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Neurobiology, Layered Texts, and Correlative Cosmologies:

A Cross-Cultural Framework for Premodern History

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Introduction/Abstract

This theoretical paper combines neurobiological and textual evidence to develop a cross-cultural model of the evolution of correlative systems.[2] The paper argues that claims that correlative thought was in some way unique to China have seriously impeded comparative studies; known by other names, correlative tendencies were no less prominent (and were sometimes more extreme) in premodern India, the Middle East, the West, and Mesoamerica than in China. Below, we discuss some factors that have led to varying degrees of interest in correlative thought in different fields; arguments are given that parallel developments in correlative cosmologies provide a potent cross-cultural framework for premodern studies in general. Our model pictures the growth of "high-correlative" systems—multileveled reflecting cosmologies, nested hierarchies, abstract systems of correspondences, and similar developments—as byproducts of exegetical processes operating in layered textual traditions over extended periods; the origins of primitive correlative thought and related animistic ideas seen at the earliest levels of those traditions, "worked up" abstractly in later strata, are tied in our model to neurobiological data. The union of neurobiological and textual evidence reviewed in our paper allows the construc-

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[2] For anticipations of some topics discussed below, see S.A. Farmer, *Syncretism in the West: Pico's 900 Theses (1486): The Evolution of Traditional Religious and Philosophical Systems* (Tempe, Arizona: Medieval & Renaissance Texts & Studies, 1998); John B. Henderson, *The Development and Decline of Chinese Cosmology* (New York: Columbia University Press, 1984); *Scripture, Canon, and Commentary: A Comparison of Confucian and Western Exegesis* (Princeton: Princeton University Press, 1991); and *The Construction of Orthodoxy and Heresy: Neo-Confucian, Islamic, Jewish, and Early Christian Patterns* (Albany: SUNY Press, 1998); Michael Witzel, *On Magical Thought in the Veda*, Inaugural Address, University of Leiden (Leiden: Universitaire Pers, 1979); "Macrocosm, Mesocosm, and Microcosm: The Persistent Nature of 'Hindu' Beliefs and Symbolic Forms," *International Journal of Hindu Studies* 1(13) (December, 1998): 501–53; and 'The Development of the Vedic Canon and its Schools: The Social and Political Milieu," in Michael Witzel, ed., *Inside the Texts, Beyond the Texts: New Approaches to the Study of the Vedas*, Opera Minora, Vol. 2 (Cambridge: Harvard Oriental Series, 1997), 256–345. See also the further collaborative study referenced in note 15.

tion of evolutionary models of the growth of premodern religious and philosophical systems, most of which acquired elaborate correlative features over time; the model links fluctuations in these developments to shifts in literate technologies and other factors affecting premodern textual flows. Part of our paper describes novel methods for studying these developments in a broad class of computer simulations; to our knowledge, ours is the first theory of the evolution of religious and philosophical ideas capable of being implemented and partially tested in such simulations.[3] The conclusion of our paper discusses a number of historical tests of our model; special emphasis is placed on challenges the model raises to popular claims that extensive manuscript traditions existed in the later Shang and Western Zhou dynasties—or, even earlier, in ancient India's oldest civilization, in the Indus Valley.

A brief cross-cultural survey of correlative systems

Ever since the publication of Marcel Granet's *La Pensée chinoise*, in 1934, specialists on premodern China have paid close attention to what Joseph Needham was to later label "correlative thinking"—referring to a general propensity to organize natural, political/social, and cosmological data in highly ordered arrays or systems of correspondence.[4] While the most intense discussion of correlative thought has occurred in Chinese studies, similar tendencies can be identified in every traditional civilization known. Correlative structures show up world wide in premodern magical, astrological, and divinational systems; in the designs of villages, cities, temples, and court complexes; in abstract orders of gods, demons, and saints; in formal numerological systems; in hierarchical and temporal cosmologies; and in many similar phenomena. The idea that reality consists of multiple "levels," each mirroring all others in some fashion, is a diagnostic feature of premodern cosmologies in general; tracing this idea from its primitive origins to its modern decline is one of the major challenges faced by specialists in premodern thought.

One of the simplest forms of correlative thought lay in the realistic links typically posited between objects and words or visual symbols in primitive magical-ritual systems; the cross-cultural similarities in those systems suggest that the deepest roots of correlative thought lay in neurobiological processes, a point to which we will return. Establishment of word-object correlations was guided by matters of gross resemblance and intense etymological speculation; classic examples are found in early divinational treatises like the *Yijing* or in the magical formulae of the *Atharvaveda*

[3] A fuller technical report on those simulations can be downloaded as a PDF file from **http://www.safarmer.com/simulations.pdf**.

[4] Key studies include Marcel Granet, *La Pensée chinoise* (Paris: La Renaissance du livre, 1934); Joseph Needham, *Science and Civilisation in China*, Vol. 2: *History of Scientific Thought* (Cambridge: Cambridge University Press, 1956); Manfred Porkert, *The Theoretical Foundations of Chinese Medicine: Systems of Correspondences* (Cambridge: MIT Press, 1973); Henderson, *Development and Decline* (1984); A. C. Graham, *Yin-Yang and the Nature of Correlative Thinking* (Singapore: Institute of East Asian Philosophies, 1986) and *Disputers of the Tao* (La Salle, Illinois: Open Court, 1989), 313–82; Richard J. Smith, *Fortune-tellers and Philosophers: Divination in Traditional Chinese Society* (Boulder: Westview Press, 1991); John Major, *Heaven and Earth in Early Han Thought: Chapters Three, Four, and Five of the Huainanzi* (Albany: SUNY Press, 1993); Nathan Sivin, "State, Cosmos, and Body in the Last Three Centuries B.C.," *Harvard Journal of Asiatic Studies* 55(1) (June, 1995): 5–37; Aihe Wang, *Cosmology and Political Culture in Early China* (Cambridge: Cambridge University Press, 2000). See also note 18 on the views of Granet's teachers Durkheim and Mauss, and note 13 for two of Bernhard Karlgren's classic papers in the *BMFEA*, which have heavily influenced later studies of correlative thought.

and Egyptian funereal texts. While a number of motifs show up globally in correlative systems—including heaven/earth distinctions, astrological correspondences, and man-the-microcosm concepts—ethnographic field studies suggest that the detailed contents of those systems typically arose from idiosyncratic shamanic and/or dream experiences; the result is that it is impossible to predict the exact forms of correlative thought that emerge even in primitive societies existing in nearly identical ecological and social conditions.[5] One object of this paper is to illuminate the mechanisms that helped stabilize different types of correlative systems in stratified textual traditions.

Increasingly abstract correlative systems, often associated with primitive dichotomies (Brahman/Ātman, heaven/earth, yin/yang, limited/unlimited, being/becoming, etc.) began to take shape throughout the Old World in early periods of textual expansion in the last half of the first millennium BCE; frequently the mythic origins of these dualistic orders can be detected not far beneath the surface.[6] Almost upon formation, these orders began fusing with more elaborate systems of correspondences relating directions, colors, sounds, tastes, smells, ritual meters, social/political orders, virtues, vices, gestures, and similar phenomena. These systems typically grew quickly through fusions with abstract enumeration orders emerging in the same era—including the *wuxing* or "five phases" in China, the four element and humor models in the West, and the three humor model in India. Typically, an originally broader range of competing orders—including, for example, five or six or even more elements—was stabilized within a few centuries into more or less standard regional sets. We will argue later that the combined action of repetitive exegetical and dissipative forces in layered textual traditions predictably led to stabilization of this sort; by the end of the first millennium BCE, these forces had already generated deep "path dependencies" in traditions that would influence cultural developments in broad geographical regions for thousands of years.[7]

By the early common era, the dominant types of correlative systems had already emerged that would guide cosmological thinking throughout traditional times. Increasingly complex scholastic systems continued to develop within the limits defined by these frameworks from late-ancient through early-modern history. Prominent byproducts included so-called Neo-Confucian and Neo-Platonic systems and related structures in post-classical Daoist, Buddhist, Hindu, Jewish, Islamic, and Christian thought; correlative systems of similar if less abstract types also evolved in heavily layered pre- and post-Columbian Mesoamerican traditions. These systems tended to emerge most rapidly in times of political integration or broadened foreign

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5 See, e.g., Fredrik Barth's groundbreaking study of ritual variation in neighboring tribes in New Guinea, *Cosmologies in the Making: A Generative Approach to Cultural Variation in Inner New Guinea* (Cambridge: Cambridge University Press, 1987); Barth's work undermines socially deterministic models of the sort associated with Durkheim, Mauss and their followers, including Granet (but cf. here also note 18). On the role of dreams in generating these systems, see Michele Stephen's study of the remarkable Mekeo tribes of New Guinea, *A'aisa's Gifts: A Study of Magic and the Self* (Berkeley: University of California Press, 1995).

6 For one study of cosmological developments involving dualistic concepts of this sort, see Holger Thesleff, *Studies in Plato's Two-Level Model*, Commentationes Humanarum Litterarum 113 (Helsinki: Societas Scientiarum Fennica, 1999).

7 The concept of path dependencies is closely related to general models of complex systems discussed later in this paper; the concept originally arose from studies of similar stabilizing forces in the evolution of economic systems. See W. Brian Arthur, "Competing Technologies, Increasing Returns, and Lock-in by Historical Events," *Economic Journal* 99 (1989): 642–65 and "Complexity and the Economy," *Science* 284 (2 April 1999): 107–09. These and closely related studies can be downloaded from **http://www.santafe.edu/arthur/Papers/Papers.html.**

contact or in harmony with developments in literate technologies that accelerated textual flows. In the most advanced traditions, repeated syncretic fusions of sources over long periods eventually led to the emergence of systems with highly exaggerated correlative properties (known in mathematics as "self-similar" or "fractal" structures) in which every part of the cosmos was said to mirror every other. The links between the development of extreme high-correlative systems and syncretic processes is suggested by the fact that similarly structured systems emerged in China, India, the Middle East, Europe, and Mesoamerica whenever information flows increased and tendencies to harmonize traditions reached extremes.

By late-traditional times, abstract correlative systems were often embodied in charts whose structures are remarkably similar to those seen in modern periodic tables; direct influences can, in fact, sometimes be traced between their premodern and their modern forms. One extreme Western chart, dating from the end of the traditional era, is shown in **Figure 1**. Similar if less extreme examples, organized in temporal as well as hierarchical fashions, show up regularly in the evolving literate traditions of premodern China, India, the Middle East, and Mesoamerica.

Studies of correlative systems outside Sinology

A large body of evidence demonstrates that correlative systems evolved in similar ways in different world civilizations. This suggests that comparative study of those systems might provide a cross-cultural framework for modeling the evolution of the religious and philosophical ideas embedded in those systems, whose structural similarities are masked by differing scholastic terminologies. Unfortunately, correlative systems have never been investigated in other fields with the same intensity seen in Chinese studies, with the result that comparative research of this sort remains badly undeveloped.

Raw materials on which to build such a framework are not lacking. Especially rich evidence on the early stages of high-correlative thought survives in early Vedic traditions, preserved in heavily layered texts from the middle third of the first millennium BCE that vastly outnumber extant Chinese and Greek sources from the same period. Correlative ideas in Vedic traditions, often (but not exclusively) referred to as "*bandhus*" (*bandhu* = relation, bond, connection, etc.) have been discussed by a long line of Indologists including Lévi, Oldenberg, Schayer, Belvalkar and Ranade, Renou, Gonda, Benke, Parpola, Witzel, Smith, Wezler, and Olivelle.[8]

[8] On what we can term correlative thought in Vedic traditions, see, e.g., Sylvain Lévi, *La Doctrine du sacrifice dans les Brāhmaṇas* (Paris: Ernest Leroux, 1898), esp. 10–12; Hermann Oldenberg, *Vorwissenschaftliche Wissenschaft: Die Weltanschauung der Brāhmaṇa-texte* (Göttingen: Vandenhoeck & Ruprecht, 1919); Stanislaw Schayer, "Die Struktur der magischen Weltanschauung nach dem Atharva-Veda und den Brāhmaṇa-Texten," *Zeitschrift für Buddhismus* 6 (1925): 259–99; S.K. Belvalkar and R.D. Ranade, *History of Indian Philosophy: The Creative Period*, Vol. 2 (Poona: Belvakunja Publishing House, 1927); Louis Renou, "'Connexion' en védique, 'cause' en bouddhique," in *Dr. C. Kunhan Raja Presentation Volume* (Madras: Adyar Library, 1946), 55–60; Jan Gonda, "Bandhus in the Brāhmaṇas," *Adyar Library Bulletin* 29 (1965): 1–25; A. Benke, "Die Magie in der Brāhmaṇa-Zeit" (M.A. Thesis, University of Erlangen, 1976); Asko Parpola, "On the Symbol Concept of the Vedic Ritualists," in *Religious Symbols and their Functions*, ed. H. Biezais (Stockholm: Almqvist & Wiksell, 1979), 139–53; Witzel, "On Magical Thought in the Veda" (1979) and "Macrocosm, Mesocosm, and Microcosm" (1998); Brian K. Smith, *Reflections on Resemblance, Ritual, and Religion* (Oxford: Oxford University Press, 1989); A. Wezler, "Zu den sogenannten Identifikationen in den Brāhmaṇas," in Festschrift Paul Thieme, *Studien zur Indologie und Iranistik* 20 (1996): 485–522; Patrick Olivelle, intro. to his translation of the Upaniṣads (Oxford: Oxford University Press, 1996), lii–lvi.

