed designs originated in the north-marking northern celestial pole, and specifically the pole of the Eurasian Neolithic-Bronze period, or c. 4000–1000 BC, at which the polar quadrilateral pivoted.

We can note as well of Puebloan architecture of the same period the ubiquitous appearance of T-shaped doorways. We can appreciate that the T-doors are composed of two rectangular shapes, one with long sides lying horizontally atop another whose lengths rise vertically from the entry stoop. As in the case of the square-in-circle *kivas*, no one knows the original meaning of the double-rectangle-shaped T-doors, though it is believed and is likely that they embraced a certain religious symbolism.³⁵ Considering what we already understand of the

³⁴ On Puebloan insistence on cardinality centered on a rough north-south axis and, in this light, specifically the Mound of the Cross at Paquime, see Lekson (1999): 82–7; photograph on p. 84 (Fig. 3.8). Paquime and the Mound of the Cross are found at the southern node of the north-south highway connecting the communities of the "Chaco Meridian."

³⁵ See Lekson (1999): 175–181.

significance of the rectangle in ancient or pre-urban / early-urban religious symbolism and its apparent source in the stellar quadrilateral at the pole of the 4th through 2nd millennia BC, the appearance of the T-doors alongside the square-in-circle *kivas* in the architecture of the early-urbanizing Puebloans is suggestive of a stellar polar source of inspiration for both the doors and the *kivas*.

The very common appearance in Puebloan settlements of specifically the symbolically pregnant T shape is particularly intriguing considering the recent unearthing of several series of megalithic circles formed from giant T-shaped unilithons or bilithons on the hill of Göbleki Tepe in Southeastern Turkey. Though dated through thoroughly peripheral means by the chief investigating archaeologist to c. 10,000 BC, these T-based monolithic circles most probably date, like another, more famous, megalithic formation based once again on T shapes formed from rectangular stones, Stonehenge, to the 4th through 2nd millennia BC (on both Göbleki Tepe and Stonehenge, see below, this chapter).

While the dates of the Puebloan ritual architecture, c. the 9th through the 15th centuries AD, far post-date the Eurasian Neolithic sites with which in this study we are accustomed to considering with regard to rectangular and/or circle-and-square designs and architecture, the critical factor of urbanization would seem to play a significant role in neutralizing any objections to our comparing across millennia these religious architectures, for it is the factor of urbanization that appears to stimulate a religious — and specifically cosmogonic or cosmographic — change that alters a Palaeolithic or Neolithic, or pre-urban, civilization's religious belief pattern. Urbanization is a drastically progressive factor in the development of civilization that in its revolutionary reorganization of human relationships requires a parallel revolution in expressions of religious adherence and ritual behavior. In the 9th c. AD, the Puebloans were just beginning the process of urbanization,³⁶ and it is with this inchoate urbanizing that we witness the implementation in architecture of what seems to have been their ancient cosmography that likely would have dated back to the period of the Eurasian Neolithic, or the 4th–3rd millennia BC, prior

³⁶ On the pre-urban hunting and gathering Basketmaker II cultures (200 BC – AD 400) that preceded the emerging agriculturalist and urbanizing Puebloans in the American Southwest, see Fagan (2005): 63–90.

to the civilization's full response to the socio-political and economic changes that urbanization would have rendered inevitable. Thus, it seems very possible that the cosmography exhibited in the Puebloan square-in-circle *kiva* design, notable especially at Casa Rinconada and Yellow Jacket (but also elsewhere in the American Southwest), dates in this civilization back to a time when the stellar rectangle appeared near or at the NCP, or c. 4000 to 1000 BC.

Another example demonstrating the perceived potency of the square-in-circle design comes again from Babylonian Mesopotamia, where a 9th-century-BC world map shows, in a way exceedingly similar to the squares set in the circles of the *kiva* ritual centers, Babylon as a rectangle resting near the top of the inner circumference of a circular horizontal band that is identified as the ocean and beyond which "the sun is not seen" (i.e., what is beyond the circular oceanic band is beyond the horizon); as in the *kivas* at Casa Rinconada and elsewhere, the long sides of the rectangle lie horizontally, i.e., toward the top and bottom of the picture. **(Figure 9)** The rectangle representing Babylon has been placed in what was considered the center of this depiction of the world, toward the top of the inner circle defined by the band of the horizon. Notably, the upper long length of the Babylonian rectangle does not face cardinal north, but rather vaguely northwest, making this indistinct northwest also the anchoring direction of this map and world view. In light of the foregoing discussion on the relative unimportance of the precise cardinal directions in ancient cosmologies, it is significant to note that neither the cosmos nor the human and physical environs in this obviously idealized — i.e., not truly physically representative — world was anchored in the cardinal directions.³⁷ The horizontal circle that encompasses the square or rectangle in such designs clearly originated in the human observation of the apparent circle formed by the interface of the dome of the heavens with the circular horizon of earth. The quadrilateral center having been placed just north of center of the circle betrays the map's reflection of a cosmology in which the city- or *omphalos*-centered world was conceived to reflect directly the organizational structure of the heavens, with the circular world pivoting on the central rectangle.

³⁷ For this tablet (BM 92687) see Horowitz (1998): 21.

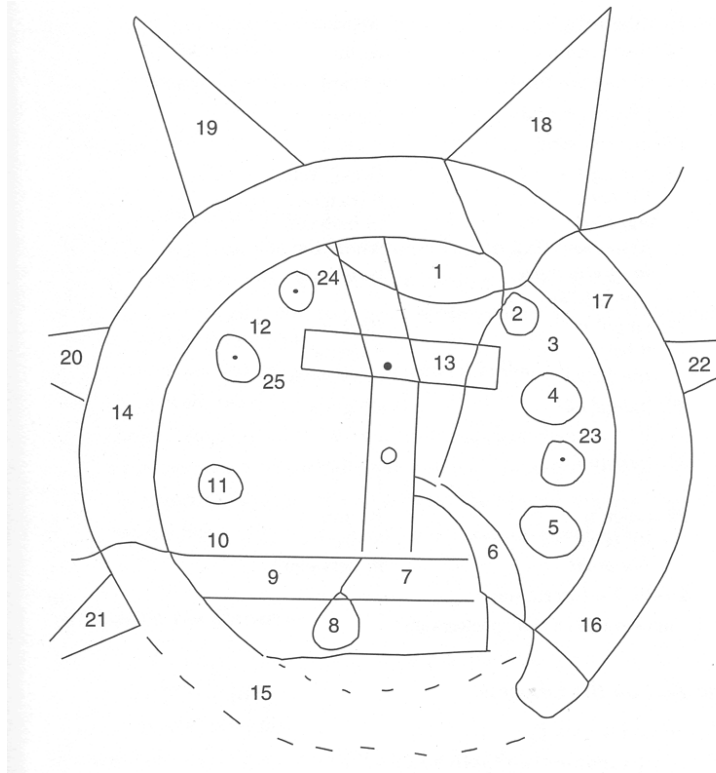


Figure 9. Babylonian map of the world. In the numbered key, 1 = Assyria; 8 = Susa; 11 = Uru (city); 13 = Babylon; 14–17 = the ringing oceans; 18–22 = outlying regions. From Horowitz (1998): 21–22.

Yet another example of the ancient square-in-circle design is found on a fragment of an apparently abstracted calendrical map of the physical world recovered from the Res Temple in Uruk. On this fragment, inscriptions appearing between the flat edges of the circle-encompassed square and the inside of the encompassing circle depict three-month periods based on the dominant seasonal winds of the year.³⁸ (Figure 10) Four triangles placed in the inside corners of the square are each labeled with a directional wind, and between the West and South Winds, along the inside face of one of the lengths of the square, is inscribed “Sunrise.” (Similarly, “Sunset” is identified to occur between the directions identified with the “East Wind” and “North Wind”.) Probably the names of the winds denote directionally not the sources of, but rather the general directions toward which blow, the winds. Thus the points denoted by “West Wind” and

³⁸ For this fragment (BagM Beih. 2 no. 98 [W.20030/121]), see *ibid.*: 194.

"South Wind" probably represent generally the direction of east / southeast / northeast, with the sunrise placed also in this general direction.

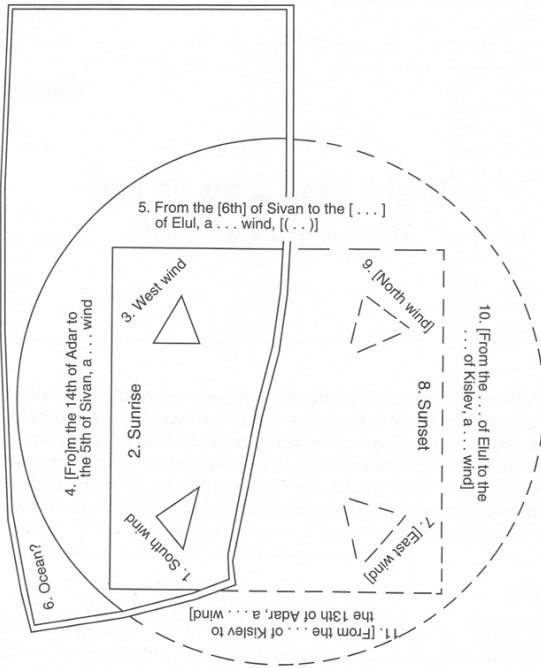


Figure 10. *BagM Beih. 2 no. 98 (W.20030/121)*, from the *Res Temple, Uruk*, showing directional winds both within and without a central square. From Horowitz (1998): 194.

The square-in-circle design also appears in the architecture of the megalithic structure of Stonehenge in Wessex, England. Constructed in three major phases between approximately 3020 and 1520 BC,³⁹ Stonehenge has been studied by a series of high-calibre archaeoastronomers

³⁹ The phases of megalithic construction at Stonehenge are those defined by Atkinson beginning in 1956. Though they do not necessarily reflect actual events on the ground, I adopt them here since they do offer a generally accurate guideline. For a more fluid treatment of the chronology of Stonehenge construction, see John North, *Stonehenge, A New Interpretation of Prehistoric Man and the Cosmos* (NY: The Free Press, 1996): 498–502. For radiocarbon dates of Stonehenge, see the lengthy report carried out in 1994–1995 under the auspices of the British government, in R. M. J. Cleal, and K. E. Walker and R. Montague, *Stonehenge in its Landscape: The Twentieth Century Excavations* (London: English Heritage Archaeology Report no. 10, 1995). Earlier estimations of the period of construction at Stonehenge date those activities to between 3100 and approximately 1100 BC, although even in these earlier datings construction within Stonehenge proper was estimated not to have continued after about 1500 BC, or the end of Phase IIIc; the date of c. 1100 BC indicates the date when extension of the Avenue of Stonehenge

since the 1720s, when William Stukeley made the first careful and scientifically informed survey of the ancient structure. Although often Stukeley is credited with having discovered that Stonehenge's purpose was astronomically oriented, he in fact merely reflected what locals correctly or incorrectly had believed of the megalith for ages, which is that it was built to reflect the cosmos, it measured astronomical values, and that, thus, in addition to — or in conjunction with — its apparent ritual functions, the structure served the ancients as both a calendar and a tool for predicting astral events.⁴⁰

Following a series of subsequent studies by John Wood, John Smith, and Godfre Higgins, since the middle of the 19th century the scientifically oriented community generally has acknowledged the likely combined ritual-astronomical nature of the structure's historic design and use.⁴¹ Partly on the basis of work done in the 1880s by W. M. Flinders Petrie, in 1901 the man often referred to as the father of modern archaeoastronomy, J. Norman Lockyer, with F. C. Penrose published his findings that Stonehenge's most significant orientation is northeast, directly toward the measurement of the sunrise at midsummer, that is, at the summer solstice.⁴² Lockyer had measured the azimuth of the northeast-leading "Avenue" of Stonehenge from the center of the megalith and found that its value of 49°35'51" aligned with his projection of the azimuth of the sun's rising at summer solstice in about 1800 BC. Since then R. J. C. Atkinson and others have corrected Lockyer's measurement to 49°54'40" and dated such a summer-solstitial sunrise azimuth more precisely to the mid- to late-3rd millennium BC.⁴³

northeast and then southeast to the River Avon was constructed. See R. J. C. Atkinson, "Aspects of the Archaeoastronomy of Stonehenge," in D. C. Heggie, ed., *Archaeoastronomy in the Old World* (Cambridge, England: Cambridge University Press, 1982): 107–116.

⁴⁰ See William Stukeley's original report to the English throne, dated 1740, reprinted in *Stonehenge, A Temple Restor'd to the British Druids* (New York & London: Garland Publishing, 1984).

⁴¹ For a brief survey of this history see Michell (1977): 7–27.

⁴² For a review of Petrie's contributions through the publication of his *Stonehenge: Plans, Descriptions, and Theories*, see North (1996): 404–5. For Lockyer's findings see the expanded second edition of his work, J. Norman Lockyer, *Stonehenge and Other British Stone Monuments* (London: MacMillan, 1909).

⁴³ On this measurement see Atkinson (1982): 112, 114.

But Stonehenge is a highly complex structure the construction and meaning of whose parts is not wholly understood. It began in the late 4th millennium BC as an earthen henge, or ring, of about ninety meters in diameter, whose perimeter was established by a trench and, inside it, a low berm created from piling up the chalky earth dug up in the excavation of the trench. Just inside the circumference of the berm were dug fifty-six holes into which, it seems, timber posts were inserted. Atop these timbers may have been placed wooden lintels, which might have served as a circumferential false horizon used for sighting astronomical phenomena, but this is uncertain. Only about 2550 BC were the large stone and associated structures begun, having been completed largely by around 2000 BC. These megalithic structures include the bluestone ring and horseshoe and the two sarsen rings. The latter are the two most prominent features of the site as it remains today, although many of the three-stone sarsens (two upright slabs capped by a lintel) have toppled. Some stones have been reset in the last 350 or so years, causing serious problems for archaeological excavations and studies performed in the 20th and 21st centuries and, in tandem with such work, theoretical reconstruction of the nature and uses of the structure dating to the 3rd and 2nd millennia BC. (**Figure 11**)

The solar alignment of the megalithic structure of Stonehenge then dates only to c. 2550 and thereafter. Prior to this, it has been postulated, the henge was employed to measure mostly lunar movements, but all attempts to prove such orientations have failed. Still, it remains very possible that the early structure was indeed used to measure lunar phenomena.

Some have speculated that the early structures of Stonehenge may have been employed to mark stellar movements, as well. John North, for instance, has suggested that a certain corridor suggested to have existed within the Stonehenge circle around 2700 BC might have traced the setting of Rigel Centauri. This he related to similar stellar alignments he posited for other Neolithic structures found in southern England.⁴⁴ Clive Ruggles, probably the most measured among recent archaeoastronomers, concurs that all of the sun, moon, and stars likely were observed at Stonehenge during its approximately 1500–2000 years of use.⁴⁵ Perhaps the nature

⁴⁴ North (1996): 328.

⁴⁵ Ruggles (1999): 139.

of the ambiguity of our understanding of Stonehenge and related Neolithic structures has been summarized best by Aubrey Burl, among the most respected of recent scholars to work on Stonehenge and other Neolithic henges and megaliths. Burl has observed that,

There were astronomers in prehistoric Britain. People observed the heavens, the sun and the moon, perhaps even the stars as they moved along their ordained courses. The dispute is not whether men ever watched the skies but the reasons for their watching,... whether the orientation... [of the passage of a chambered tomb to face the rising moon] was decided by an astronomer-priest or a clan magician, one a proto-scientist investigating the complexity of the lunar cycle, the other a shaman performing rituals of death and regeneration beneath the brilliance of the cold moon.... [A]nd it is true that the more obvious movements of the moon and sun would soon be known to country dwellers whose lives were regulated by dawn, daylight, dusk and the nights of the full moon. To align upright stones or a megalithic tomb upon midwinter sunset would not have been difficult, especially if the alignment did not have to be exact.⁴⁶

⁴⁶ Aubrey Burl, "'By the Light of the Cinerary Moon': Chambered Tombs and the Astronomy of Death," in C. L. N. Ruggles and A. W. R. Whittle, eds., *Astronomy and Society in Britain During the Period 4000–1500 BC* (Oxford, England: B. A. R., 1981): 243.