Figure 1. A late-traditional European cosmological chart illustrating some typical cross-cultural features of high-correlative systems. The chart is composed of one hundred cells set out in ten columns and rows. The ten vertical columns represent ten orders of reality, beginning with the divine realm on the left and ending on the right with the "realm" of colors. Each row in each column represents a different hierarchical level in its order, ranging from the archetypal and perfect order at the top to the least perfect at the bottom. The whole is meant to illustrate the "sympathetic harmony" that magically unites the cosmos; movement horizontally through any row takes you through corresponding elements in different orders that are correlatively linked. Thus in the fifth row from the bottom we find cosmic correspondences between the order of angels known as "Powers," the sun, the metal gold, the "stone" iron pyrite (fool's gold), the sunflower, the lotus tree, dolphins among sea animals, cocks among flying creatures, lions among quadrupeds, and gold among colors. On the far left, each hierarchical division in the universe is related to a different musical scale in a quasi-Pythagorean manner. Similar mathematical and harmonic principles show up in non-Western cosmological charts, organized in temporal as well as hierarchical fashions. Charts like these were widely used for magical-medical purposes in Europe as well as for contemplative ends, as they were in China and elsewhere in the Old World. Similar schemas were manifested in verbal form in hundreds of scholastic traditions stretching from the last centuries BCE to early modern times in China, South East Asia, India, the Middle East, and the West. Primitive charts of the same general type can also be found in various literate Mesoamerican traditions. From R. Fludd, *Utriusque cosmi maioris scilicet et minoris metaphysica, physica atque technica historia, in duo volumina secundum cosmi differentiam divisa* (Oppenheim, 1617–21).

Claims have been made that all of Vedic philosophy depended on what Sinologists would immediately recognize as "correlative thought"—although Indologists do not use that phrase—emerging in increasingly complex and abstract forms in successive strata of tightly linked Brāhmaṇas, Āraṇyakas, Upaniṣads, and Sūtras in Vedic traditions; indeed, as Renou argued decades ago, the original meaning of *upaniṣad* was "connection" or "equivalence"—which we could just as correctly translate as "correlation"!—and "the aim of the whole of Vedic thought may be expressed as the

attempt to formulate *upaniṣads*."[9] Nevertheless, study of the exegetical processes that generated *bandhus* or *upaniṣads* has attracted virtually no interest in the field, following the distaste expressed by nineteenth-century Indologists for the exegetical discussions in the Brāhmaṇas and related texts, in which India's earliest high-correlative systems were shaped. Dismissals of the "irrationalities" and "absurdities" of these discussions can be found in a long line of researchers stretching from F. Max Müller (epitomized in his famous "twaddle of idiots" remark) to Sylvain Lévi, Arthur Macdonell, Julius Eggeling, Arthur Berriedale Keith, and Frits Staal.[10] Nowhere have the connections between these exegetical discussions and attempts to "formulate *upaniṣads*" been studied in detail. This is particularly unfortunate, since exegetical reworkings of stratified texts can be traced far more easily in Vedic traditions, whose textual strata have been recognized for over 150 years, than they can in either Chinese or Greek sources, in which the concept of textual layering itself is still often viewed as controversial.[11]

In any case, abundant materials are available to study the emergence of high-correlative systems in Vedic sources—providing useful models for studies of similar processes in early Chinese and Greek traditions, for which we possess far fewer sources. By the middle of the first millennium BCE, at the latest, we find elaborate high-correlative systems emerging in Vedic traditions as exegetes struggled to harmonize heavily layered ritual texts passed on from earlier eras. To cite just one example: In later strata of the *Taittirīya Brāhmaṇa*, apparently dating from early in the second half of the millennium, we find elaborate lists of *bandhus* in which each Vedic god is systematically correlated with unique numbers, consorts, ritual meters, directions, seasons, hours of the day, priestly orders, oblations, sacrificial animals, and similar phenomena. The correlations found here and in other texts of the period are significantly more detailed than classic examples of early correlative thought in high-syncretic Chinese treatises like the *Lüshi chunqiu* (The Spring and Autumn of Mr. Lü), completed on the eve of China's unification in the latter part of the third century BCE.[12] Similar correlations are even more fully developed in Vedic Upaniṣads and Sūtras from the last half of the millennium, which exegetically "worked up" (as Karlgren put it for his Han dynasty "systematizers"[13]) earlier traditions in even more abstract directions. Correlative systems of still greater complexity, especially rich in numerological associations, are found in early Buddhist and Jainist texts compiled near the close of the millennium.

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9 Louis Renou, *Religions of Ancient India* (New York: Schocken Books, 1968), 18; cf. Smith, *Resemblance, Ritual, and Religion*, 31–32, and Olivelle, "Introduction," lii, n. 28).

10 Cf. Witzel, "On Magical Thought in the Veda"; for summaries of the views of some of these later writers, see Smith, *Resemblance, Ritual, and Religion*, 32 ff.

11 On this issue in Chinese traditions, see, e.g., the discussions in E. Bruce and Taeko Brooks, *The Original Analects: Sayings of Confucius and His Successors* (New York: Columbia University Press, 1998). Resistance to the idea of textual layering is even stronger in Greek studies, where challenges to the traditional authorship of heavily stratified works like the Aristotelian and Platonic corpora have been largely taboo since Werner Jaeger's day. For discussion, see Farmer, *Syncretism in the West*, 27–28, n. 72.

12 [*Lüshi chunqiu*], *The Annals of Lü Buwei*, with trans. by John Knoblock and Jeffrey Riegel (Stanford: Stanford University Press, 2000).

13 Bernhard Karlgren, "Legends and Cults in Ancient China," *Bulletin of the Museum of Far Eastern Antiquities* 18 (1946): 199–365; "Some Sacrifices in Chou China," *Bulletin of the Museum of Far Eastern Antiquities* 40 (1968): 1–32.

By the early common era, centuries of reworkings of these layered texts had given birth to high-scholastic systems of extraordinary elaboration. These developments are beautifully illustrated in the intricate logical-mystical constructs of the massive seventh book of the Buddhist *Abhidhamma Piṭaka*, which far surpasses in complexity (and obscurity) any extant Chinese or Western scholastic treatise from the same era.[14] Correlative systems of the same general type as those seen in post-classical Daoism in China, or in contemporary gnostic, Neo-Pythagorean, or Neo-Platonic traditions in the West, can be studied in later strata of the Mahābhārata and Purāṇas, in countless tantric and maṇḍala sources, and in late-ancient and medieval scholastic systems subdivided (just as elsewhere in the Old World) into a profusion of warring "schools." Fresh developments in these systems continued to appear up through the Mughal period, exhibiting structural features similar to those seen in contemporary high-syncretic systems from the European Renaissance or Ming dynasty. These parallel developments can be simply explained by the fact that those systems arose from integrations of layered traditions whose temporal depth and complexities were of roughly the same magnitude in each previous stage of history, stretching from the mid first millennium BCE until early modern times.[15]

But, for reasons noted earlier, while *bandhus* and *upaniṣads* in Indian traditions have been discussed continuously since the nineteenth century, the importance assigned to correlative thought by Indologists has never approached the levels found in Chinese studies, hampering the comparison of cosmological developments in the two civilizations.

Historical fashions have limited discussions of correlative systems even more drastically in Western thought. The fact that correlative systems were being elaborately developed in Greece by the fourth century BCE—the same period in which we find major developments in those systems in India and China—is evident from many sources. Even well-known texts like the Aristotelian *Metaphysics* (Book I, 986a23 ff.) provide unambiguous reports of abstract charts of correspondences remarkably similar to those known from slightly later in China. The Pythagoreans, the *Metaphysics* tells us, claim that

> . . . there are ten principles, which they arrange in two columns of cognates—limited and unlimited, odd and even, one and plurality, right and left, male and female, resting and moving, straight and curved, light and darkness, good and bad, square and oblong.[16]

[14] For a heroic attempt at translation, see U. Nārada Mūla Paṭṭhāna Sayadaw, assisted by Thein Nyun, trans., *Conditional Relations (Paṭṭhāna). The Chaṭṭhaṅgāyana Text of the Seventh Book of the Abhidhamma Piṭaka* (London: Pali Text Society, 1969, 1981), 2 vols. The extreme complexities of these early scholastic systems suggest that textual flows in the regions of South Asia in which they were compiled were anomalously high or, more likely, that they arose from intense inbreeding of sources in "closed" monastic conditions.

[15] Some of these parallels are treated in Henderson, *Development and Decline*, chapt. 1, 40 ff., and Farmer, *Syncretism in the West*, chapt. 2, 74–96. A fuller treatment of this issue is found in a working paper on which part of the present article is based: Steve Farmer, John B. Henderson, and Peter Robinson, "Commentary Traditions and the Evolution of Premodern Religious, Philosophical, and Cosmological Traditions: A Cross-Cultural Model" (1997, 2002). A PDF file of the paper can be downloaded from **http://www.safarmer.com/model.pdf**. Cf. also José Ignacio Cabezón, ed., *Scholasticism: Cross-Cultural and Comparative Perspectives* (Albany: SUNY Press, 1998).

[16] Following here the standard Oxford translation. The *Metaphysics* ascribes these ideas to Alcmaeon of Croton, who lived in the fifth century BCE; however, extant fragments ascribed to Alcmaeon contain nothing remotely this abstract; hints in the same passage of the *Metaphysics* suggest that these charts were probably the work of fourth-century commentators "working up" far less abstract concepts in the Pythagorean subtradition associated with Alcmaeon's name.

Broader correlative systems grew rapidly in the following centuries in Stoic and gnostic sources, Neo-Pythagorean and Neo-Platonic traditions, Hermetic and Orphic texts, and in a wide range of astrological-magical, medical, and mystical sources. These ancient correlative systems reached their heights of complexity in the high-scholastic traditions of post-Plotinian Neo-Platonism (identified with such figures as Iamblichus, Porphyry, Syrianus, and Proclus) and closely related Aristotelian commentaries (ascribed to Alexander of Aphrodisias, Themistius, and Simplicius, etc.), compiled from the second through sixth centuries CE. The exegetical origins of these systems are underlined by the fact that their most extreme developments can be traced to attempts to harmonize discordant strata in the Platonic or Aristotelian corpora. But once again, modern discussions of these systems have focused on other features than their exegetical origins or correlative properties, obscuring their connections to similar high-correlative systems emerging in exactly the same period in India and China.

It is only in late-medieval and Renaissance studies that we find extensive discussions of "systems of correspondences" in Western thought. But even here, the literature rarely associates these systems deeply with their ancient antecedents, let alone with non-Western traditions, which are rarely discussed (or even mentioned) by specialists in these fields. The whole apparatus of correlative thought was clearly implied in the so-called great chain of being, popularized by Lovejoy in lectures delivered one year before Granet's work went to press.[17] But Lovejoy heavily stressed the hierarchical and "rational" sides of Western cosmology over its correlative or "organic" components—skewing the data in opposite directions from Granet and reinforcing old romantic myths, backed by both writers for different ends, concerning deep East/West divides.[18] Outside the exceptions already noted, so little has been made of correlative thought in the West that Needham, in one of his most sublime Sinophilic moments, could seriously claim that all but the most "primitive" forms of Western correlative thinking were a Chinese import, adopted wholesale in the "philosophy of organism" he associated with Leibniz's monadology.[19]

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[17] Arthur O. Lovejoy, *The Great Chain of Being: A Study of the History of an Idea*. The William James lectures delivered at Harvard University, 1933, by Arthur O. Lovejoy (Cambridge: Harvard University Press, 1936).

[18] While Granet romanticized about a timeless Chinese "Sagesse" opposed to Western "Raison" (*La Pensée chinoise*: e.g., 27–28), Lovejoy ignored China entirely and dismissed the "illusionism" and extreme "other worldly" views he associated with Indian thought as "plainly the extremest kind of nonsense" (1936: 30). Granet's stress on the unique development in China of correlative thought arose from Durkheimian views "run amok," as Henderson (*Development and Decline*, 7) puts it—based on the view that Chinese ideas "dépend très strictement de l'évolution sociale" (1934: 26–7), and linked to the implied assumption that each civilization gives birth to its unique forms of thought. Surprisingly, while Granet (p. 29 note) credits his views to Durkheim and Mauss in *Primitive Classification*, a rereading of the sections of that work on China shows Granet's teachers abandoning their accustomed social determinism to insist that systems of correspondences were independent of *any* form of social organization—pointing to examples in Greece, Mesopotamia, Egypt, India, and elsewhere in Asia no less than in China. See chapt. 4 in Émile Durkheim and Marcel Mauss, "De quelques formes primitives de classification: contribution à l'étude des representations collectives," *Année Sociologique* 6 (1901–2), Paris, 1903: 1–72; trans. by Rodney Needham as *Primitive Classification* (Chicago: University of Chicago Press, 1963). It was hence Granet, and not Durkheim or Mauss, who was most responsible for the persistent myth that correlative thinking was a peculiarly Chinese phenomenon. On some further distortions of Chinese thought in Western scholarship, see Zhang Longxi, "The Myth of the Other: China in the Eyes of the West," *Critical Inquiry* 15 (1) (Autumn, 1988): 108–31.

[19] Needham, *Science and Civilisation*, Vol. 2, 292–303. On 2000 years of Western antecedents to Leibniz's monadology, see *Syncretism in the West*, 85–89.

The result of these conflicting tendencies in Chinese, South Asian, and Western scholarship is that specialists have yet to exploit the powerful cross-cultural framework that studies of correlative systems can provide for premodern research. Correlative thought has been intensely discussed by Sinologists since Granet's day, but with little regard for its deepest foundations (leaving aside Graham's forays into old structuralist models), and none for the exegetical processes involved in its development. Correlative systems have been studied piecemeal in premodern India and the West, but without concern for their cross-cultural properties or their links to layering processes in textual traditions. Similar remarks can be added in respect to studies of early correlative systems in ancient Egypt or Mesopotamia, or in Mesoamerica, which (especially now that Maya sources are being deciphered) offer abundant materials for study of the evolution of correlative thought in literate New World civilizations.[20]

In the rest of this paper we will briefly examine the neurobiological grounds of correlative thought and closely related animistic-religious ideas; we will then consider the ways in which high-correlative systems "worked up" those ideas in later textual traditions. One of the implications of the model introduced below is that it is useful in many ways to approach premodern thought as a unified field: It is critical for Sinologists to be familiar with Indological issues, Western specialists with Mesoamerican studies, and all premodernists with some basic neurobiological principles. As suggested below, a unified approach to these fields provides unexpected insights into the evolution of correlative systems—approached globally and not just in premodern China.

Neurobiological foundations of correlative systems

With the exception of A. C. Graham's studies from the 1980s, which attempted to link correlative thought to old structuralist theories (drawing on Saussure, Jakobson, and Levi-Strauss, etc.), discussions of correlative systems have usually ended at the purely descriptive level. Those systems have also typically been discussed statically, ignoring the fact that those systems evolved at vastly accelerated rates in specific periods—e.g., throughout much of the Old World in the last half of the first millennium BCE (in the so-called axial age) and in later high-scholastic eras. Both these limitations can be overcome when those systems are approached from neurobiological and historical perspectives.

Even a quick look at the neocortex (or simply cortex)—the thin outer brain layer responsible for all high-level perceptual, motor, emotional, and cognitive processing—underlines important links between brain architecture and correlative systems. The following sections review three principles of neurobiology relevant to this topic: (1) the existence throughout the neocortex of high degrees of structural symmetry, seen most dramatically in "topographic maps" (the technical term for

[20] A good starting point for cross-cultural research of this sort is found in Mesoamerican concepts of man-the-microcosm, which were just as important in New World medical traditions as they were in medical traditions in premodern China, India, and the West. See, e.g., Alfredo López Austin, *Cuerpo humano e ideología: las concepciones de los antiguos nahuas*, 3rd ed. (Mexico: Universidad Autónoma de México, 1989–1990), 2 vols.

correlative brain structures);[21] (2) hierarchical/abstractive processes involved in the perceptual and cognitive functions of those maps; and (3) social biases in the early formation of brain maps that can be tied to animistic-religious features of primitive correlative systems. After a brief review of these principles, we will examine some ways in which these primitive correlative systems were "worked up" abstractly in textual traditions.

Cortical symmetries and topographic (or correlative) 'maps'

It will be useful before we start to review quickly how different cortical regions are related to brain functions. Most brain functions are known today to involve highly "distributed" processes arising from the interaction of many brain areas; the result is that those functions cannot be localized in the simple ways that were often taken for granted by laymen and researchers alike even a few decades ago. Nevertheless, insofar as damage to specific cortical areas results in fairly predictable perceptual, cognitive, or behavioral deficits, the traditional assignment of individual brain functions to specific cortical regions retains significant heuristic value. Thus localized damage to the occipital lobe, found in the extreme posterior of the cortex, typically results in major visual deficits; injuries to the regions known as Broca's and Wernicke's areas normally lead to profound language deficits (different in each of the two regions); damage to "higher" cognitive functions—including planning, judgment, novel category formation, model building, and social behavior—is most pronounced when damage occurs in the prefrontal cortex, in the extreme anterior of the brain; and so on.[22]

For our limited purposes, the most crucial fact is that *despite* these functional differences, high levels of symmetry link every cortical region. In all but one special case (in primary visual cortex), for example, vertical cell counts are almost precisely the same in each area of the neocortex, regardless of its functions. Moreover, cells in all regions are "wired" in highly correlative fashions, generating what have been aptly characterized as "nearly crystalline arrays." A few of these structural symmetries are quickly illustrated in **Figure 2**.

Pioneering work by Mountcastle on the somatosensory cortex and Hubel and Wiesel on the visual cortex first demonstrated in the late 1950s through 70s that symmetries of this sort are not accidental but are central to brain processing. Narrow bands of tightly wired neural assemblies, often referred to as "columns," were shown by these researchers to serve highly specific computational tasks—beginning with primitive "feature" detection in the primary sensory regions located in posterior areas of the

[21] Topographic mapping refers to the fact that spatial relations between tightly linked groups of neural cells (or "neural assemblies")—the basic units of cortical processing—are typically preserved in synaptic projections to other brain regions; as noted below, correlative mapping of this sort is critical to perceptual integration and to the development of "higher" cortical functions. On topographic maps, see Patricia Churchland, *Neurophilosophy: Towards a Unified Science of the Mind-Brain* (Cambridge: MIT Press, 1986), 119 ff., and Barry E. Stein and M. Alex Meredith, *The Merging of the Senses* (Cambridge: MIT Press, 1993). For recent discussions of cortical maps from a computational perspective, see the papers collected in Klaus Obermayer and Terrence Sejnowski, eds., *Self-Organizing Map Formation: Foundations of Neural Computation* (Cambridge: MIT Press, 2001).

[22] For detailed discussions, see, e.g., Vernon B. Mountcastle, *Perceptual Neuroscience: The Cerebral Cortex* (Cambridge: Harvard University Press, 1998); Joaquîn M. Fuster, *The Prefrontal Cortex: Anatomy, Physiology, and Neuropsychology of the Frontal Lobe*, Third Edition (Philadelphia: Lippincott-Raven, 1997).

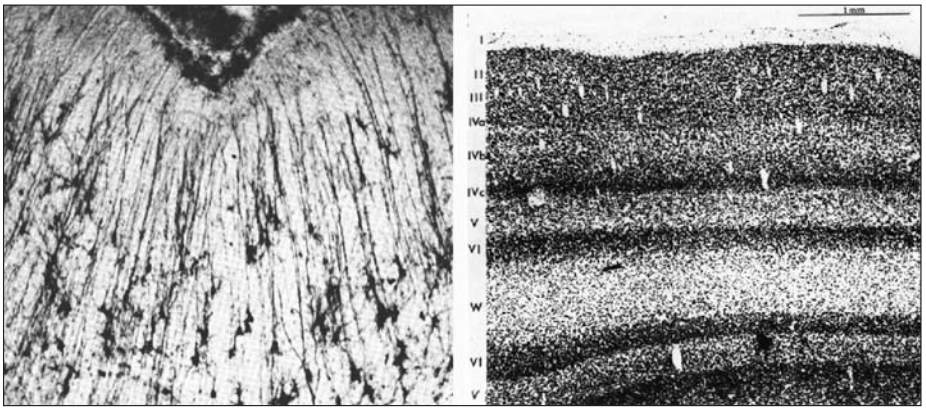

Figure 2. Illustrations of structural symmetries in the neocortex, which are highlighted differentially in vertical and horizontal directions when cortical tissue is treated with different staining methods. As we argue below, these symmetries are critical to the formation of topographic 'maps' and ultimately to the generation of premodern correlative systems. On the left: some vertical symmetries in the cortex, arising from stereotypical 'wiring' patterns in neural cells serving specific computational functions; adapted from Nauta and Feirtag (1986). On the right, horizontal layering in the striate (primary visual) cortex underscored by different staining methods; the numbers on the left mark cortical layers that are again associated with specific neural functions; adapted from a classic paper by Hubel and Wiesel (1977).

neocortex. Thus some neural columns are selectively "tuned" in the primary auditory cortex to specific tones, frequencies, or other variables; other columns in the visual cortex are "tuned" to specific orientations of lines in space, to different colors, or to other visual features; and so on for all other perceptual processing regions.

Extending these early findings, researchers in the past decade have focused on how cortical symmetries are involved in *reconstructing* reality when data from early feature detectors are reassembled in stages—first in monosensory and later in multisensory "maps" of the perceptual field.[23] Animal studies of neurons in both subcortical and cortical integration centers suggest that correlative overlays of a series of sensory maps are critical to the synthesis of perceptual data; the integrative functions of these maps are illustrated in **Figure 3**.

Both anatomical and experimental research have shown that maps that integrate data in every part of the cortex are wired in correlative fashions like these, joined by massive feedback and feedforward loops that link distant cortical and subcortical regions.[24] Recent studies suggest that simultaneous firings of neural assemblies joined in these multiple maps, coordinated by means of those looplike connections, are required to "bind" perceptual and cognitive experience into experiential wholes.

It is important to note that the principles of topographic organization extend all the way to the prefrontal cortex—suggesting that all higher categories of thought, and not just reconstructions of perceptual reality, are dependent on correlative processes. The fact that orderly mapping of data occurs in the prefrontal cortex was first suggested in a famous series of experiments by Patricia Goldman-Rakic

[23] For details, see Stein and Meredith, *Merging of the Senses*.

[24] For early discussion of this issue, see the now classic study by Gerald Edelman, *Neural Darwinism: The Theory of Neuronal Group Selection* (New York: Basic Books, 1987).

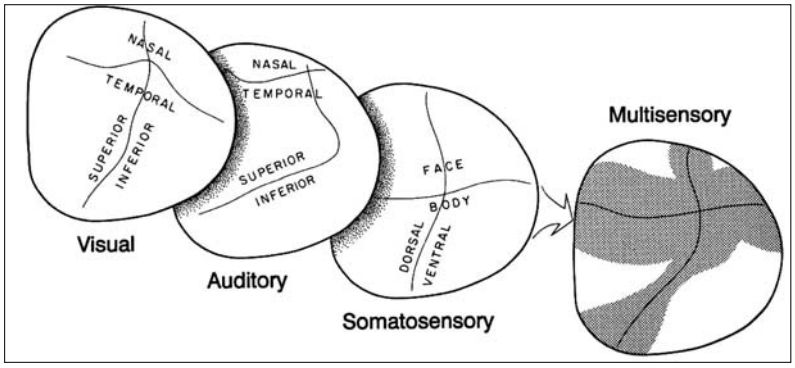

Figure 3. An abstract representation of the integration of topographic (or correlative) maps involving vision, hearing, and touch in multisensory neural integrators, in this case located in a subcortical region (the superior colliculus). Both animal and human studies suggest that the step-like integration of perceptual and cognitive maps generated in different cortical regions *requires* that data in those regions be organized in structurally correlative fashions; in the absence of such symmetries, as suggested by studies of brain-damaged patients, reality would be perceived in a fragmented fashion. Diagram adapted from Stein and Meredith (1993).

in the 1970s and 1980s. In one experiment, researchers in Goldman-Rakic's group injected a tracer chemical near the frontal pole of a monkey's brain, located near the extreme anterior of the prefrontal cortex. Autoradiographic images of a distant cortical region linked to that area displayed remarkably symmetries induced by the experiment—suggesting that neocortical projections map neatly in the brain even in regions far removed from any sensory input.[25] Still further studies suggest that topographic mapping even in the sensory cortex is critical to learning as well as to the performance of perceptual tasks.[26]

Finally, it can be noted that studies of synesthesia—the bizarre pathological condition in which colors may be "heard," or sounds "tasted," etc.—provide further suggestions that correlative thinking has deep neurobiological roots. One model of synesthesia, in fact, pictures the condition as simply a heightened level of consciousness of multisensual integration taking place continuously in all subjects just below the conscious level. This model finds support in the fact that synesthesia can be readily induced in normal subjects through the use of hallucinogenic drugs—a standard means of producing heightened awareness of perceptual correspondences in premodern ritual traditions.[27]

The fact that human emotions can be reliably manipulated through systematic

[25] For discussion, see Walle J.H. Nauta and Michael Feirtag, *Fundamental Neuroanatomy* (New York: W.H. Freeman, 1986), 303, 307.

[26] See, e.g., M.E. Diamond, R.S. Petersen, and J.A. Harris, "Learning through Maps: Functional Significance of Topographic Organization in Primary Sensory Cortex," *Journal of Neurobiology* 41(1) (October, 1999): 64–8.

[27] On synesthesia, see, e.g., T.J. Palermi, R. Blake, et al., "The Perceptual Reality of Synesthetic Colors," *Proceedings of the National Academy of Sciences* 99(6) (19 March 2002): 4127–31; Simon Baron-Cohen and John E. Harrison, eds., *Synaesthesia: Classic and Contemporary Readings* (Oxford: Blackwell Publishers, 1996); R. E. Cytowic, *Synesthesia: A Union of the Senses* (New York: Springer Verlag, 1989). Also suggestive is A. R. Luria's classic study of synesthesia and memory processes, *The Mind of a Mnemonist* (New York: Basic Books, 1968).

shifts in music, rhythms, color, light and darkness, and other sensual input provides further suggestions of this nature—as do studies of correlative processes linking language and hand movements or research into other non-verbal social communications.[28] The view that mild synesthesia may be involved in all aesthetic experience can be traced back at least to Goethe's studies of colors and emotions, and to later efforts by the French symbolists to develop "natural" theories of correspondences.

In conclusion, it should be noted that the specific contents of cortical maps are not "hard-wired" in the brain but are highly "plastic," changing exact response patterns as input from physical or cultural environments is varied.[29] Even the location of specific cortical processing regions may vary in different individuals, depending largely on cultural or environmental input. The result is that while neurobiology helps explain the origins of correlative systems, it cannot predict the exact contents or specific functions of those systems, which are subject to numerous historical variables. We will consider some of the forces that shape these contents when we discuss layering processes in premodern literate traditions.

Functional hierarchies in cortical processes ('maps of maps')

The second feature of cortical organization pertinent to our model is closely related to correlative mapping, and can accordingly be discussed quickly. Topographic maps not only link cortical regions existing on the same brain "level"—producing structurally congruent maps of visual and auditory fields, for example—but are organized as well in hierarchical stacks in which increasingly abstract "maps of maps" combine lower-level data in higher-level categories. Precise localization is again problematic due to the distributed nature of brain functions; but a significant body of animal and human studies suggests that generation of the most abstract "maps of maps," if not their local storage, is one of the principal functions of the prefrontal cortex.[30]

Hierarchical stacking of maps is widely recognized as a general feature of the neocortex, linking mono- and multisensory maps in posterior areas of the brain with cognitive maps in more anterior regions. The result is a series of complexly nested systems in which "the frontal hierarchy is the mirror image of the posterior hierarchy," as Fuster puts it[31]—unconsciously adopting the most common premodern metaphor used to describe high-correlative systems.