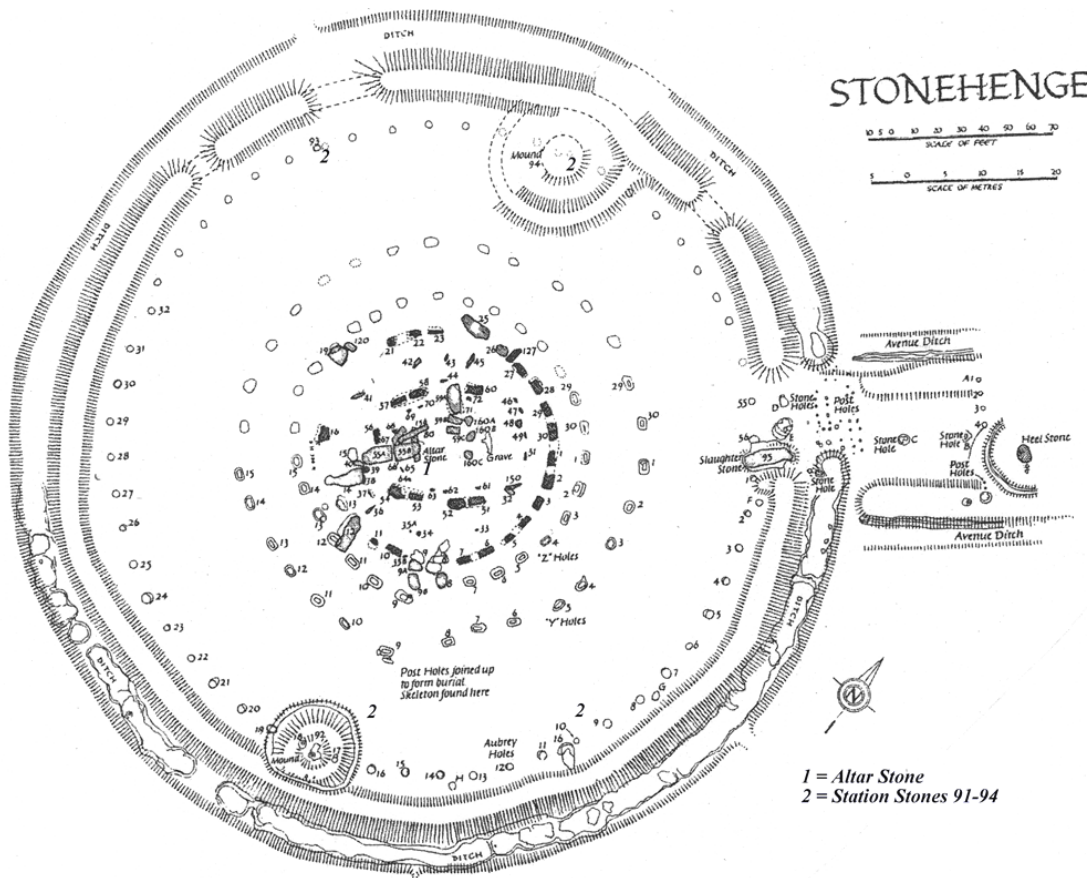


Figure 11. Diagram of the Stonehenge apparatus. Adapted from Hawkins (1973): 284 (in turn adapted from Newall [1953]: back flap insert).

At present, then, we are merely able to repeat R. J. C. Atkinson's remark that the only confirmable astronomical orientation of Stonehenge is that of the Avenue toward the summer solstitial sunrise during the 3rd millennium BC.⁴⁷ Helping to demonstrate the deliberate establishment of this orientation is the additional fact that the ellipse created by the twenty-two bluestones erected within the sarsen circle in the center of the Stonehenge apparatus and capped with lintel stones was designed at the time of its construction c. 2550–2100 BC to align with the azimuth of the Avenue. The azimuth of the axis of symmetry of the bluestone ellipse has been measured at $49^{\circ}57'3''$, while the azimuth of the central axis of the Avenue, as we have seen, is

⁴⁷ Atkinson (1982): 112. And even this measurement assumes that the sun was observed at the point at which 2' of its upper limb was visible above a treeline rising ten meters above the skyline.

now measured at $49^{\circ}54'40''$, forming a symmetry highly unlikely to have been merely coincidental.⁴⁸ Thus it is likely that even in the 3rd millennium BC the structure's essential orientation was indeed toward the sun's rising on or near the summer solstice.

In addition to the orientation of the Avenue and bluestone ellipse, significant is the presence in the Stonehenge design of a perceived imperfect rectangle formed from connecting the positions of four prominent stones and mounds placed virtually on the circumference of the Aubrey postholes near the perimeter of the Stonehenge circle. The disposition of these stones seems to confirm the deliberate nature of the northeast orientation of the Avenue. These so-called station stones (Stones 91 and 93) and mounds (Stones 92 and 94) were installed at about the same time that the sarsen circles, bluestone circle and horseshoe, and the Avenue were constructed (see items numbered 2 in **Figure 11**). Their perceived rectangle, like their contemporaneous lithic structures, is oriented toward the summer solstitial sunrise. That is, the perceived lengths lie perpendicular to (i.e., face) and the interpolated short sides lie parallel the Avenue's orientation. Thus the short sides of this large perceived rectangle can be imagined to create rays that are virtually identical in their azimuth to the Avenue and thus also the summer and winter solstitial sunrise and sunset.

A second rectangle lies within the circle of Stonehenge and indeed also within the larger rectangle perceived to have been formed from stones 91–94. This rectangle is found in the shape of the so-called Altar Stone (item numbered 1 in **Figure 11**). Though the stone long ago toppled from its original position, it lies near the center of the Stonehenge circle, and in its toppled state its lengths yet lie virtually perpendicular to the northeast-southwest axis of the megalith. It thus remains nearly concentrically aligned with the rectangle that has been assumed to be formed from the larger station stones/mounds rectangle. Stukeley and, before him, Inigo Jones estimated that indeed this unique stone faced the northeastern Avenue. While some consider that at one time the stone lay not horizontally but upright, as a pillar, to serve as an artificial sighting horizon, this thesis requires that the stone was moved several times or at least some distance to

⁴⁸ *Ibid.*: 112.

reach its present location and thus requires a further hypothetical stretch.⁴⁹ In any case, most scholars do place the Altar Stone in its original station(s) close to where it now lies, slightly southwest of the center of Stonehenge with its lengths and sides parallel with the larger rectangle imagined to be formed by station and mound stones, or stones 91–94. In other words, it seems to have been aligned with the major northeastern axis of Stonehenge toward the summer (and, in the southwest, winter?) solstice.

Taken together, then, the near identity of the azimuths of the Avenue, the sarsen and bluestone alignments, the perceived rectangle of the station stones / mounds, and the rectangle of the Altar Stone in pointing to or facing toward the summer solstitial sunrise seems to confirm that the builders of the megalithic complex focused their ritual attention on the rising summer sun — or, as others have argued via complex geometric and astronomical alignment schemes, the

⁴⁹ No one can be certain of the original placement or orientation of the Altar Stone, or even that it was employed as an altar. Atkinson, noting the untrimmed state of one end of the stone, postulated that the stone might have been set in the ground originally as a pillar and employed as an artificial horizon for sighting the solstitial sunrise. At some time it may well have been, but this does not mean that at other times the stone had not lain as an altar, concentrically aligned with rectangle formed from the station and mound stones, and that at some point the stone was trimmed on one end and moved to stand upright as a pillar (approximately ten meters high) and thereby serve as an artificial horizon. The many changes made over approximately 1500 years to the geometry created by the stones of Stonehenge are documented, as far as they can be, and need not be detailed here, but Atkinson's (and now also John North's) postulation regarding the Altar Stone remains supposition only. For a survey of Stonehenge construction developments, see North (1996): 409–433.

Stukeley noted early on that the toppled Altar Stone was of a stone type denser than the others that comprise Stonehenge, for, he reasoned, it had to withstand the high heat of the ritual / sacrificial flame (Stukeley [1740]: 5). R. J. C. Atkinson studied the composition and type of all of the stones of Stonehenge and found that the Altar Stone is indeed unique among all Stonehenge stones, its likely having been transported from the Cosheston Beds of Old Red Sandstone in South Wales. Atkinson believed, and it is generally accepted now, that the stone was transported to Stonehenge by sea, an immense task in the 3rd–2nd millennia BC, which betrays an importance that virtually confirms the Altar Stone's singular significance as the central stone of the entire Stonehenge apparatus. Atkinson also found that the stone contained significant quantities of mica, which would have enabled, as Stukeley first surmised, the stone to withstand the high heat of sacrificial flame. See R. J. C. Atkinson, *Stonehenge* (London: Hamish Hamilton, 1956): 46.

setting winter solstitial sunset in exactly the opposite direction, the southwest.⁵⁰ Recalling Burl's observations, this does not by any means indicate that those responsible for the megalith's construction were sophisticated astronomers. Quite the contrary, the alignments are mostly inexact, and all attempts to prove a highly precise ancient astronomy have failed. We should understand rather that Stonehenge and its predecessor earthen and wooden henges were primarily ritual centers, originally public but after c. 2550 BC increasingly private and elite,⁵¹ and that the rituals performed there centered most apparently on solar — and perhaps also lunar — movements.⁵²

⁵⁰ North (1996): *passim*.

⁵¹ See Ruggles (1999): 138–9.

⁵² At the latitude of Stonehenge the major lunar standstills in the northwest and southeast occur roughly at right angles to the summer and winter solstitial solar positions at rising and setting, respectively. Those in the southwest and northeast occur *roughly* in line with the solar solstices. Petrie seems to have been the first to notice the angles created by this quadrilateral, but he considered them to have helped to constitute an annual calendrical calibration device. This very well could be true, though if so surely the construct did not employ an exact observational geometry. It is worth noting that Petrie's observations influenced Lockyer significantly, such that the alignment of the rectangle with the Avenue, sarsens, and bluestones has had a significant impact on the historical development of our understanding of Stonehenge.

In the early 1960s C. A. Newham postulated that the rectangle was designed to work in conjunction with the Aubrey holes to mark and predict lunar positions. (On Newham's work of 1963, destroyed in a publisher's fire before publication, see A. and A. S. Thom, *Megalithic Remains in Britain and Brittany* [Oxford: Clarendon Press, 1978]: 151). From this time forward the latitudinal coincidence of the site's solar and lunar orientations has been in large part responsible for causing incautious theoreticians to offer excessive claims for the remarkable sophistication of the astronomical science of the Stonehenge designers, including that it was an ancient astronomical computer capable of predicting — through gaps in stones, several series of false horizons, the Aubrey postholes, etc. — lunar eclipses. Too many to recount here, the most infamous case is that of Gerald Hawkins, whose fascinating but seriously flawed *Stonehenge Decoded* (Garden City, NY: Doubleday, 1965; see also Hawkins' "Stonehenge: A Neolithic Computer," *Nature* 202 (1964): 1258–1261) did much to popularize the myth of ancient scientific sophistication. R. J. C. Atkinson most effectively demonstrated the limitations of Hawkins' findings in his "Moonshine on Stonehenge," *Antiquity* 40: 212–216. See also (1) R. Colton and R. L. Martin, "Eclipse Cycles and Eclipses at Stonehenge," *Nature* 213 (1967): 476–8.; and (2) Clive L. N. Ruggles, "Archaeoastronomical Anomalies," *Nature* 294 (1981): 485–486.