The analogies between the organization of brain maps and the structure of correlative systems can also be inferred from an important series of experiments conducted by Merzenich and his colleagues in the 1980s, which first demonstrated

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[28] For some reviews, see David McNeill, *Hand and Mind: What Gestures Reveal about Thought* (Chicago: University of Chicago Press, 1992); Peter Brown, *The Hypnotic Brain: Hypnotherapy and Social Communication* (New Haven: Yale University Press, 1991).

[29] For overviews of cortical plasticity, see the papers in Bela Juilesz and Ilona Kovács, eds., *Maturational Windows and Adult Cortical Plasticity*, Proceedings Volume XXIII, Sante Fe Institute (Reading: Addison-Wesley, 1995).

[30] For relevant studies and bibliography, see Fuster (1997), esp. ch. 8; Jordan Grafman, Kenneth J. Holyoak, and François Boller, eds., *Structure and Functions of the Human Prefrontal Cortex*, Annals of the New York Academy of Sciences, Vol. 769 (New York: New York Academy of Sciences, 1995), esp. Part V; Nina Robin and Keith J. Holyoak, "Relational Complexity and the Functions of the Prefrontal Cortex," in Michael S. Gazzaniga et al., eds., *The Cognitive Neurosciences* (Cambridge: MIT Press, 1995), 987–997.

[31] Fuster, *Prefrontal Cortex*, 212.

that global changes in cortical maps follow similar transformations in lower neurological systems. This work has led to the construction of general brain models whose dynamic properties are remarkably similar to those found in premodern cosmologies, in which all "higher" and "lower" realms were typically thought to change in harmony. As Edelman remarks, summarizing Merzenich's work, "changes on any one level must result in readjustment of all 'linked' levels"—language that could be adopted unchanged to describe the dynamics of virtually any traditional cosmological, astrological, or divinational system.[32]

The role played by the prefrontal cortex in the hierarchical generation of the most abstract "maps of maps" is suggested by a large body of data: by the fact that the prefrontal cortex is more deeply connected than any other region to other cortical and subcortical areas; by evidence that it was the last region to develop in evolutionary terms; and by the fact that it is the final area to develop in children, coinciding with the first appearance of what are normally viewed as abstract reasoning abilities.[33] While most high-level concepts are undoubtedly acquired passively through linguistic transmission, as Vygotsky first emphasized in the 1920s, the *original* generation of those concepts necessarily derives from the syncretic integration of lower-level "maps" by the prefrontal cortex. It is important to note that these integrative processes are not limited to syntheses of perceptual information; indeed, much more rapid and reliable abstractive processes can be expected when those integrative processes operate on data "fixed" in textual traditions.

As we argue later, abstractive/syncretic processes of the latter type were critical to the accelerated development of abstract correlative systems that occurred in all advanced Old World societies in the second half of the first millennium BCE.—giving rise to cosmological frameworks that were increasingly "filled out" over the next two millennia as texts continued to accumulate and became the object of repeated exegetical integrations.

Topographic brain maps and animistic religious concepts

We can finally look at our third and in some ways most far-reaching principle, which links correlative brain processes to the origins of key animistic and religious properties of early correlative systems.

Since the mid 1960s, a number of prominent ethologists including Jolly, Humphrey, and Dunbar have argued that the vast evolutionary expansion that took place in the primate cortex, especially in the prefrontal region, arose in response to complex social needs and not to process socially "neutral" data. Social theories of intelligence,[34] as these views are sometimes called, may grossly underestimate the role of other co-evolutionary processes in the expansion of the neocortex, as their critics

[32] *Neural Darwinism*, 173. For an overview of these experiments, see M. Merzenich, G.H. Recanzone, W.M. Jenkins, and R.J. Nudo, "How the Brain Functionally Rewires Itself," in M.A. Arbib and J.A. Robinson, eds., *Natural and Artificial Parallel Computation* (Cambridge: MIT Press, 1990), 170–210. For discussion of the historical implications these experiments, see Farmer, *Syncretism in the West*, 95–6, note 92.

[33] On some of these issues, beyond the studies mentioned in previous notes, see Terrence W. Deacon, *The Symbolic Species: The Co-Evolution of Language and the Brain* (New York: W.W. Norton, 1997). Some parts of prefrontal anatomy are not fully mature until well into adolescence.

have justly claimed. Nevertheless, it is impossible to question the heavy social biases in brain processing that originally led to the construction of these theories. Over a century and a half of studies of brain-injured patients demonstrate that the largest part of cortical space by far is devoted to social processing—to face recognition, verbal communications, decoding of social cues, regulation of sexual behavior, and similar functions—and not to "abstract" problem solving.[35] Much evidence indicates that the most complex social programs are regulated by the prefrontal cortex, highlighting again its role as the brain's master model builder, responsible for generation of the most abstract "maps of maps."[36] These functions are underlined by the fact that injuries to the prefrontal region, especially around the orbitofrontal area, frequently leave general intelligence intact but profoundly disrupt emotional and social behavior, destroying the individual's ability to generate or act in accordance with socially appropriate models of the world.[37]

Recent studies suggest that it is a basic principle of brain development that cortical maps in regions that mature early guide mapping developments in later maturing regions.[38] Given the deep social biases found in brain processing, it is hence not surprising to find general tendencies in children, no matter what their religious background, to overextend social categories to non-human phenomena when generating models of the world. Extending this finding to the historical realm, it can be argued that animistic religious views embodied in all early correlative systems are a natural outgrowth of the early social biases in brain processing, on the one hand, and normal mapping developments in the cortex, on the other.[39] The depth of early animistic or anthropomorphic biases in thought is suggested by the fact that remnants of those biases often show up even in supposedly "abstract" high-correlative systems—as illustrated, for example, by Aristotelian elements that *yearn* to reach their natural place, or by abstract concepts of force in China, India, and the West that clearly originated in primitive concepts of divine or cosmic "breath" (*qi*, *prana*, *pneuma*, *spiritus*, etc.).

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[34] On social theories of intelligence, see, e.g., A. Jolly, "Lemur Social Behavior and Primate Intelligence," *Science* 153 (1966): 501–6R; N.K. Humphrey, "The Social Function of Intellect," in R. Byrne and A. Whiten, eds., *Machiavellian Intelligence: Social Expertise and the Evolution of Intellect in Monkeys, Apes, and Humans* (Oxford: Clarendon Press, 1988), 13–26; R.I.M. Dunbar, "Coevolution of Neocortical Size, Group Size and Language in Humans," *The Behavioral and Brain Sciences* 16 (1993): 661–736; and Dunbar, *Grooming, Gossip, and the Evolution of Language* (Cambridge: Harvard University Press, 1997).

[35] On this issue, Dunbar ("Coevolution" and *Grooming, Gossip, and the Evolution of Language*) points to amusing studies that suggest that approximately 60% of all human conversations are spent gossiping about personal relationships and experiences—which is comparable to the percentage of time devoted to grooming among lower primates.

[36] Cf. Fuster, *Prefrontal Cortex*, 211–13; Deacon, *Symbolic Species*, 264 ff. and *passim*.

[37] On prefrontal regulation of social behavior, see, e.g., H. Damasio et al., "The Return of Phinias Gage: Clues About the Brain from the Skull of a Famous Patient," *Science* 264 (1994): 1102–05; Bruce L. Miller and Jeffrey L. Cummings, eds., *The Human Frontal Lobes: Functions and Disorders* (New York: Guilford Press, 1999), esp. chs. 31 and 32; Fuster, *Prefrontal Cortex*, 172 ff.

[38] This is most dramatically illustrated by learning disorders that arise after aberrant perceptual maps are established in sensory regions in early childhood. See the groundbreaking article by M.M. Merzenich and W.M. Jenkins, "Cortical Plasticity, Learning, and Learning Dysfunction," in Bela Juilesz and Ilona Kovács, 247–72.

[39] On the extension of social categories to cognition in the earliest stages of infancy, see, besides the classic studies of Piaget and his school, the experimental studies cited in David Premack and James Premack, "Origins of Human Social Competency," in Gazzaniga et al. (1995), 205–18. Interestingly, these data support the views of Durkheim and Mauss on the general dependence of early modeling of the world on socialization processes—though not the socially deterministic views often associated with their work. On these issues, see esp. chapt. 5 in *Primitive Classification*.

Further support for this idea shows up in hypersocial behavior patterns and exaggerated anthropomorphizing tendencies seen in children with Williams syndrome, a peculiar form of retardation that spares the prefrontal cortex, resulting in severe impairments in most cognitive domains *except* those involving social interactions. The condition can be viewed in a sense as the inverse of autism, which is marked by early failures in socialization and a deficiency in normal anthropomorphizing tendencies, followed frequently by catastrophic disruptions in later prefrontal developments.[40]

Preliminary conclusions

A large body of evidence, only a small part of which we can discuss here, demonstrates that known neurobiological principles lay at the foundations of correlative tendencies found in all traditional civilizations—not just in premodern China. Even early tendencies to organize data in primitive dualistic categories (Brahman/Ātman, heaven/earth, yin/yang, limited/unlimited, being/becoming, etc.), which were heavily stressed in older structuralist models, can be persuasively linked to neurobiological processes, in this case opposing excitatory and inhibitory forces that underlie every neurological function—from the simplest synaptic operations to the highest levels of categorization and social modeling in the prefrontal cortex.[41]

Finally, combining data on social biases in cortical processing with what is known of correlative brain developments underscores the neurobiological origins of early animistic or anthropomorphic religious ideas and the closely related concept of "man the microcosm." It is amusing to note that recent neurobiological discoveries can be cited to support the early critique of anthropomorphism ascribed to Xenophanes, who reputedly lived on the borders of the preliterate and literate worlds[42]:

> The Ethiopians have gods that are black and snub-nosed, the Thracians gods that are red-haired and grey-eyed.
>
> If oxen and lions had hands or could draw and create works like those of men, and if animals were to draw pictures of gods, horses would draw pictures of gods like horses, and oxen like oxen, and each would make their bodies similar in shape to their own.[43]

Study of how correlative systems were modified in layered textual traditions, to which we now turn, is critical to understanding the ways in which "plastic" brain structures and cultural traditions have co-evolved over time. The fact that historical

[40] Primitive animistic and correlative-magical tendencies in normal children were first studied by Piaget in the 1920s. On Williams syndrome in general, see W. Jones, U. Bellugi, et al., "Hypersociability in Williams Syndrome," *Journal of Cognitive Neuroscience* 12 (2000) Suppl 1: 30–46. An interesting discussion of the relationship between Williams syndrome and autism can be found in Deacon, *The Symbolic Species*, 268 ff.

[41] The complementary roles of excitatory and inhibitory circuits in social behavior have been extensively studied in patients with prefrontal damage. For an important review, see Don M. Tuckerk, Phan Luu, and Karl H. Pribram, "Social and Emotional Self-Regulation," in Grafman et al., 213–239.

[42] Dying, according to the most common tradition, in 480 BCE, within four years of the traditional dates of the deaths of "Confucius" and the "historical Buddha." Similar critiques of anthropomorphic tendencies arose in the same period in other regions of the Old World, for reasons suggested later.

[43] Diels-Kranz, *Fragmente der Vorsokratiker*, frag. 16, 15, embedded in Clement of Alexandria, *Stromata* VII, iv, 22.1; V, xiv, 109.1–3.

data can be linked in *any* plausible way to brain development further suggests that cross-cultural studies of correlative systems are not simple antiquarian exercises: they may, in fact, provide a shortcut to future mergers of the neurobiological and cultural sciences that have been widely anticipated in the scientific literature since A.R. Luria's early work in the 1930s.[44]

Layered texts and exegetical transformations of primitive correlative systems

Neurobiology highlights what might be termed the primitive default conditions in correlative thought. But it cannot on its own explain how or why high-correlative systems evolved in advanced premodern civilizations. Much of our research in the last two decades has been devoted to studying the textual components of this development, focusing on the interaction of neural and textual processes that generated different *types* of high-correlative systems in varying historical conditions. The final sections of our paper summarize a few of our general conclusions on this issue; readers are referred to our earlier studies for discussion of the role of exegetical processes in specific premodern traditions.[45]

One of our conclusions can be summarized quickly: Many of the most distinctive features of high-correlative systems can be modeled as syncretic byproducts, or "exegetical artifacts," of repeated attempts to reconcile conflicts in heavily layered textual traditions. That conclusion holds for early anticipations of high-correlative systems in Egyptian and Mesopotamian traditions,[46] for the pan-Eurasian explosion of high-correlative thought in the last half of the first millennium BCE, and for the vast correlative cosmologies that emerged cross-culturally from late-ancient to early-modern times. Variations in the levels of abstractness, formality, and complexity in different high-correlative systems can be tied to the complexity of the traditions synthesized in those systems, to the degree to which later systems were built on the structural foundations of earlier ones, and to the influence of various dissipative forces in traditions that we note later.

One implication of our model is that it predicts the accelerated growth of correlative thought in every premodern period of textual expansion, when rates of information flows increased and pressures to harmonize traditions reached exaggerated levels. The "twaddle of idiots" that Max Müller derided in the Brāhmaṇas reflects, in a sense, early developments of this sort studied in midstream.

The following sections expand on a few of the points summarized above:

1. Premodern exegetical methods were in many ways culturally invariant.
These invariances are especially evident in the case of syncretic methods used "to

[44] On the latter issue, see, e.g., A.R. Luria, *Cognitive Development: Its Cultural and Social Foundations*, trans. by Martin Lopez-Morillas and Lynn Solotaroff, edited by Michael Cole (Cambridge: Harvard University Press, 1976). Cf. the interesting discussions by one of the founders of modern "selectionist" neurobiology, Jean-Pierre Changeux, in *Neuronal Man: The Biology of Mind* (Oxford: Oxford University Press, 1985), esp. chapt. 9.

[45] See the references in note 2.

[46] For discussion of some of these antecedents, see Barbara N. Porter, ed., *One God or Many? Concepts of Divinity in the Ancient World*, Vol. 1 of the Transactions of the Casco Bay Assyriological Institute (Washington: Casco Bay Assyriological Institute, 2000). See especially in that volume Simo Parpola, "Monotheism in Ancient Assyria," 165–209; cf. also Walter Lambert's seminal work on the same topic, referenced below.

reconcile irreconcilable texts," to adopt Dodds's phrase.[47] We have identified several dozen methods of this type in our cross-cultural research; all can be linked to the same hierarchical-correlative processes that the brain uses to organize and synthesize *all* types of data—whether or not embodied in textual traditions. A few examples of these methods and their systematic effects are summarized in the chart found in the **Appendix** to this paper.

It is important to note that the same reconciliative technique could have different systematic effects when applied to different genres of texts or layers of traditions. When used to harmonize conflicts in early texts, for example, the same methods could generate monotheistic deities or abstract ethical or cosmological principles, depending on the exact types of texts or exegetical tasks to which those methods were applied. In later layers of traditions, byproducts of standard reconciliative techniques included paradoxical dualistic or trinitarian concepts of deity, formal systems of correspondences, multileveled images of heaven or hell, elaborate emanational systems, and a number of other familiar scholastic constructs. Over many centuries, a broad spectrum of exegetical byproducts was typically gathered up in increasingly formal multilayered systems—in Neo-Daoist, Neo-Platonic or Neo-Confucian, Buddhist, Hindu, Islamic, or Christian cosmologies, etc.—whose levels of correlative purity or "self-similarity," for reasons clarified later, tended to increase whenever traditions inbred or grew in complexity.

One of the most common syncretic methods harmonized textual conflicts by positing the simultaneous truth of conflicting ideas on different "levels" of reality—in the process generating new cortical "maps" reinterpreted as religious or metaphysical realities. The results of the repeated use of such methods, applied allegorically to poetic as well as to religious and philosophical texts, were the familiar bifurcations of reality universally associated with scholastic traditions. One variation of these methods reconciled conflicting references to gods, ethical principles, or other concepts by recasting them as inferior reflections of some "higher" and more abstract entity; use of this method can be linked to the earliest development of proto-monotheistic or monotheistic deities (whose syncretic origins have been discussed by Lambert and Parpola in respect to Assyrian religion, by Thompson and Taube in Mesoamerican traditions, and by us and others in Western sources[48]), or, when applied to different types of exegetical problems, to the emergence of abstract cosmological principles (Heaven, the Way, Brahman/Ātman, the One, *Logos*, the idea of the Good, etc.). Despite the cultural differences dividing these concepts, the integrative processes that generated them were basically the same.

Similar reconciliative ends were often achieved by assigning conflicting ideas or

[47] Referring here to Proclus's use of the Neo-Platonic *henads* (abstract and repeatedly bifurcated orders of Greek deities) "to reconcile irreconcilable texts" containing conflicting references to the gods. See E.R. Dodds, *Proclus, The Elements of Theology: A Revised Text with Translation, Introduction and Commentary* (London: Clarendon Press, 1963), 267; cf. 259–260. For discussion, see *Syncretism in the West*, 86–89.

[48] For a brief discussion of some of these studies, see *Syncretism in the West*, 75–81. Cf. also Willfred G. Lambert, "Gott: Nach Akkadischen Texten," in *Reallexikon der Assyriologie*, bd. 3 (Berlin: W. de Gruyter, 1971), 543–46, and Lambert, "The Historical Development of the Mesopotamian Pantheon: A Study in Sophisticated Polytheism," in Hans Goedicke and J.J.M. Roberts, eds., *Unity and Diversity: Essays in the History, Literature, and Religion of the Ancient Near East* (Baltimore: Johns Hopkins University Press, 1975), 191–200. Durkheim and Mauss also point in *Primitive Classification* (Eng. trans., 79) to anticipations of similar views in late–nineteenth century research, e.g. in the works of Hermann Usener.

traditions to different cyclical stages (or "phases") in cosmic history, or to emergent cosmological "types" in linear models of time; in both cases, the correlative structures of these two basic classes of temporal cosmologies (which were often syncretically fused) were normally tightened with each exegetical act.

While the full repertoire of exegetical methods was culturally invariant, some methods tended to be used more often in certain traditions than others; these differences help explain key regional differences in cosmological developments. Sometimes the selection of one method over another can be traced to underlying features of an evolving tradition; key variables included the levels of internal contradiction in the tradition, the types of texts found in its earliest layers, and the extent of its internal layering or "temporal depth." Exegeses of early sources mainly concerned with seasonal rituals, for example, naturally tended to favor the use of syncretic tools of a cyclical sort, while harmonizations of extended traditions of societies undergoing sustained social or environmental change just as naturally favored the use of the kinds of "typological" methods developed extensively in Jewish, Christian, and Islamic traditions; repeated uses of these alternate exegetical tools can be linked to long-range regional differences in the emergence of cyclical or linear models of time. Attempts to harmonize other types of sources, including epic texts picturing the mirroring worlds of gods and men, just as naturally favored the development of hierarchical systems of atemporal sorts. Accidents of textual preservation, foreign influences, or random choices of reconciliative methods could complicate developments in any one case; but once a basic exegetical pattern was established in early levels of a tradition, inertial forces tended to reinforce its use in later layers in path dependent ways.[49]

In approaching these developments, it is important to note that most exegetical discussions had little if any impact on systematic thought; still others exhibited strong anti-systematic tendencies.[50] The result is that systematic developments in premodern traditions were often painfully slow, masking the links between those developments and exegetical processes. Analogies here can be drawn to evolutionary biology, in which the slow accumulation of small mutations may lead almost imperceptibly to new life forms. Our model pictures similar mutations in traditions, frequently buried in obscure discussions in massive (or lost) commentaries, that slowly transformed religious, philosophical, and cosmological systems through many outwardly trivial exegetical acts. But in this case the general direction of change was convergent, not divergent. Over many centuries, the slow accumulation of those acts resulted in the emergence of high-correlative systems whose abstract correlative structures, if not their specific contents, tended to become increasingly similar over time.

The close associations between exegetical processes and the growth of those systems has also been masked by the prominent role played throughout premodern history by encyclopedias and epitomes, which tended to ignore formal exegetical discussions while summarizing (and hence further systematizing) their results; the result was a common decoupling of high-correlative systems from the exegetical

[49] In the computer simulations that we discuss later, "best-fit" rules can be used to match conditions in early textual traditions to the use of specific exegetical techniques; see the report referenced in note 61.

[50] On these tendencies, see Henderson, *The Construction of Orthodoxy and Heresy*; cf. Farmer, *Syncretism in the West*, ch. 4.

processes that helped generate them. Unlike the tedious exegetical discussions underlying the growth of those systems, summaries of this type tended to be laid out in intuitive and mnemonically attractive forms, mirroring the same hierarchical and correlative patterns used internally by the brain in processing information. The result is that bare summaries of the contents of these systems, and not discussion of the exegetical mechanisms that regulated their growth, have frequently passed for "analysis" of these systems even in modern times—reinforcing traditional views that those systems were unconditioned products of "speculative" thought.

It is only in extreme syncretic systems that the links between high-correlative thought and exegetical processes become impossible to ignore, making those systems ideal "laboratories" to study the evolutionary forces driving systematic developments.[51] To carry our evolutionary metaphor one step further: periods of accelerated text flows that promoted the growth of extreme syncretic systems can be compared to biological eras of so-called punctuated equilibrium, in which evolutionary forces accelerate and the principles are clarified that give rise in all periods to new forms of life.

2. Developments in high-correlative traditions were closely coupled to rates of information flows and innovations in literate technologies.

High-correlative systems did not grow steadily, but tended to rise and fall in response to shifts in information flows, which were drastically affected by political and religious forces, innovations in information technologies, and major demographic changes. Of these forces, shifts in literate technologies (the development or spread of writing, light-weight writing materials, high-fidelity mnemonics, simplified scripts, shifts from scrolls to codices, the invention of paper or printing, etc.) were among the most powerful.

Consider as one example the conditions that existed in the fourth century BCE, which witnessed the accelerated growth of high-correlative systems in much of the civilized world. At a minimum, evidence suggests that literate revolutions were occurring throughout this century at the extreme ends of the Old World, as witnessed by the profusion of new traditions emerging in this period in the Middle East, Greece, and China. As we have argued elsewhere, evidence suggests that these developments depended less on increases in literacy rates, as Goody and others have argued, than on the vastly expanded use after the mid first millennium BCE of light-weight writing materials, the *sine qua non* of the development of layered manuscript traditions.[52]

The case for this development in South Asia is far less certain, due in part to still unresolved issues concerning the dates of early Vedic sources and closely related Old Avestan traditions in Iran. Adding to these difficulties, since the late 1980s a series of influential studies by Fussman, von Hinüber, Falk, and others has argued that no use of writing for religious, philosophical, or literary purposes (and possibly no writing at all) existed in India until shortly before, and possibly not until, Asoka's

[51] Cf. *Syncretism in the West*, xiv.

[52] Cf. ibid., 78–79 and n. 52, and Farmer, Henderson, and Robinson, "Commentary Traditions." We have since slightly revised our views, in ways noted below, on the interaction in this era between literate and oral traditions in South Asia.

rock inscriptions appeared in the mid third century.[53] In judging these arguments, it is critical to note that South Asian texts whose core layers are commonly (if not universally) assigned to the fourth century BCE, including heavily layered texts traditionally ascribed to Pāṇini, Yāska, and various Vedic "school" founders, not only contain a few potential allusions to writing (the meaning of each of which is heatedly contested), but—far less ambiguously—numerous references to or quotations from earlier or contemporary sources.[54] While isolated cross-references of this sort exist in earlier Vedic sources, massive use of quotations and cross-referencing is unknown before this period, suggesting that India was undergoing a textual revolution of *some* sort in the fourth century BCE no less extreme than those occurring in China, Greece, or the Middle East; indeed, the number of extant Indian texts typically dated to this century far exceeds those surviving from any other Old World civilization. For the purposes of this paper, it is largely a matter of indifference whether the "texts" originating in this period were written or (as most Indologists currently believe) "fixed" exclusively through oral means—using high-fidelity mnemonics radically different from those studied by Goody, Ong, and other Western scholars in the tradition of Parry and Lord, who exclusively considered lower-fidelity mnemonics typical of epic traditions.[55]

What were the attitudes in this era of priests, scribes, commentators, and/or reciters in the Middle East, Greece, India, and China to the rapidly expanding corpus of texts suddenly available to them? By the end of the fourth century BCE, most

[53] The most thorough discussion of the evidence is found in Harry Falk, *Schrift im alten Indien: Ein Forschungsbericht mit Anmerkungen* (Tübingen: G. Narr, 1993). For a brief overview in English, see Richard Salomon, *Indian Epigraphy: A Guide to the Study of Inscriptions in Sanskrit, Prakrit, and the Other Indo-Aryan Languages* (New York: Oxford University Press, 1998), esp. 7–14. These new views of South Asian literacy must be taken seriously, but they also have important academic critics; all discussions of this issue take as their starting point the previous consensus that literacy came to India much earlier in the first millennium BCE, following the classic study by Georg Bühler, *On the Origin of the Indian Brāhma Alphabet. Indian Studies* 3. 2nd rev. ed. (Strassburg: Karl J. Trübner, 1898).

[54] On the latter point, see, e.g., Makoto Fushimi, "Brāhmaṇa Passages in Āpastamba-Śrautasūtra," *Electronic Journal of Vedic Studies* 4(1) (August, 1998). Quantitative measures of cross-referencing of this sort have not been exploited yet for their potential in estimating rates of textual flows or in helping date early sources in South Asia; we hope to discuss this issue elsewhere.