A third set of rectangles is one that has not, at least in scholarly literature of which I am aware, garnered any significant attention. This is the set of rectangles comprised of the rectangular stones from which all of the megalith's trilithons and other structures are constructed: every single stone is hewn either roughly or more precisely in the form of a rectangle. Moreover, as in the cases of both the Puebloan T-doors and, as we shall review below, the T-shaped unilithons / bilithons of Göbleki Tepe, the trilithons at Stonehenge that together form circles or ellipses, essentially constitute Ts.

We may ask, then, why the 3rd-millennium BC builders of Stonehenge placed so much apparent importance on the shape of the rectangle. Not only do two rectangles seem to appear in parallel positions within the cosmological circle of the megalith, but also the entire megalith itself is constructed, it seems, from rectangular megaliths. While, as we have seen, it has been

More careful and respected but also somewhat flawed was the work of Alexander Thom and, later, his son Archibald Thom. In his massive study spanning some five decades the senior Thom measured alignments at tens of Neolithic henge, barrow, and cursus sites in Britain to ascertain particularly lunar observational practices. His data seemed to indicate a clear preference for extremely accurate alignments at such sites with the summer solstice and the four major lunar standstill limits (NE, SE, SW, and NW). However, Ruggles subjected Thom's data selection and interpretation to critical review and found that in fact virtually no case can be made for any high accuracy of measurements or alignments. Still, Ruggles concluded that a more modest claim for rough alignments with the summer solstice and major lunar limits might be possible, though still inconclusively. See (1) Clive L. N. Ruggles, "A Critical Examination of the Megalithic Lunar Observatories," in Ruggles and Whittle (1981): 197; (2) Clive L. N. Ruggles, *Astronomy in Prehistoric Britain and Ireland* (New Haven and London: Yale University Press, 1999): 49–67; (3) R. J. C. Atkinson, "Comments on the Archaeological Status of Some of the Sites," appearing as Appendix 4.2 to Ruggles (1981), in Ruggles and Whittle (1981): 209; and (4) Christopher Chippindale, *Stonehenge Complete, Revised Edition* (NY: Thames & Hudson, 1994): 229.

A more recent and both learned and fascinating attempt to theorize a sophisticated astronomy for the complex structures of Stonehenge is found in John North (1996), *passim*. North considers that the orientation of the main axis was to the winter solstice setting sun in the southwest as viewed from the Avenue in the northeast, and that the sarsens, bluestones, and many other extant and perished components of the megalith and its earlier earthen and timber apparatus constituted a highly complex and accurate (but inherently slightly inaccurate toward some orientations, caused by the designers' wish to achieve a comprehensiveness of alignment) astronomical observatory that was used primarily in religious ritual observations of heavenly phenomena. Despite the largely theoretical nature of North's construct, the sophistication of his scholarship and the daring of his thought make his work compelling and stimulating reading.

argued that the geometry of the interpreted rectangle formed from the station / mound stones recorded the extreme declinations of both the sun's and moon's ecliptics in their respective annual and 18.6-year cycles, in fact the lunar measurements are far from exact, and they quickly fall out of phase with the moon's actual movements. Consequently, some have argued instead that the apparent indication of the lunar positions by the perceived lengths of the large rectangle formed from the station and mound stones results simply from the extraordinary coincidence of cosmological perspective occurring at the particular latitude of Stonehenge, whereby from the perspective of the Stonehenge circle the points on the horizon at which the sun and moon rise and set in their extreme declinations describe approximate right angles.⁵³ That is, the imagined rays formed from connecting linearly the station and mound stones probably represent a fortuitous accident of latitude.

No one can determine for exactly what reason(s) the stones and mounds defining the corners of what has been nearly universally perceived to be the large rectangle were placed as they were; nor can we even be certain that the original position of the Altar Stone paralleled the orientation of this large reconstructed rectangle toward the solstice(s), though it appears likely that it did. Still, from the apparent similarity of this quadrilateral-in-circle design with other like designs found amid ruins of other Neolithic cultures and the apparent cosmological significance that they all seem to have shared, we might safely postulate that they and Stonehenge recreate the perceived cosmos in a ritual center on earth. Thus Clive Ruggles has mused on the apparent solar alignment of the megalith that,

The obvious conclusion is that the axial orientation was changed in and around 2500 BC so as to incorporate the solar alignment, perhaps as part of the process of legitimizing the place of the monument at the centre of the cosmos and hence reinforcing its symbolic power.⁵⁴

⁵³ Compare Thom (1978): 139; Ruggles (1981): 197; Ruggles (1999): 49–67; R. J. C. Atkinson (1981) in Ruggles (1981): 209; and Chippindale (1994): 229.

⁵⁴ Ruggles (1999): 139.

If Stonehenge was indeed such a symbolic cosmological center, and it appears that it was,⁵⁵ then the Altar Stone rectangle, the rectangle comprised of the four station stones and mounds that align with the sun's ecliptic extreme, and the rectangular shape of all of the stones of the megalith might represent a direct reflection of something in the cosmos as it was perceived by the Stonehenge builders of the mid-3rd millennium BC. If so, then this something likely would have been the northern celestial pole, for as we recall from our previous review of ancient stellar cartographs, their center pivot always has been the northern celestial pole of the night sky, and this is true of the observation of the sun's and moon's ecliptics, as well. Therefore, just as we saw in the case of the ancient Mesopotamian and other constellational alignments, since the pivot of the heavens was the only center by which the astronomical events could have been measured, then these concentric and constitutional rectangles of Stonehenge appear to recreate in the heavenly mirror of the megalith this singular pivot, the rectangle found at the ancient northern celestial pole as that rectangle's lengths rotated to align perpendicularly with azimuth 49°54'40", the azimuth of the Avenue. The concentric circles of Stonehenge may in turn reflect the concentric circles found in and of the heavens, the inner circles built at various times recreating the stellar circle surrounding the polar quadrilateral at the pole itself and the circumferential circles representing the point of intersection of the sky and earth, or the domical heavenly canopy itself.

Therefore, the rectangle-in-circle construction of Stonehenge may reflect simply (1) the actual appearance of the night sky, and (2) that in making their cosmological or astronomical measurements the megalith's designers understood and employed the stationary, pivotal nature of the quadrilateral shaped by bright stars surrounding the northern celestial pole. Whether these ancient people attributed spiritual power to the pole and its rectangle is unknowable, but the

⁵⁵ Archaeologists conducting a recent dig at and study of Stonehenge in the summer of 2008, involving the first dig allowed at the site in over four decades, have proffered that Stonehenge was a ritual necropolis. There is nothing of this thesis incongruous with the position that the site served as a cosmologically oriented ritual center (see immediate below, this chapter, on the megaliths discovered recently at Gobleki Tepe in southeastern Turkey), though the evidence for the site's having been a necropolis is actually scanty and inconclusive. See Dan Jones, "New Light on Stonehenge," *Smithsonian* 39:7 (October 2008): <http://www.smithsonianmag.com/history-archaeology/light-on-stonehenge.html?c=y&page=1>.

unusual composition and centered position of the rectangular Altar Stone seem to indicate that this slab indeed served as the locus of ritual performed to the sun (and moon and stars) on what were for the ancient Britons quite apparently the most important days of their calendar. Considering that the Stonehenge designers and ritualists apparently intended to unify the night and day skies in their marking and celebration of the summer solstice, it is reasonable to conjecture that both solar and stellar polar gods were worshiped in the solstitial rituals.

Finally, in this description and analysis of the structures of Stonehenge, I have for the sake of clarity in referring to pertinent and valuable modern scholarly works maintained a reference to the "rectangle" *imagined* to be formed from the station and mound stones, although I have purposefully modified its description as a rectangle to express that it was never drawn or created in the structure of Stonehenge but only has been perceived by modern observers. That is, this "rectangle" does not actually exist, for its "corner" stones and mounds have never been connected linearly in the Stonehenge apparatus itself using constructions that follow straight lines. Rather, the station and mound stones all lie along the circumference of the Aubrey postholes near the perimeter of the Stonehenge circle, and they thus are connected only by arcs that together form the Aubrey circle. In order to recreate in our minds the true geometry that the station and mound stones establish, we really must deconstruct the rectangle and allow the arcs that already connect them to dominate our vision of the plan, simply because they are actually there. Doing this does not alter the fact that the station and mound stones together *seem* to align with the points on the horizon at which the winter and summer solstitial rising and setting sun appeared and disappeared c. 2500–2000 BC, but it does affect the way in which we can safely represent the 3rd-millennium BC builders' understanding and representation of the cosmos that they perceived.