[55] For a quick overview of Indian mnemonics, see Arthur A. Macdonell, *A History of Sanskrit Literature* (London: Heinemann, 1900), 41 ff.; cf. Frits Staal, *The Fidelity of Oral Tradition and the Origins of Science* (Amsterdam: North-Holland Publishing Company, 1986). We can only touch briefly here on the heated debates over the roles of writing and orality in early Indian traditions. It is our current working thesis that writing had at least an indirect impact on Vedic traditions in the century or so following the Persian conquests in Gandhāra (N.W. India) in the last half of the sixth century BCE, reflecting the introduction in the region of written Aramaic by Persian officials. Significantly, Gandhāra was the area in which Pāṇinian grammar began to evolve sometime around this era and in which Yāska reportedly lived; N.W. dialects also figured prominently in the texts of the canonized Vedas traditionally said to have been "fixed" orally around this time on the extreme *opposite* (N.E.) side of the Indian subcontinent. In a forthcoming article on the "Gandhāran thesis," we plan to discuss preliminary evidence that the evolution of the extreme Indian mnemonics used to canonize the Vedas developed in the N.W. as a "counter literacy" of sorts, grounded in older and less extreme mnemonic techniques, introduced by Brahmins to protect their ritual traditions from the threats of literacy emanating from the Persian conquests. Suggestive evidence exists that this development was followed by migrations of Vedic scholars to newly forming Indian states in the N.E., where the Vedas found their final canonized form. If the *prima facie* evidence we have collected on this thesis can be confirmed, puzzling near simultaneities in the canonization of traditions stretching from the Middle East through India from the sixth through fourth centuries BCE (and, indeed, eventually involving China) may have a remarkably simple explanation—linked directly or indirectly to literate forces spread by the vast Persian empire. The fullest treatment to date of the exceedingly complex issues involved in the formation of Vedic traditions is found in Witzel, "The Development of the Vedic Canon and its Schools."

major Old World traditions were already heavily stratified, embodied in texts that had grown in layered ways over extended periods, or that added to existing strata rapidly through syncretic fusions with other traditions. That the lines between traditions were unusually fluid in this era can be illustrated by much evidence, including recent Chinese tomb finds of complex mixes of texts that cannot be identified easily with what were later recognized as single traditions.[56]

One consequence of layering processes was that the texts available in this period were increasingly loaded with contradictions; ironically, authorship of those texts was typically ascribed to ancient seers, sage-kings, "school" founders, mythic heroes, prophets, or divine forces, implying exactly the reverse—that those texts could *not* be contradictory; that every apparent conflict hid secret truths. That assumption led to the application of a broad spectrum of exegetical tools to unveil those truths, resulting in predictable correlative transformations of earlier sources. By the end of the fourth century BCE, developments of this sort were already well on course in the Middle East, Greece, India, and China; repeated use of similar exegetical methods in all these regions resulted in accelerated abstract developments in otherwise unrelated religious, philosophical, and cosmological traditions—efficiently explaining many so-called axial age effects.[57]

Opposing traditions also emerged in this period that violently attacked or tried to co-opt their competitors, resulting in wholesale forgeries, interpolations, and emendations that added further to the textual confusion. These problems were accompanied by growing uncertainties concerning the sense of key terms in earlier textual layers, especially terms originating in genuinely ancient times or foreign languages or dialects. Attempts to resolve these problems can be linked to the sudden emergence in this period throughout the Old World of formal etymological, grammatical, and logical traditions, all of them directly or indirectly linked to exegetical concerns.[58]

Evidence from the fourth century BCE reveals not one but a broad range of exegetical attitudes, all of which would reappear in some guise in later periods of textual growth: exegetes heatedly defending or attacking the integrity of single traditions or "schools"; high-level syncretists (and casual eclectics) fusing traditions with abandon; and, at the opposite extreme, anti-text radicals, reacting to the "clamour of the schools," some of whom eventually turned their skepticism on human knowledge in general. Incipient anti-text movements in Greece, India, and China (ironically, most of which quickly generated their own written canons) found support in exegetical strategies of paradoxical types that helped generate "higher" mystical realms, inex-

[56] Cf. the comments in Sarah Allen and Crispin Williams, eds., *The Guodian* Laozi: *Proceedings of the International Conference, Dartmouth College, May 1998* (Berkeley: Society for the Study of Early China, 2000), 179 ff. and *passim*.

[57] For traditional views of these effects, marked by much mystical obfuscation, see Karl Jaspers, *Vom Ursprung und Ziel der Geschichte* (München: R. Piper, 1949), and the papers collected in S.N. Eisenstadt, ed., *The Origins and Diversity of Axial Age Civilizations* (Albany: SUNY Press, 1986).

[58] Seen, e.g., in the linguistic and logical developments in the Platonic *Cratylus* and Aristotelian *Organon*, in the traditions associated with Yāska and Pāṇini in India, and in so-called Mohist traditions in China. For a summary of some of these developments outside China, see, e.g., Wout van Bekkum, Jan Houben, Ineke Sluiter, and Kees Versteegh, *The Emergence of Semantics in Four Linguistic Traditions: Hebrew, Sanskrit, Greek, Arabic* (Amsterdam: John Benjamins, 1997). On related developments in China, see, e.g., A.C. Graham, *Later Mohist Logic, Ethics, and Science* (Hong Kong: Chinese University Press, 1978)

pressible in words, that became increasingly prominent in the Middle East, Greece, India, and China in the last third of the millennium.

Elsewhere, we have looked at later eras of accelerated growth in correlative systems, tied to a variety of forces that affected text flows. These eras included the great period of Old World empires in the early common era, which witnessed the emergence of the first high-scholastic/syncretic systems; medieval periods transformed by major cross-cultural exchanges and (in East Asia) by the first printing revolution, which helped generate a wide range of secondary and tertiary scholastic systems; and the great age of syncretism in the Old World (and, indeed, the New One) starting in the late fifteenth century CE, which in a sense summed up the results of two thousand years of earlier traditions. Study of exceptional periods like these, as we argued earlier, is critical to understanding the links between rates of textual flows and the growth of high-correlative systems.

Fluctuations in these rates can also be tied to periods of *decline* in high-correlative systems, the most obvious coinciding with the collapse of the Han, Gupta, and Western Roman empires in late antiquity. Dampened rates of growth in those systems can be similarly identified in literate societies that possessed light-weight writing materials—and hence manuscript traditions of some sort—when conditions of sharply restricted literacy existed or strong institutional controls over information flows. Key examples show up in ancient Egypt before the Persian period, in the Assyrian and Neo-Babylonian empires (in which scribes wrote on parchment as well as clay), in pre-Warring States China, and in the literate societies of Mesoamerica. The emergence of correlative systems can be traced in all these societies, in some cases (not all) in some detail; but key concepts in those systems never approached the levels of abstraction reached during the Old World textual revolutions of the last half of the first millennium BCE.

From a theoretical standpoint, even more revealing cases can be identified in which attacks on high-correlative systems followed sharp *increases*, and not decreases, in rates of textual flows—suggesting that the links between those rates and correlative growths were nonlinear. Striking examples appear in the early anti-text movements of the fourth century BCE, which we have already noted, and in a long line of textual "purist" movements and religious reformations that reappeared regularly in mature literate civilizations. These movements tended to rise and fall in harmony with the emergence of extreme syncretic tendencies, providing systematic "brakes" of sorts on correlative thought and, at least in some cases, peeling away later layers of stratified traditions. Advanced philological movements of this type were among the forces that contributed to the final collapse of high-correlative systems in China no less than in the West.[59] As we argue below, developments of this sort can be simulated in nonlinear computer models widely used to study the evolution of similar complex systems in other fields.

[59] *Development and Decline*, chapts. 6–9; *Syncretism in the Wes*t, chapt. 4.

3. Major parallel developments in premodern traditions can be explained without recourse to direct transmissions.

It is obviously *not* our claim that no long-distance transmissions existed in premodern history; any such claim could be quickly falsified by pointing to large-scale diffusions of Buddhist ideas that began no later than the early common era. However, radical differences in the intellectual contexts in which so-called abstract thought first emerged provide good reasons for *not* invoking processes of transmission to explain this or similar broad intellectual developments. Surely it is far-fetched to imagine that the sudden appearance of abstract cosmological principles (Heaven, the Way, Brahman/Ātman, the One, *Logos*, the idea of the Good, etc.) in the last half of the first millennium BCE can be explained by transmission of the bare *concept* of "abstract thought" throughout the Old World. This is especially true since near simultaneities in the appearance of these and related ideas—"golden mean" and "middle way" theories, abstract concepts of elements or "phases," formal logical paradoxes, abstract numerological schemes, heightened mystical tendencies, and so on—can be quickly explained as exegetical byproducts *without* invoking such transmissions. All that was necessary to ensure the parallel development of ideas like these was sufficient cultural contact (through trade, travel, or demographic exchanges) to keep levels of sophistication in literate technologies in the Old World more or less in sync.

A short list of later developments that can be quickly explained in similar ways is provided in **Figure 4**. Many of the "exegetical artifacts" noted here can be identified not only in textual traditions, but as well in architectural and artistic structures whose derivation from ideas originating in literate traditions is often obvious.[60] Similar artifacts can also be found in the literate and architectural remains of pre-Columbian Mesoamerica. Examples of the exegetical methods that helped generate these concepts are again provided in the **Appendix** to this paper.

Figure 4
Common 'exegetical artifacts' that emerged in Old World traditions from classical through early modern times

Increasingly paradoxical and transcendent concepts of deities	Increasingly complex 'mirroring' visions of heaven and hell
The transformation of real or mythic tradition founders into cosmic beings	Elaborate formal charts of correspondences, maṇḍalas, etc.
Trinitarian concepts in Buddhism, Christianity, and Hinduism	'Double truth' concepts in Hindu, Buddhist, Islamic, Neo-Confucian, and Christian scholasticism
Concepts of avatars, multiple Buddhas, etc.	Nested hierarchies in scholastic systems
Layered views of time (distinctions between time, eternity, aeviturnity, etc.)	Abstract emanational systems with a single or periodic reabsorption into the One
Elaborate cyclical cosmologies with 'self-similar' or fractal structures (cycles within cycles, 'phases,' kalpas, etc.)	Progressively complex numerological-cosmic systems (seen in Buddhist scholastics, Shao Yong, Joachim of Fiore, etc.)
'Types' in linear models of time (e.g., in Judeo-Christian and Islamic thought)	Increasingly formal correlative structures of canons and texts
Intensified mystical-magical systems	Extreme correlative (or fractal) cosmologies in which everything reflects everything else ('Indra's net,' Dante's mutlileveled picture of the cosmos, etc.)
Formalized astrological systems	
Abstract hierarchies of angels, souls, bodhisattvas, demons, aeons, faculties, virtues, vices, etc.	

[60] Recalling here Victor Hugo's description of Gothic cathedrals as "encyclopedias in stone," and the close relationship between Buddhist texts and the correlative structures of great stupas like the one at Borobudur.

4. Patterns in the rise and fall of correlative systems are similar to those seen in other complex systems, suggesting that these patterns can be simulated in computer models.[61]

The claim that computer models can simulate much if anything pertinent to the evolution of religious or philosophical ideas breaks radically with traditional views of the history of thought—just as similar claims about neurobiology broke with accepted biological assumptions little more than two decades ago.[62] Today, of course, computer models not only of neural processes but of many other biological systems at least as complex as the cultural systems discussed in this paper are all part of mainstream science.[63] Given the close links that we have shown exist between neurobiological and correlative systems, the claim that similar models have value in studying the evolution of those systems is hardly surprising.

Suggestions that the creation of such models is feasible show up in the fractal structures of extreme correlative systems, which not only organized cosmological data in correlative arrays, but sometimes represented the entire cosmos as a complex system in which everything reflected everything else. Perhaps the best-known example of this shows up in "Indra's net," a cosmological metaphor that reached its fullest expression in Huayan Buddhism in the second half of the first millennium CE. In this metaphor, the universe is pictured as a net whose nodes are fixed with jewels that mirror each other in endlessly recursive patterns, like reflections in an infinite hall of mirrors; similar metaphors based on mirroring themes were also pervasive in late-ancient and medieval cosmologies in the West. Even broader representations of multileveled reflecting worlds show up in the extreme scholastic-syncretic systems that evolved throughout the Old World in late-traditional times; the correlative structures of these systems were often so perfectly developed that they can be labeled "fractal cosmologies" without a hint of exaggeration; see **Figure 5**.

Broad families of algorithms that can generate fractal structures like these have been developed in the past two decades in disciplines concerned with the evolution of complex systems—including physics, astronomy, evolutionary biology, neurobiology, cardiology, geology, economics, mathematics, anthropology, and many other fields. One popular group of algorithms belongs to a class of models known as nonlinear dissipative systems, which in one particularly simple and elegant form generates complex correlative structures from the interaction of two simple forces—one that pumps information or energy of some sort repeatedly into an evolving complex system and another that leaks part of that information or energy out of it. When the rates of these forces are appropriately "tuned," the system develops self-similar or fractal structures in layered fashions remarkably similar to the ways in which those

[61] A more technical treatment of the computer models discussed below is found in a technical adjunct to this paper written with our colleague Peter Robinson of NASA-Ames Research Center: Steve Farmer, John Henderson, Michael Witzel, and Peter Robinson, "Computer Models of the Evolution of Premodern Religious and Philosophical Systems." The paper can be downloaded as a PDF file from **http://www.safarmer.com/simulations.pdf.**

[62] It is useful to recall that nearly all modern computer models of brain systems trace their origins to mathematical proofs in a five-page paper published just twenty years ago: J.J. Hopfield, "Neural Networks and Physical Systems with Emergent Collective Computational Abilities," *Proceedings of the National Academy of Sciences* 79 (1982): 2554–58.

[63] For a recent summary of developments in the field, see Marie E. Csete and John C. Doyle, "Reverse Engineering of Biological Complexity," *Science* 295 (1 March 2002): 1664–69.