In the end we see a geometry consisting simply of one rectangle placed at or near the center of a series of concentric circular / elliptical forms that, all composed of rectangular stones, together direct the internal viewer's sight down a purposefully constructed avenue that indicates the point on the horizon where in the 3rd millennium BC the summer solstitial sun rose. Then there is in Stonehenge only a recurrent series of rectangular stones set within or among concentric circles or ellipses, and they cannot be thought to represent in any way an ideal square

plane of earth described by the solstitial and equinoctial solar events. We cannot even be certain of the Altar Stone rectangle's original alignment during the 3rd and 2nd millennia BC: it could have aligned with the Avenue, or it could have been placed so that its lengths faced perpendicularly true north where lay a model rectangle pivoting at the northern celestial pole. We therefore remain in the dark about the true contemporary meaning of particularly the rectangular and ritually significant Altar Stone, but its placement at or near the center of the Stonehenge apparatus that itself was constructed of tens of rectangular megaliths, suggests that the Altar Stone mimics the identically rectangular stellar structure found at that time pivoting at the northern celestial pole and thus that it plausibly served as first a central anchor enabling measurement of other astral phenomena (and, most importantly, the sun's motions) and, given therefore its central significance, a ritual center devoted to propitiation of perceived gods of the sun and pole.

Over the past decade another series of megalithic structures, together constituting what seems to be a massive hilltop necropolis, has been partially unearthed in southeastern Turkey. German archaeologist Klaus Schmidt has uncovered several sets of large apparently ritual rings whose perimeters are marked by megalithic structures somewhat reminiscent of the trilithons of Stonehenge, though these are unilithons and bilithons.⁵⁶ What is striking is that all of the stones employed to build the ringing unilithons / bilithons — both the pillars and the lintels that rest atop them — were consciously cut and hewn each to form a rectangle (or, in the case of unilithons, the stone was cut to form a single shape whose two composite forms each constitutes a rectangle). Each of the unilithons and bilithons thus constitutes a "T" shape. (**Figures 12ab**)

⁵⁶ Klaus Schmidt, "Carved Creatures from the Dawn of Agriculture: Göbleki Tepe, Turkey," in Brian M. Fagan, ed., *Discovery! Unearthing the New Treasures of Archaeology* (London: Thames & Hudson, 2007): 180–183; and Andrew Curry, "The World's First Temple?" in *Smithsonian* 39:8 (November 2008): 54–60. Online at <http://www.smithsonianmag.com/history-archaeology/gobekli-tepe.html#>.

Figures 12ab. Figure 12a shows a ring of T-shaped lithons unearthed at Gobekli Tepe, Turkey. Figure 12b shows one of the T-shaped lithons, with an animal relief design carved into its upright. 12ab from Curry (2008): 54–60; and <http://www.smithsonianmag.com/history-archaeology/gobekli-tepe.html#>.



Figure 12a



Figure 12b

Repeated in several distinct but proximate locations on the hill of Göbleki Tepe, the circular rings formed in outline by several deliberately placed rectangularly formed T-shaped bilithons thus produce once again the familiar square-and-circle motif. Moreover, that these apparent ritual burial structures were astrologically or celestially inspired and oriented seems apparent not only in their hilltop location but also in the appearance on the flat sides of many of the bilithons' rectangular pillars of animal relief carvings that resemble very much similar artistic representations of constellationary animals in nearby Mesopotamia / Syria that date to the 2nd millennium BC. (**Figures 12b, 13**)

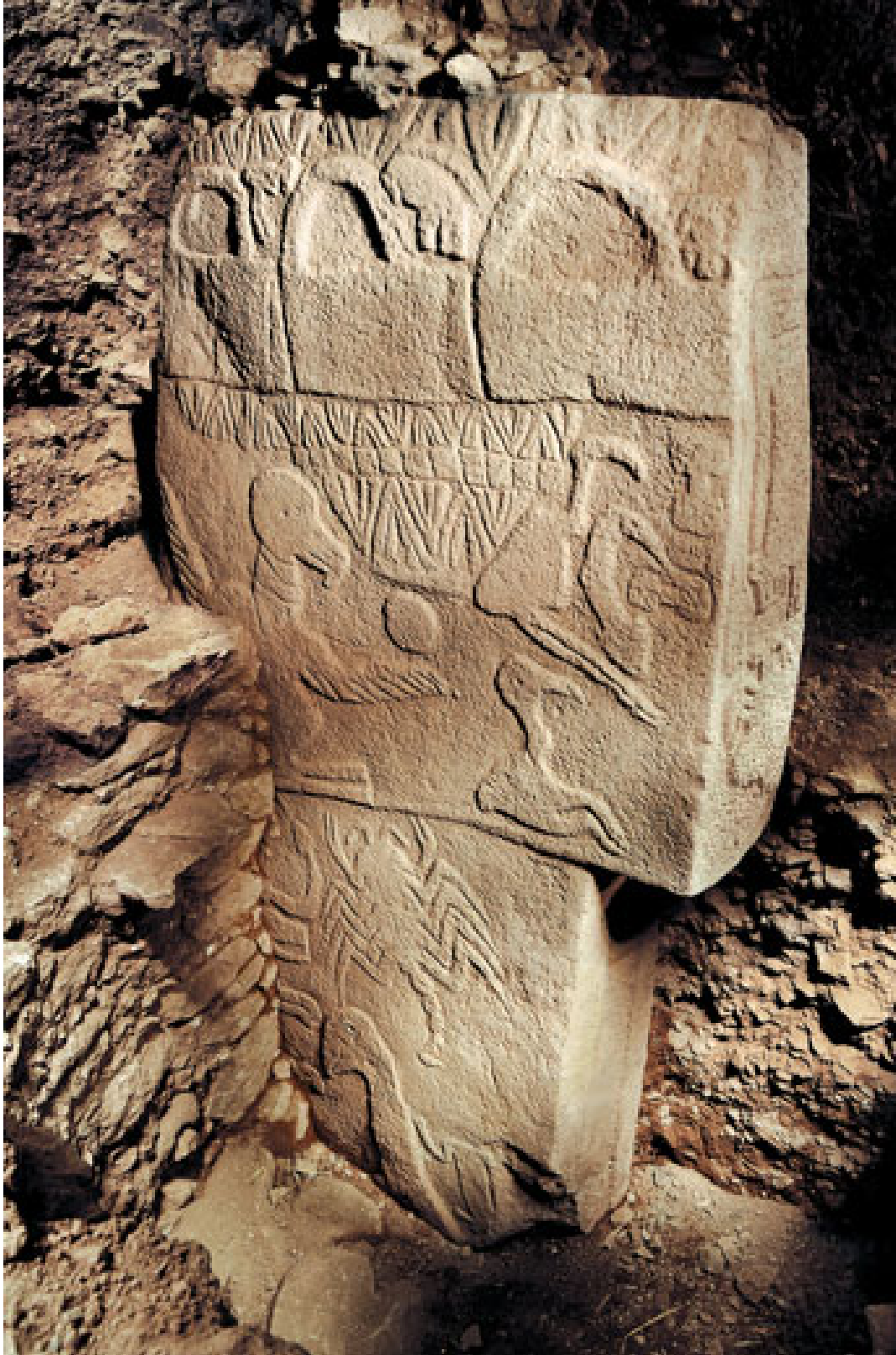


Figure 13. Animal relief designs on a lithon at Göbleki Tepe, Turkey. From Curry (2008).

Although Schmidt has, on the basis of the radiocarbon dating of material derived from peripheral and unrelated archaeological sites, dated the Göbleki Tepe rings to c. 10,000 BC, both the perfectly rectangular shapes of the lintels and pillars and the advanced artistry or design of the carved relief animal figures would have required a skill and labor intensity absolutely otherwise unknown — and, frankly, inconceivable — in 10,000 BC, or even 6000 BC for that matter. The artistry displayed in the creation of the animal figures in particular should date the bilitons and the necropolises to sometime during the 4th through 2nd millennia BC, which is, of course, precisely when other civilizations in Europe, Mesopotamia, India, and, as we shall see, China also represented their apparent worship of the polar godhead through the rectangular — and rectangle- / square-in-circle — design. Thus the insistence on the rectangular forms further dates the Göbleki Tepe hilltop necropolis to this period.

Therefore, we have through the recoveries at Göbleki Tepe garnered yet another example of a seemingly astrologically / astronomically oriented square-in-circle design that provides evidence that in the Neolithic world squares and circles, and particularly their combination, apparently constituted for humans on earth a formal expression by which to mimic or recreate the abode of the godly who resided in the sky — and particularly, it seems, the quadrilaterally shaped stellar pole — where, it may be, also were dispatched the spirits of guiding ancestors on the deaths of their human forms. Finally, the "T" shapes, formed from combining two rectangular shapes, that were emphasized in all of the Puebloan civilization and the Stonehenge and Göbleki Tepe sites may very well identically recreate the intersection of two apparent stellar lines at the Neolithic pole (see above, section on the Bull and Winged Gate motif), and in this they would relate directly to the cross form that appears ubiquitously in designs produced across the northern hemisphere among pre-urban and early-urbanizing societies. On the cross shape we will have more to say below.

We again find a rectangle situated lengthwise in the center of a cosmic circle in what has been called "The Dream of Mahâmâyâ," a 2nd-century-BC medallion carved on a sandstone column that depicts the mother of the Buddha, Mahâmâyâ, lying on a rectangular mat and

dreaming of the divine white elephant, the vehicle of Indra and Buddha's divine father, entering her womb.⁵⁷ (Figure 14)



Figure 14. *Dream of Mahâmâyâ* (2nd century BC), showing Buddha's mother dreaming of her impregnation in the rib by the divine elephant, vehicle of Indra, while lying symbolically on a rectangular mat in the center of the celestial sphere. From Snead (1989): 171, Plate 149.

⁵⁷ Stella Snead, ed., *Animals of the Four Worlds. Sculptures from India* (Chicago: Chicago UP, 1989): 171 (Plate 149).

We take note particularly of the rectangular form on which the dreaming mother lies as the god prepares to enter her ribs to provide the seed for the genesis of the great god Buddha. The rectangle, while apparently a simple mat, is more than a mat, for, virtually identical to the cases of the *kivas*, the Babylonian world map, and Stonehenge, the rectangle rests in the center of a cosmic circle, the lengths lying horizontally or perpendicular to the top of the depicted scene. Within the circle, i.e., the orb of the heavens, the divine elephant god approaches the dreaming woman lying on the rectangle. Buddha's mother's name, it should not be lost, means "Great Cosmogenic Impulse," the *mâyâ* of her name denoting the single power of the Absolute that generates all existence in the phenomenal world. Humans' collective dream, it has been said, is the Absolute's *mâyâ*;⁵⁸ thus, here the dreaming Mahâmâyâ symbolizes the process of creation sparked and powered by the quintessential energy of the Absolute. The divine elephantine father of Buddha, as the vehicle of Indra, represents the movement of the life pneuma of the cosmos into the fully phenomenal realm.⁵⁹ We must not forget, of course, that this elephantine symbol of the flow of the life force appeared as among the prominent gods on the Harappan tablets and therefore possesses a very ancient sacred significance (we note as well the presence in this scene of a modified form of the Harappan ritual censer, attesting to the RV IA and later Indian Vedic-based culture's having inherited from the Harappan civilization significant religious iconography and meaning that, in this instance, most likely derived in turn from the early Egyptian depiction of the northern celestial pole as a similarly shaped mooring post). Mother Mahâmâyâ, then, is the Creator herself, passing through her the creative *mâyâ* brought by Indra's elephantine vehicle, or agent. That she lies on the religiously pregnant rectangle in the middle of the cosmic circle of the heavens is very suggestive of the rectangle that rested in ancient times, when the RV IA religious stimulus for this illustrated story developed, at the northern celestial pole.

⁵⁸ On *mâyâ* see Heinrich Zimmer (ed. Joseph Campbell), *Myths and Symbols in Indian Art and Civilization* (Princeton: Princeton University Press, 1992): 23–57, 205–208.

⁵⁹ Zimmer (1992): 102–109.

The Square in Early Chinese Iconography: Questions of Origins and Transformations

It is uncertain whether some, much, or all of early Chinese representations of the quadrilateral in seemingly religio-politically potent iconographic symbolism originated either autochthonously or via diffusion from western and central Eurasian civilizations and cultures. However, reviewing such symbolism that arose in various cultures of the Chinese Neolithic and Bronze periods and the civilization of early-imperial China, it will become apparent that likely both processes, autochthonous development and exogenous influence, contributed consistently to the creation and transformation of Chinese quadrilaterally, or polar-, oriented iconography.

A critical example of the Bronze-period Chinese or proto-Chinese projection of power into the design of the square occurs in the Shang oracle-bone inscription (OBI) character whose cognate character in 3rd-century-BC and later Chinese small-seal (*xiaozhuan*) script is the character 巫 (in the *kaishu* script) now pronounced in Mandarin as *wu*. This Shang and early-Zhou character, 卂, which is both a cross shape and an implied and nearly completed square, often has been mistranslated as "shaman" following an interpretation of Zhou and later usage of the character *wu* 巫 (see above, Chapter 3, and below, Vol. II, Chapter 4, on the matter of the misapplication of Zhou to Shang understandings of these characters and thus also the entire religious orientation of the Shang). The Sinitic character 卂 appears to be none other than what in the West came much later to be known as the Cross Potent, or the Teutonic or Jerusalem Cross, as indicated by Victor Mair.

Professor Mair reconstructed a theoretical Shang-period pronunciation for this character of **m^yag*, which he traced to phonetic origins in PIE **magh-*.⁶⁰ The latter is a form reconstructed from several IE isoglosses whose essential meaning is to be able (to do something) and, therefore, also the power that one possesses as a result (or cause) of this capability. The English words *might* and *machine* are thought to have derived ultimately from this reconstructed PIE root, as are the words *magic* and its derivative *magician*, all of which words connote the

⁶⁰ Victor Mair, "Old Sinitic **M^yag*, Old Persian *Magus*, and English 'Magician'," in *Early China* 15 (1990): 27–47.

possession of an unusual power. PIE **magh-* also is the root of the Old Persian cognate *magus*, meaning both *magic* and those who possess the power of such magic, the Persian *magi*.⁶¹ Professor Mair theorized that the logical and appropriate translation of the Shang character **m^yag*, then, is, simply, "magician." He proffered that at the Shang court the **m^yag* were employed in positions similar to their contemporary Iranian (and often Zoroastrian) *magi*. The latter served professionally at the courts of any ancient Eurasian kings willing to employ their religious-ritual technical expertise.⁶²

Professor Mair's breathtaking thesis of the Iranian origin of the word that is represented by the Sinitic character, what we will along with Professor Mair refer to as **m^yag*, is intriguing, and indeed it appears to describe accurately one of the meanings of the character apparent in Shang OBIs — we shall revisit this matter in particular in Volume II, Chapter 4.

Aside from the OBI evidence that in his article Professor Mair brought to bear to ground his argument, his thesis found support in the contemporaneous but independent work of Rao Zongyi. Rao suggested that this character, Professor Mair's Sinitic (Shang OBI) **m^yag*, or the Western Cross Potent symbol (⚊), came to China from West Asian origins and, along with many other characters of basic geometric design, brought writing to China.⁶³ In separate papers Rao further recounted from earlier archaeologists' work the identification of the origins of both (1) the cross form in northern Iraq in the mid-6th millennium BC and (2) the related potent Eurasian religious symbol of the swastika in the area of the Dead Sea in the early 4th millennium BC. Both forms then spread from the Levant-Mesopotamia across Asia.⁶⁴ The swastika likely

⁶¹ Calvert Watkins, ed., *The American Heritage Dictionary of Indo-European Roots*, revised and edited 2nd edition (Boston & New York: Houghton Mifflin, 2000): 50.

⁶² Mair (1990): 35–39.

⁶³ Rao Zongyi, "Sichou zhi lu yinqi de 'wenzi qi yuan' de wenti" 絲綢之路引起的'文字起源'的問題, in *Mingbao yuekan* 明報月刊 25.9 (September 1990): 47–50. Indeed the swastika appeared in the western Yellow River corridor as early as the 3rd millennium BC, on artifacts of the Majiayao culture. See Boltz (2000): 10.

⁶⁴ The earliest known occurrence on a relic of the cross dates to c. 5500 BC at Halaf, in northern Iraq near eastern Turkey, while the earliest known swastika symbol appears on a stone scepter recovered from remains of the Teileilat Ghassul culture uncovered northeast of the Dead Sea; this artifact dates to c. 4000–3500 BC. See Jao Tsung-

was the origin of the ancient Cross Potent symbol and apparently also reached Harappan India by the 3rd millennium BC, where it appears as a cross on the Indus seals that we already know are religiously pregnant artifacts.⁶⁵

But why is any of this etymological theorizing and archaeological evidence relative to **m^yag*, the Cross Potent, and the swastika pertinent to our discussion of the origins of the parallelogram located at or near the northern celestial pole during the 5th through 2nd millennia BC? It is relevant because we can recognize both (1) how easily these square-based forms are transformed from or into an actual square (Indeed, long ago P. J. Loewenstein postulated an intimate connection between the swastika and Chinese magic squares⁶⁶), as we have seen previously in the case of the Puebloan Mound of the Cross, and (2) how both the cross and swastika themselves mimic the intersection of two imaginary lines at the ancient pole. Again, these celestial lines are, first, that drawn between the stars Alioth, Thuban, and Pherkad, and, second, the line defining in the Western astronomical tradition the tail of the serpent Draconis, which passes through the pole stars 11 Draconis (Thuban) and 10 Draconis, thus intersecting the Alioth-Thuban-Pherkad line perpendicularly. In Chapter 3 we noted how the Chinese of the 2nd century BC understood this latter line to represent both a dragon and the spear of the polar god Taiyi. Earlier in this chapter we saw as well how this ancient polar meridian appeared in the Mesopotamian bull and winged gate motif dating to the 3rd and 2nd millennia BC, where the meridian was portrayed as a lead rope held at each end by the high god An and his daughter Ishtar (Inanna). In this scene the meridian rope passes through the polar rectangle that rests on the back of a bull, the Dipper.