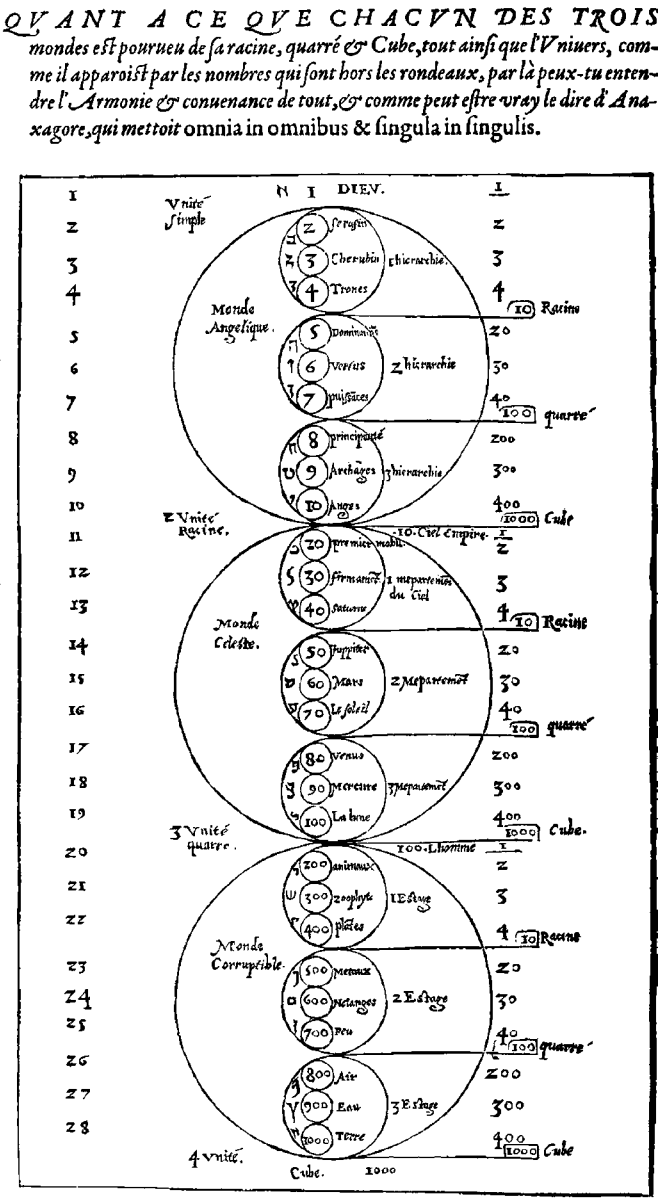

Figure 5. An abstract diagram meant to illustrate the perfectly correlative structure of the universe, 'worked up' by a 16th-century French commentator from verbal hints in the works of one of the most extreme syncretists in history, the Italian philosopher Giovanni Pico della Mirandola (1463–94). The perfectly fractal structure of Pico's cosmology is evident in the scaled circles-within-circles and numerological proportions representing different ontological 'levels' in the universe. Pico's commentator sums up the fractal principles of reality with words often (if anachronistically) ascribed to the pre-Socratic philosopher Anaxagoras: *Omnia in omnibus & singula in singulis* ('All things exist in all things, and all individuals in all individuals'). The saying, which finds many counterparts in extreme syncretic systems in China, India, and the Middle East, could pass for a credible modern description of a self-similar or fractal system. Reprinted from *Syncretism in the West*, 195.

By permission of the British Library, 692.f.17, e6v.

structures emerged historically in high-correlative systems.[64]

While other mathematical methods can be used to simulate fractal growths of this type,[65] nonlinear dissipative models are particularly well suited for the task due to the obvious similarities between their dynamic properties and the exegetical

[64] For details, see "Computer Models," referenced in note 61.

[65] E.g., cellular automata of the sort exhaustively discussed in Stephen Wolfram, *A New Kind of Science* (Champaign: Wolfram Media, 2002).

mechanisms found in layered textual traditions. As suggested in this paper, levels of self-similarity in premodern traditions tended to increase in predictable fashions as scribes, exegetes, scholiasts, and mnemonist-reciters of different eras "worked up" layered texts in extended attempts to harmonize them. Repetitive transformations like this can be usefully compared to the information or energy "pumps" in nonlinear dissipative models; dissipative forces or systematic "leaks" required in those models to ensure that levels of self-similarity increase as those systems evolve are fulfilled in historical traditions by textual losses, linguistic drift, or scribal or recitative errors, which played critical (if rarely discussed) roles in the structural evolution of premodern religious and philosophical systems. The joint operation of these two forces can be exploited in nonlinear dissipative models to simulate the growth of a broad range of cosmological structures—abstract systems of correspondences, complexly nested hierarchies, and in extreme cases hyperscholastic systems in which everything in the cosmos ends up reflecting everything else. Adjusting rates of information flows in these simulations provides ways to model the dampened growth or decline of correlative systems found in special historical situations—including the exceptional nonlinear conditions that led to the final collapse of those systems in the early scientific era.[66]

Even "toy" simulations based on these ideas have important heuristic uses—clarifying the relationship between neurobiological processes, exegetical transformations in layered traditions, and related factors pertinent to the evolution of premodern religious and philosophical ideas. Those simulations can also help demonstrate the power of cross-cultural models of the history of thought, which should find increasing uses both in and out of the classroom as processes of cultural globalization move apace. Simulations of the same type can also be used to strengthen existing philological methods, most importantly by adding new strategies to traditional stylometric tools used to help date early texts.[67]

But perhaps the most important use of such simulations lies in the illustrations they can provide of the contingent nature of many of the leading ideas that divide major world civilizations. One central principle of complex systems that can be dramatically illustrated in such simulations is the concept of the "sensitive dependence on initial conditions," or the so-called butterfly effect.[68] In the historical case at hand, even small variations in ideas in early levels of layered traditions—arising from initial (and sometimes random) selections of canonical texts, key exegetical tasks, or syncretic methods—tend to be amplified over time by the same repetitive exegetical and dissipative forces that lead to long-range correlative growths in those traditions. The result is a rapid stabilization or historical "lock-in" of ideas, ending in long-term path dependencies in traditions of the sort noted earlier in this paper.[69] The ability of computer simulations to illustrate the ways in which even trivial differences in early

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[66] Given their origins in neurobiological processes, correlative tendencies obviously show up in different ways in modern traditions; we plan to discuss this issue elsewhere.

[67] See further the discussion in "Computer Models."

[68] So named after a famous 1972 lecture by Edward Lorenz: "Predictability: Does the Flap of a Butterfly's Wings in Brazil Set off a Tornado in Texas?" The text of the paper was first printed in Lorenz, *The Essence of Chaos* (Seattle: University of Washington Press, 1993).

[69] For technical references, see note 7.

textual traditions can have massive effects in civilizations over thousands of years is one of the most sobering, and potentially most liberating, conclusions that can be expected from the application of scientific models to the history of thought.

Some conclusions specific to Sinology, and tests to confirm or falsify the model

Our analysis at the start of this paper of the old idea that correlative thought was more deeply entrenched in China than in other early civilizations suggests that historical research is not immune to its own path dependencies—originating in this case in nothing more profound than differing personal attitudes towards premodern traditions expressed by early researchers including Max Müller, A.O. Lovejoy, and Marcel Granet. Recognition of the neurobiological grounds of correlative systems, coupled with cross-cultural studies of how layering processes affected those systems' later growth, can help combat persistent myths concerning "great divides" supposedly separating major world civilizations.

Important ongoing work in Sinology, much of it associated with the Warring States Project at the University of Massachusetts at Amherst,[70] has helped refocus attention on processes of textual layering in the formative stages of Chinese thought. Hopefully expanded studies of this type will help revive similar interests among Western classicists, who largely abandoned studies of this sort early in the twentieth century, and encourage new research in this direction by Mesoamericanists, who are just starting to confront the heavily layered textual traditions of literate New World societies.

While research on stratified texts has been underway for 150 years, especially in biblical and Vedic studies, philologists have rarely studied the obvious connections between textual layering and long-range developments in the history of thought. Much more attention, as epitomized by classic papers published in this journal by Bernhard Karlgren,[71] and by recent work in the Warring States Project, has focused on the traditional goal of unraveling stratified texts to attempt to reconstruct the original historical conditions underlying individual layers. While important conclusions can arise from such studies,[72] insights of a different sort, as argued in this paper, can be gained by *reversing* this traditional approach—focusing on the ways in which exegetical transformations of layered texts affected both short- and long-range evolutionary developments in the cross-cultural history of ideas.

While numerous sources exist for studies of exegetical transformations in later periods of premodern history, and sometimes in very early ones (e.g., in heavily layered funereal texts in Egypt), Sinology is especially important to these studies due to recent discoveries of Chinese tomb texts from the critical period of early canon formation in the last third of the first millennium BCE. Comparison of the "received texts" of works like the Laozi with pre-canonized versions of those works found

[70] See the Project's homepage at **http://www.umass.edu/wsp**. For illustrations of the theoretical approach underlying the project, see Brooks and Brooks, *The Original Analects*. An early version of the present paper was presented at a Warring States Workshop Conference (WSWG 15) held in October, 2000.

[71] See the references in note 13.

[72] One of us (Witzel) has applied these methods to reconstruct social and political developments in South Asia in the Vedic era, which are even less well understood than those in similar periods in China. For discussion and detailed bibliography, see Witzel, "The Development of the Vedic Canon and its Schools."

at Guodian and Mawangdui can potentially throw new light on other premodern fields, including Vedic and Greek studies, in which many examples survive of heavily redacted texts originating in this period, but little if any hope exists of finding uncontaminated textual sources of the type "worked up" in those redactions.

The model discussed in this paper provides suggestions as to what kinds of evolutionary trends we can expect from detailed studies of these early sources, more of which can be expected to surface from Chinese archaeological finds in the next few decades. Such comparisons can also yield tests of various evolutionary views presented in this paper—with results that could lead us to expand, modify, or abandon parts of our model.

Tests of other sorts exist of that model, from which many predictions can be derived concerning what kinds of ideas should, or should not, be expected in the earliest layers of textual traditions. We conclude by discussing three major empirical tests of this nature; discussion of these tests will also allow us to answer in anticipation some objections to our views:

1. The model could be falsified by the discovery of formal systems of correspondences that developed in the *absence* of 'fixed' textual traditions.

In the heyday of structural anthropology, a long series of researchers, including most prominently Lévi-Strauss and Griaule, *did* claim that elaborate correlative systems of this sort, including formal systems of correspondences, were generated by preliterate peoples in the absence of "fixed" textual traditions.[73] These views heavily influenced A. C. Graham's studies in the 1980s of correlative systems in China, which (like the work of most Sinologists before him) largely ignored the question of historical development in those systems.

We agree with Goody and Barth[74] that the abstract systems of correspondences discussed by Lévi-Strauss, Griaule, and other structuralists were largely artifacts of their own literate methodologies—or, in certain cases, reflections in more primitive societies of direct or indirect contacts with literate civilizations. We nevertheless concede that genuine confirmation of what we have referred to in this paper as "high-correlative" systems in the *absence* of "fixed" texts and layering processes—regardless of whether those texts involved writing or (keeping South Asian traditions in mind) high-fidelity mnemonics[75]—would seriously challenge, and potentially falsify, parts of our model. On the other hand, the model cannot be overturned by pointing to the fluid correlative systems that Barth and others have extensively studied in preliterate ritual traditions, which are fully consistent with our claims concerning the neurobiological grounds of correlative systems.

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[73] See, e.g., Claude Lévi-Strauss, *Structural Anthropology* (New York: Basic Books, 1963); Marcel Griaule, *Conversations with Ogotemmêli: An Introduction to Dogon Religious Ideas* (London: Oxford University Press, 1965).

[74] Jack Goody, *The Domestication of the Savage Mind* (Cambridge: Cambridge University Press, 1977); Barth, *Cosmologies in the Making* (1987) (see note 5).

[75] See the discussion above and in note 55.

2. The model could be falsified by the discovery of 'primitive monotheism' or abstract cosmological principles that did *not* emerge from integrations of primitive animistic traditions.

Claims that "primitive monotheism" *did* exist (typically identified with African, Australian, and American sky gods, etc.), supposedly antedating polytheistic traditions, were seriously raised in the first half of the twentieth century by the Catholic philologist and anthropologist Wilhelm Schmidt, who waged a life-long battle against the evolutionary views of religion expressed by Spencer, Tylor, and Frazer, etc., as well as by "higher" biblical critics like Wellhausen.

Few academics today would publicly endorse Schmidt's ideas, let alone be tempted to wade through the twelve thick volumes of proofs he offers in *Der Ursprung der Gottesidee* (1912-1955). But Schmidt had prominent followers in the first half of the twentieth century; moreover, echoes of his ideas continue in influential anthologies of religious texts like one compiled by Mircea Eliade, which opens with long selections on what Eliade labels "supreme beings," "great spirits," "high gods," "cosmic gods," and "all knowing gods," etc., supposedly representing primitive religious ideas in Australia, Africa, North America, Polynesia, South America, Japan, and India.[76] Given Eliade's continued influence in religious studies, at least in the United States, the result is that Schmidt's *Urmonotheismus* surreptitiously lives on, as do claims in other circles that monotheism was "invented" early in Hebrew history.

We acknowledge that early syncretic fusions of diverse deities or animistic forces, of the sort seen even in the earliest strata of the Vedas, were legitimate anticipations of the integrative forces that generated monotheistic gods in later periods of history. But dream-like (and temporary) mergers of animistic beings, which play a significant role in primitive ritual traditions, are far removed from Schmidt's concept of an *Urmonotheismus*, which supposedly preceded polytheistic concepts. Convincing evidence of the emergence of monotheistic ideas that did *not* arise from syncretic processes in textual traditions—a development that we consider to be highly unlikely—would present a major challenge to our model.

Questions concerning the origins of abstract cosmological principles raise more serious issues. One implication of our earlier discussion of hierarchical processing in the brain is that the concept of abstraction is a relative one: even the assignment of proper names involves relatively high levels of abstraction; the result is that sharp distinctions that are often made between "mythic" and "abstract" modes of thought in antiquity simplify a highly complex issue.

There is no doubt, in any event, that even totally preliterate peoples did associate some deities with more abstract powers than others. A classic example shows up in the fluid collection of Vedic gods known as the Ādityas, some of whom functioned at times as abstract gods of tribal or cosmic order or justice.[77] An even more abstract concept of truth, justice, or cosmic order was manifest in the Vedic concept of *ṛta* (which was closely associated with the Ādityas), the related idea of *aṣa* in Old Avestan traditions, the Egyptian principle of *ma'at*, and similar abstract ideas of order or truth in other early societies.

[76] Mircea Eliade, *Essential Sacred Writings From Around the World* (New York: Harper & Row, 1967).
[77] For one study, see Joel Peter Brereton, *The Ṛgvedic Ādityas* (New Haven: American Oriental Society, 1981).

Nevertheless, an enormous gulf in degree if not kind separated these partly abstract and partly mythopoeic entities, which invariably remained closely associated with animistic deities, from the transcendent concepts of Heaven, the Way, Brahman/Ātman, the One, *Logos*, the idea of the Good, etc, that came to prominence in the Old World textual revolutions of the second half of the first millennium BCE. Our model could only be challenged by the discovery of transcendent principles of this latter sort that did *not* arise in layered traditions from earlier animistic bases, but emerged instead (as much of the traditional research implies) as free "inventions" of speculative genius.[78]

3. The model could be falsified if conditions were identified in which high of levels of elite literacy and extended manuscript traditions existed but predicted 'high-correlative' structures were *not* generated.