I (Rao Zongyi), "Questions on the Origins of Writing Raised by the Silk Road," *Sino-Platonic Papers* 26 (September 1991): 3–8.

⁶⁵ Rao Zongyi, "Shuo Swastika," in *Rao Zongyi shixue lunzhuxuan* (Shanghai: Shanghai guji chubanshe, 1993): 1–16. On the cross of the Indus seals and its identification with the swastika, see p. 6 of Rao's article.

⁶⁶ P. J. Loewenstein, "Swastika and Yin-Yang," *China Society Occasional Papers* (n.s.), no. 1 (London: China Society, 1942). On Chinese magic squares, see below, Volume III, Chapter 4.

As late as the imperial Han period in Chinese history (202 BC – AD 220) the square, often depicted within a circle, was a ubiquitous symbol of the potency of heavenly gods and spirits. Indeed, it symbolized directly heaven, the abode of the gods. Square-in-circle and square images derived from Han-period tomb reliefs that Hayashi Minao published some time ago provide instructive examples of the magical potency of the square-in-circle and square designs in early-imperial Chinese religious iconography. The images clearly show that the square-in-circle and square were magic shapes associated with heavenly spirits or gods.⁶⁷

Hayashi's interest in the images found in the tomb reliefs was less in the meanings of their specific shapes than in the presence of ritual space depicted thereby that was intended to invoke and host the spirits whom the tomb owner besought to offer his own spirit protection and assistance in the spirit's world of the dead. Thus Hayashi did not comment on the possible meanings of the particular square-in-circle design but rather linked up the presence of this space with similar objects found in Chinese graves from the 4th millennium BC and on. These items, *cong*, are important for our own purposes but will be discussed in detail below in Volume II, Chapter 2, in the context of the quest for the Neolithic source in China of the mimicking of the shapes formed from stars of the ancient pole. More pertinent to the present discussion are the squares within circles that surely signified spiritual and cosmogonic power during the early-imperial period.

One of Hayashi's illustrations shows a decorative "money tree" recovered from a tomb of the Latter Han period. On its branches are perched various gods. Most significant for us is the "money tree's" foliage, which takes the form most universally understood to represent coins of typical Qin and later imperial Chinese design — round with a square-cut open center. (**Figure 15**) The appearance of these square-in-circle "coin" designs in an obviously deeply religious context (as foliage on a tree that is home to spirits and carved on a wealthy person's tomb) offers a new, more meaningful backdrop to understanding the reason for this particular design of imperial Chinese coins that sustained for some 2,000 years. The square-in-circle was not a vague symbol of "heaven and earth" as has been assumed for over 1,000 years, the circle having since

⁶⁷ Hayashi Minao, "Chûgoku kodai no gyokki, sô ni tsuite," in *Tôhō Gakuhô* 60 (March 1988): 1–72.

circa 700 AD been believed to symbolize heaven and the square the earth. Nor was it original to the design of the coin. Rather, the design of the coin derived from the contemporary Qin-Han understanding of the geometry or cosmography of the magically potent spiritual world of, simply, heaven. Thus the design of the standard imperial Chinese coin originally was conceived to capture, through mimicry, the spiritual power of heaven. Then the trees on which these Han tomb designs appear should be termed not "money trees" but rather "heaven trees" or, derivatively, "spirit trees."

Figures 15a-c. Square-in-circle designs found on "spirit trees" in Han period tombs. From Hayashi (1988).

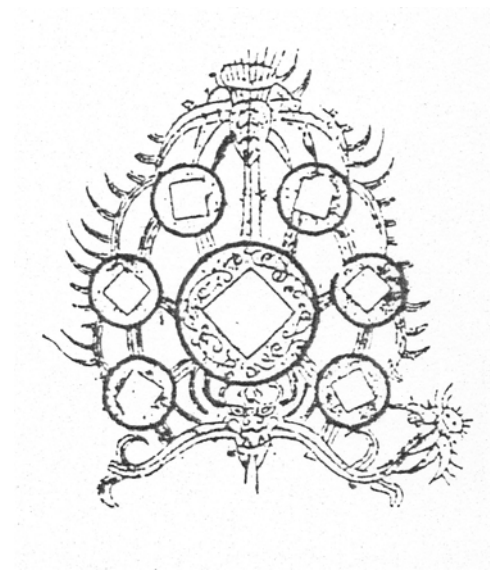


Figure 15a

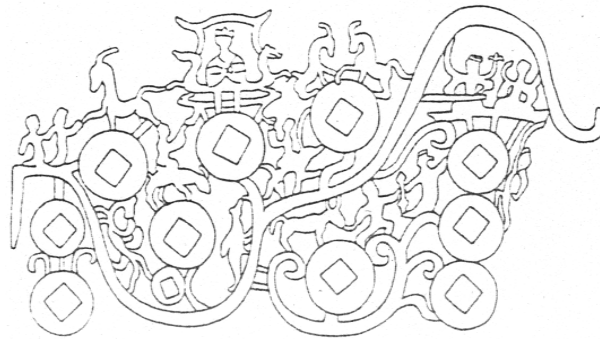


Figure 15b

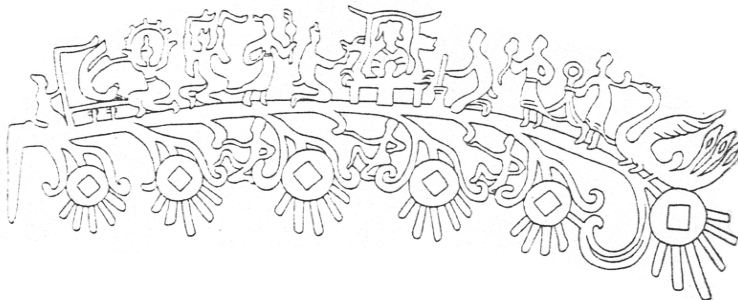


Figure 15c.

Hayashi also discovered on many tomb tiles similar designs that he considered to represent the ancient altar to the soil, or *she* 社. These designs depict animals, human figures, and other symbolic motifs placed above and below a circle within which can be seen a rectangle or square, out of which square grows upward a tree.⁶⁸ (Figure 16)

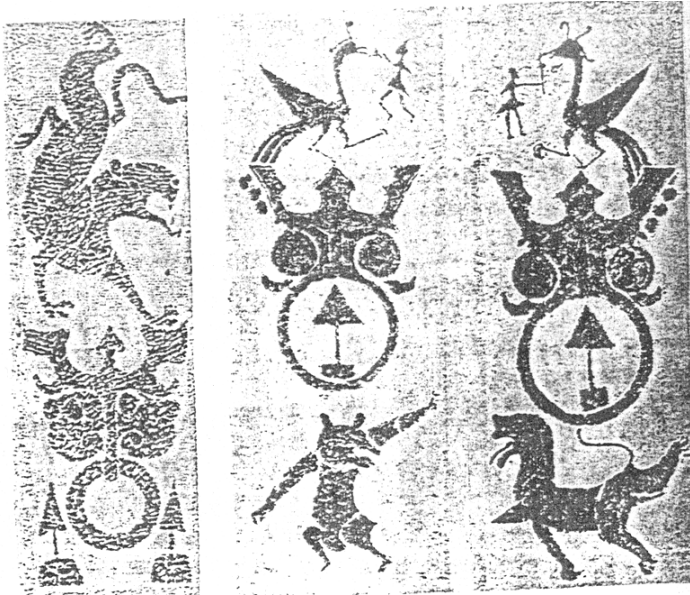


Figure 16. Religious symbolism surrounding the potent tree-and-square-in-circle motif that probably depicts the *she* 社 altar. From Hayashi (1988).

It is likely that the square / rectangle represents the mound of earth that constitutes the *she* altar itself. Therefore, the tree emerging from the square / rectangular earthen altar, like the money, or spirit, trees found within graves, is a religiously potent symbol of a spirit in that it depicts the ritual space occupied by the god of the *she* altar. Hayashi uncovered and reproduced many other tiles depicting again trees emerging from square bases, but in these cases they stand alone without their circular enclosure.⁶⁹ (Figure 17)

⁶⁸ *Ibid.*: 47, 55.

⁶⁹ *Ibid.*: 53.

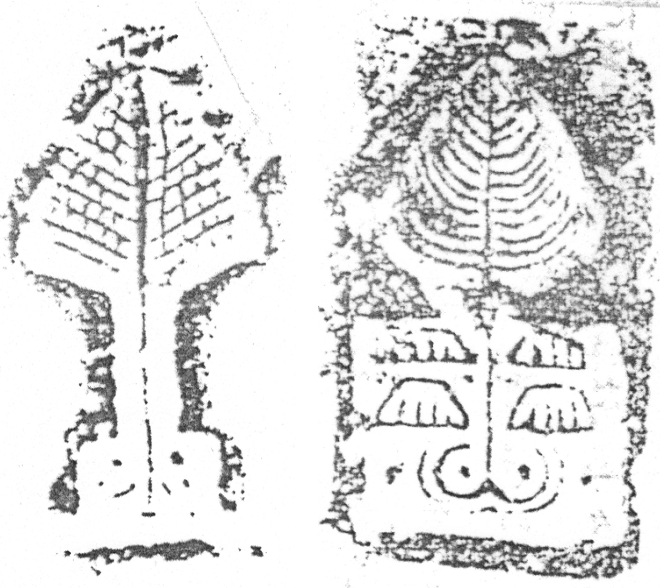


Figure 17. Han tomb reliefs showing what Hayashi understood to be a "tree of life" growing from a square that probably represents the she altar. From Hayashi (1988).

Then, very much as in other cultures across Eurasia and even the Americas, in China both the square-in-circle and its abbreviation in the simple square or rectangle served as symbols of heavenly or spiritual / magical power from as early as the Bronze and continuing through the early-imperial period. We will see in Volumes II and III that the symbolism of the quadrilateral, in particular, but also the square-in-circle motif, in fact seems to have maintained its heavenly symbolism in China from the Neolithic through about 200 AD.

Considering only the quadrilaterally designed shapes of ancient religious symbols found across Eurasia and the possible origins of what were their *Urforms*, the swastika in 5th-millennium-BC Southwest Asia and the stellar cross centering on Thuban that circumambulated the pole from the 5th millennium BC and on, we cannot know whether the essential cross or swastika design originated singularly in Southwest Asia to spread across Asia in subsequent millennia or multivalently and roughly coterminously across Eurasia from the 5th millennium BC and on. However, the particular design of the swastika suggests a singular, not multiple, origin, and thus we may surmise that this design spread from Southwest to East Asia between c. 5000 and 2000 BC.

In Chapter 1 we reviewed the irrefutable evidence of human movement and interaction across Eurasia from no later than the 4th and 3rd millennia BC, including (1) the movement eastward from the European steppe across Eurasia of such IE-language-speaking peoples (and probably including speakers of both Tocharian and forms of early Iranian) known to us archaeologically as the Anafasievo, Yamna, and Andronovo, and from their movements into Asia and interactions with the Mongoloid peoples of Asia (2) the ultimate development by circa the 7th–6th centuries BC of the pan-Eurasian nomadic pastoralist Skytho-Saka-Siberian technological and cultural complex, as well as through such movements across Eurasia of peoples over millennia's time (3) the importation to proto-Chinese Neolithic and later Bronze civilizations of the technologies of bronze-making by circa 2200 BC, chariots and writing by circa 1200 BC, and iron-making by circa 600 BC. We also have considered in Chapters 2 and 3 how (1) the mythologies of the bear and seven brothers / sages entered Chinese folklore sometime during and after the Palaeolithic, and (2) the Mesopotamian astronomically derived calendar consisting of seventeen zodiacal constellations spread to India c. 1000–900 BC and, after the seventeen star groupings were further divided by RV IA astronomers to become first twenty-seven and then twenty-eight, the complete set was transmitted to China by the middle to late 5th century BC. In Chapter 3 we further noted that it is possible, given the extensive human and technological evidence demonstrating that pan-Eurasian interactions had by 1200 BC already occurred for at least some 2000 years, that the primitive and inaccurate luni-solar calendar employed at the courts of both Babylonian and Shang kings of the 2nd millennium BC originated in Mesopotamia and had spread across Eurasia to be adopted by the Shang political center.

In the case of Eurasia, then, we must recognize that Campbell's diffusion model for explaining the appearance of his "Face of Glory" in sacred designs found across cultures of Eurasia must be acknowledged and allowed, and this is particularly so when we note that the essential outline shape of the Face of Glory is the quadrilateral. On the other hand, we cannot discount the possibility that the ancient recognition across Eurasia (and the Americas), mostly during the 4th through 2nd millennia BC, of the quadrilateral arose from independent and unconnected observations of and projections onto the stellar quadrilateral that was either

proximate to or dead-center on the pole during this same period. In fact, quadrilaterally organized artistic and religiously oriented motifs can be found among recovered proto-Chinese artifacts dating to the 4th millennium BC, which both perhaps predated any possible migration of a religious "tool kit" across Eurasia and probably antedated the Southwest Asian development of the tool kit itself.

In the following volume we will review how the old polar center of the late-Neolithic and Bronze periods seems to have found its way into Chinese conceptions of godliness, power, and the cosmos as reflected symbolically in art, architecture, and text. Among the central questions with which we will eventually, in Volume III, need to grapple is how and why the square or quadrilateral, which from the Neolithic through the early-Zhou period appears to have symbolized the high polar sky god and the power associated with it, came to represent during the Zhou and Han periods both broadly the active stellar space within the dome of the heavens and more narrowly human propitiation of the high gods of the heavens, and, later, how the square, after about the 2nd century AD, came gradually, by circa 700 AD, to symbolize singly the earth. The answer is complex and must await our having considered a great deal of evidence from Neolithic through Han times. But we can state here prior to the next stage of our investigation that the transference to earth of the power symbolism of the heavenly quadrilateral relied on not a direct transposition of symbolic meaning but a long, complex, and multivalent transformation that resulted from all of celestial, socio-economic, political, military, religious, and philosophical causes.

In addition to non-purposeful changes imputed by Zhou-period Chinese to the quadrilateral that very naturally led to the transference of that form's symbolic meaning from heaven to humanity to earth, we will witness also how by and after c. 550 BC the literate Chinese of the Eastern Zhou period recognized the loss of the meaning of the old center and consciously made an effort to discover new moorings around which they could reconstruct a unifying security. In the process they developed an abstract center that recalled the internal symbolic meaning of the old quadrilateral polar center but without any reference to the concretely visible apparition in the sky. Beginning with social-political philosophy in the late 6th century BC and

culminating by the 3rd and 2nd centuries BC in a theory that identified political unity with the personal cultivation of an absolute center, ironically during the Qin and early Han periods, or circa 221–100 BC, this new universally applicable abstract system of unity was rejoined with the continued physical application in ritual of the old center, the concretely visible polar quadrilateral, in a universal cosmology that justified political and personal unity under an empire that claimed universality. Ironically, it is very apparent that in this new imperial cosmology developed during the Han and adapted for use by the imperial court, the square retained its vaulted status and continued to represent throughout much of the Han both heaven's power and the channel of human communication with heaven. In both a figurative and real sense, through the approximately 1100 years of this process of reconfiguring the power of heaven's center for renewed use on earth, heaven's power had been brought down to earth to be employed not only in carrying out court ritual to heaven and earth but also ubiquitously among the earth's culturally Chinese population.

Below the study represented in Volume II presents Chinese Neolithic and Bronze artifacts on or in whose apparently divine pictorial representations and designs we can identify the magical power of the ancient northern celestial pole. In some cases the pole appears to be represented as a square; in others it is found as a combined circle-and-square design; in still others it is mimicked as a simple line, or a cross; and yet other designs, such as the dual arcs of an ungulate's horns, might follow from the pole, as well; finally, in the artifacts left by several cultures the stellar arrangements at the ancient pole appear to take many forms simultaneously, perhaps each form representing a distinct aspect of the pole.

Seemingly, in many or all such cases these designs symbolize or pictorialize the given culture's high godhead. From the Neolithic period, such gods appear to include those represented on ceramics and jades and in grave designs of the (1) Yangshao cultures of the upper Yellow River Valley (the old Northwest); (2) Dawenkou, Longshan, and Hongshan cultures of the Yellow River effluvial plain and east-northeast coastal areas of China; and (3) Songze and Liangzhu cultures of the middle coastal east (Shanghai region). On bronzes the face of what seems to be the god of the pole appears on artifacts produced by the Qijia, Erlitou, Shang, and

Zhou cultures. In addition, whether in OBIs or bronze epigraphs dating to the Shang and Zhou, the high generic gods of these cultures, Di and Tian, are represented, still displaying the polar rectangle, but now as logograms. The archaic or Sinitic characters employed to denote the high gods Di and Tian evolved quite simply — but in a very complex religious organization — from the rectangle at the pole. Finally in Volume II the meanings in Shang religion of the polar quadrilateral and its potent constructs will be analyzed such that a new theory of what the god Di really seems to have represented can emerge. It will be shown that in fact a heretofore largely unnoticed godhead known as Ding constituted the true pinnacle of spiritual power in the Shang religion.

During the long and complex Zhou period the primary godheads, Di and Tian, and especially the latter, along with the basic quadrilateral design from which they were formed, lost their physical heavenly referent and thus also their immediate value as linchpins of a polity centered on the old Zhou court. As this occurred, the identities of and relationships shared by Tian, Di, Ding, Taiyi, and other, newer, cosmological constructs had to be reconfigured to suit a sky in which the old polar quadrilateral no longer shone from the center. We will see in the final chapters of Volume III how all of these threads combine in a tightly woven yarn. This process will enable us to come to terms with squares, circles, heavens, humans, and the earth through their religious dimensions expressed during the early imperial period of the Qin and Han (221 BC – AD 220).

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