Test #1: The problem of alleged manuscript traditions in the Western Zhou

Claims are frequently made that extensive and not just restricted literacy existed in China by the time of the Western Zhou, and possibly even in the Shang dynasty. Most prominently, Edward L. Shaughnessy has pictured the Western Zhou, apparently from its beginnings in the eleventh century BCE, as a "supremely literate society," rightly credited by long Chinese tradition (despite the disbelief of "iconoclasts and the comparativists") with composition of numerous texts including core layers of three of the Chinese classics—the Classics of *Documents*, *Poetry*, and C*hanges*. Based on suggestions in cast-bronze memorial texts from the Western Zhou, Shaughnessy also pictures extensive state and family archives existing at a similarly early date, apparently containing texts written (as in the Warring States period) on bamboo or wooden strips. The implication is that China had high levels of literacy, at least in court circles, and extensive manuscript traditions at least 700 years *before* the explosion of high-correlative thought that began in the fourth century BCE—which we (and many other researchers) have associated with major textual revolutions in that period.[79]

We acknowledge that high levels of elite literacy or the existence of extended manuscript traditions in the Western Zhou would constitute a serious challenge to our model. We nevertheless believe that future confirmations of these phenomena are highly unlikely. This follows since—leaving aside the three Chinese classics Shaughnessy mentions, whose dates are largely what are at issue—no traces exist in Western Zhou cultural artifacts (including cast-bronze texts) of the types of high-correlative thought that our model tells us to expect (and much comparative data suggest was found) in all premodern societies in which high levels of elite literacy existed. Nor

[78] Our views here can be usefully compared to the discussion of early cosmological developments in China found in Nathan Sivin, "The Myth of the Naturalists," in *Medicine, Philosophy and Religion in Ancient China* (Aldershot: Variorum, 1995), section IV, 1–33.

[79] Cf. Edward L. Shaughnessy, *Before Confucius: Studies in the Creation of the Chinese Classics* (Albany: SUNY Press, 1997), 3 ff.; Shaughnessy, "Western Zhou History," in Michael Loewe and Edward L. Shaughnessy, eds., *The Cambridge History of Ancient China: From the Origins of Civilization to 221 B.C.* (Cambridge: Cambridge University Press, 1999), chapt. 5.

can hints of such thought be found in major literary sources (including the *Spring and Autumn Annals* and early strata of the *Analects*) that are known for sure to date from many centuries later. The result is that our model suggests that Shaughnessy and other researchers expressing similar views have seriously overestimated the types and extent of literacy found in the Western Zhou. But we also concede that if future discoveries prove that these researchers are right and we are wrong, at a minimum we would be forced to make major adjustments in our model.

Test #2: Alleged manuscript traditions in the Indus Valley Civilization

Even more extreme claims of massive lost literatures have been made for the Indus Valley (or Harappan) Civilization that flourished ca. 2600 - 1900 BCE—contemporaneous with the early literate societies of Mesopotamia and Egypt. Encouraged by the discovery of many thousands of short inscriptions on Indus seals, tablets, copper plates, potsherds, and other durable goods, a long line of archaeologists and Indologists from the 1920s until the present has assumed that extensive lost literatures existed in Harappa which—given the vast geographical extent of the civilization—probably included substantial religious, historical, and even proto-scientific or philosophical texts. Since no Indus inscriptions have ever been found that qualify by any stretch of the imagination as extended "texts"—the average Indus inscription is less than 5 symbols long, and the longest on one surface (a highly anomalous case) carries only 17 symbols—the assumption has been all but universal that the Harappans wrote their texts, as Mohenjo-Daro's most famous archaeologist put it, on "birch bark, palm leaves, parchment, wood, or cotton cloth, any of which would naturally have perished in the course of the ages."[80]

Substantial manuscript traditions in the Indus Valley would present an even more serious challenge to our model than confirmation of extensive literacy in the Western Zhou, since not a hint exists in the vast remains of the Indus Valley of the types of high-correlative artifacts that our model suggests should have been produced by *any* literate premodern society—let alone one that supposedly wrote long texts on perishable materials for some 700 years. If standard views of Indus "writing" were correct, the model described in our paper would be in serious trouble.

Puzzled that the predictions of that model clashed so violently with eight decades of Indus Valley research, in the summer of 2000 we began compiling lists of archaeological "markers" found in all premodern civilizations known for sure to have written extensively on perishable materials. These include those of the Egyptians, Assyrians, Neo-Babylonians, Chinese, Persians, Hebrews, Greeks, Etruscans, Romans, Arabs, Mesoamericans, and (most importantly) the ancient South Asians once they unquestionably developed writing some 1500 years or so after the collapse of Harappan Civilization. A short list of those markers includes the production of texts of substantial length on potsherds, rock or cliff faces, building stones or bricks, frescoes, statues or votary objects, bronze vessels, sea or turtle shells, weapons, or similar

[80] John Hubert Marshall, ed., *Mohenjo-Daro and the Indus Civilisation: Being an Official Account of Archaeological Excavations at Mohenjo-Daro Carried Out by the Government of India Between the Years 1922 and 1927* (London: A. Probsthain, 1931), Vol. I, 40.

durable goods *as well* as on perishable materials; archaeological remains of inkpots, writing utensils, or similar tools of literate technologies; iconographical evidence of scribes or texts; and evolutionary changes in scripts arising from the continuous pressures of copying long texts. Remarkably, not one of these markers—each one of which is found in all these other civilizations (even when no perishable texts have survived)—shows up in the Indus Valley.

Even more remarkably, not one of the thousands of articles and books written on the "Indus script" since the 1920s has mentioned even the most obvious of those markers, which on its own largely proves the case: the total absence in the Indus Valley Civilization, unlike all these other societies, of texts of any length on *durable* materials. When the extreme brevity of Indus inscriptions is viewed in the light of comparative evidence, the obvious suggestion emerges that not only did the Harappans not write long texts on perishable materials, but that ancient India's most famous unsolved puzzle, involving its "undeciphered script," is a non-problem—since Indus symbols do not appear to have functioned as part of a true script. This suggestion can be supported by much further evidence, including numerous anomalies in Indus symbol frequencies that are radically unlike those found in any known writing system in the premodern world.[81]

Afterword

The theoretical model discussed in this paper, which finds unexpected support in the latter discovery, helps belie traditional claims that the methods of the natural and cultural sciences are radically opposed—that historical researchers have no need for abstract models, the formulation of predictions and empirical tests, or computational tools routinely used in other fields of science. Ironically, the fact that claims of extensive literacy in the Indus Valley have gone virtually unquestioned since the 1920s underlines the fact that historical researchers are often blinded by unexamined models of the most elementary sorts. Making the heuristic assumptions of the cultural sciences as explicit, testable, falsifiable—and ultimately as disposable—as those in the hard sciences is among the most important requirements in the field.

The history of science is full of examples of discoveries that have followed unexpected mergers of fields or the wholesale adoption by one science of the methods of others. Frequently, these mergers occur in periods of rapid developments in information technologies that have repeatedly triggered major revolutions in human thought. We believe that many signs exist, promoted by obvious technological developments in our own period, that mergers of this sort are already underway that will drastically change our understanding of all of premodern history in the coming decades.

[81] Discussions of this evidence have been presented by one of us (Farmer) at the Third and Fourth Harvard University Indology Roundtables, held in May 2001 and 2002. Initial work on the problem began with informal collaborations between Farmer and Witzel in July 2000. An abstract of a forthcoming paper, which provides evidence that Indus symbols were not linguistic but magical and ritualistic in nature, can be downloaded from **http://www.safarmer.com/Indus.pdf**.

Appendix: A Few Systematic Effects of Exegetical Strategies

The following is a short list, intended to be illustrative and not exhaustive, of a few exegetical strategies that had major systematic effects. The majority of these strategies had a reconciliative purpose: to harmonize traditions, to unveil the hidden unity in canonical sources, to reconcile new traditions with old ones, or to co-opt the ideas of warring traditions or subtraditions. Which strategies were preferred in different traditions—and hence which types of cosmologies tended to evolve within those traditions—depended in part on (1) the ease with which those methods solved given exegetical tasks and (2) the frequency with which those methods showed up in earlier layers of tradition. The inbreeding of traditions over long periods resulted in the cross-cultural growth of multilayered correlative systems that by late traditional times exhibited high levels of structural complexity, formal consistency, and self-similarity. Partially counterbalancing these developments were anti-scholastic (or classicist) movements that tended to grow in strength the further traditions drifted from the sense of their base texts; the seesaw battle of syncretic and anti-syncretic forces was a major theme in the history of thought that lasted until the final collapse of high-correlative systems in early modern times.

Exegetical Strategy	Description	Typical Byproducts
Correlation of gods from different polytheistic traditions.	Gods of different traditions are ordered in abstract series, or viewed as bodily parts of superior deities, for reconciliative ends.	Generation of early pantheons of gods in ancient Egypt, Mesoamerica, India, Greece, etc. Similar tendencies in Chinese "folk" religion.
Fusion of different gods or concepts of god in one or more tradition.	Conflicting concepts of gods are fused to create transcendental deities.	Initial appearance of proto-monotheistic or monotheistic traditions.
Transcendent fusion of conflicting moral or intellectual concepts in one or more tradition.	Conflicting uses of terms are integrated to create abstract universal concepts.	'Heaven,' *dharma*, *Logos*, the 'One,' Platonic theory of ideas, etc. Abstract dualistic frameworks are created for later cosmological developments.
Paradoxical fusions of divine beings or cosmic principles.	Conflicting references to divine beings or cosmic principles are identified in paradoxical ways to demonstrate the unity of a body of texts.	Simultaneously transcendent and immanent gods; paradoxical Confucian-Daoist 'Way'; Buddhist, Christian, and Hindu trinities; dualistic deities in Tibetan or Mesoamerican traditions, etc.

Assignment of divine beings, sages, or inferior creatures from various traditions to hierarchical or emanational series.	Key concepts in different traditions are harmonized by assigning those concepts to different levels of reality.	Grades of Confucian sages and worthies; Buddhist and Hindu avatars and saints, etc.; gnostic aeons and Neo-Platonic henads; orders of demons and angels, etc.
Syncretic fusion of multiple or conflicting stories concerning ancient sages, philosophers, and tradition founders in an evolving canon.	Multiple stories of sages, philosophers, and tradition founders are harmonized by transforming those figures into semi-divine or divine beings.	Eventual transformation of Confucius, Laozi, Socrates, Plato, Buddha, Jesus, etc., into semi-divine or cosmic beings.
Systematic correlations of conflicting references to single deities.	Conflicting references to a deity are identified as inferior manifestations of that deity.	Abstract schemas of the names and powers of god in Islamic and Christian scholasticism; the kabbalistic *sefirot*, etc.
Allegorical methods applied in hierarchical frameworks.	Abstract philosophical or religious ideas read out of (or into) non-philosophical works.	Intensified hierarchical visions of reality. Transformation of poetic and other non-philosophical works into cosmological treatises (Homer, *Spring and Autumn Annals*, etc.)
Allegorical methods applied in a temporal framework (typology).	Concepts or persons in earlier traditions are pictured as imperfect anticipations of concepts or persons in later ones.	Growth of analogical views of time in progressive (linear) frameworks.
Compilational or allegorical strategies applied in cyclical temporal frameworks.	Conflicting stories, concepts, divine beings, or temporal events in canonical texts are reconciled by assigning them to different eras in a cyclical temporal framework.	Multiple creations and destructions of the world in Greek or Mesoamerican traditions; concept of avatars and multiple Buddhas, etc.; reconciliative use of the "five phases" (*wuxing*) in Chinese historical writings.
Compilational strategies in hierarchical frameworks.	Conflicting stories, concepts, or cosmological schemes are joined in a hierarchical manner.	Multileveled visions of heaven and hell in Christian, Buddhist, Hindu, and Mesoamerican traditions; complex faculty psychologies; etc.

Syncretic syllogisms.	Disjoined snippets of texts are conjoined to unveil their hidden unities. Heavy use in Vedic, Neo-Confucian, Midrashic, and similar commentarial traditions.	Increased reverence towards holy books; intensified word magic, bibliomancy, etc.
Standard scholastic distinction.	Apparent conflicts in authorities are reconciled by adding appropriate verbal modifiers to the concepts of those authorities.	Reality becomes increasingly complex, correlative, and (normally) hierarchical.
'Double-truth' models.	Religious or philosophical authorities are reconciled by distinguishing complementary realms of truth.	Bifurcations of reality in the three-treatise school of Buddhism; similar developments in Neo-Confucian, Vedantic, Averroistic, and Latin scholastic traditions.
Mystical letter/glyph interpretations and/or anagrammatic manipulations of sacred canons.	Mystical letter/glyph interpretations and anagrammatic readings introduced to demonstrate the hidden unity of canonical texts.	Glyphomancy in China, anagrammatic manipulations of texts in India, the Middle East, and the West. Intensified linguistic realism, fusion of mysticism and calligraphy, etc.
Higher-level fusions of systems of correspondences.	Presyncretized (correlative) concepts found in earlier texts are conjoined in increasingly abstract forms.	Abstract numerologies of the type found in Shao Yong or Joachim of Fiore. Extreme syncretic-correlative systems with amplified magical properties in medieval and early modern times.

For detailed discussion of individual strategies, see Henderson, *Scripture, Canon, and Commentary* and Farmer, *Syncretism in the West*. For discussion of exegetical methods opposing these strategies, see Henderson, *The Construction of Orthodoxy and Heresy*.

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