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Thoughts on Cord Knotting as an Early Record-Keeping System in Ancient China

Abstract

Is it possible to demonstrate the existence of cord knotting in ancient China, and if so, how might it have influenced the evolution of the Chinese writing system?

In this paper I am aiming to examine the existence of cord knotting in ancient China and its potential influence on the evolution of Chinese writing. By reviewing extant Chinese scholarship and comparing cord knotting practices with similar mnemonic and accounting devices worldwide, I propose that although cord knotting predates Chinese writing, it did not directly lead to its development; rather, it evolved contemporaneously as an independent system of record keeping, that later contributed stylistic elements to the formation of Chinese characters. Cord knotting served as a mnemonic tool for recording labour days, wages, loans, and other vital economic transactions, and its visual conventions may have contributed to the formation of the silk classifier found in many Chinese characters. This study situates cord knotting within broader global practices while reevaluating traditional Chinese texts, suggesting that the aesthetic and functional elements of knotted cords played a significant role in the emergence and evolution of Chinese logographs.

Building on this claim, the paper develops three lines of argument. First, it establishes a global comparative baseline for ‘rope media’ by synthesizing Cyrus L. Day’s tripartite typology—magical/apotropaic, mnemonic (numerical and cultural), and practical knots—and by reviewing rich cross-cultural cases such as the Andean khipu, Polynesian and North American mnemonic cords, Hawaiian ‘tax-gatherer’s memorandum cords’, and the Ryukyuan warazan straw-cord counting system. These analogues demonstrate that knot-based records can sustain durable administrative functions—time-reckoning, tribute accounting, genealogical recall—without becoming phonographic writing. They therefore provide a plausible technological ecology within which a Chinese cord-record system could have coexisted with, but remained distinct from, early script.

The study re-examines Chinese classical references to cord knotting (*Yi-xici*, *Shuowen* postface, Zheng Xuan’s commentaries, *Wenxin diaolong*, *Zhuangzi*, and ethnographic notices) not as direct proof but as cultural memory of an administrative practice. To avoid what I call ‘textual primacy bias’, these sources are balanced against palaeographic and archaeological evidence. Applying Demattè’s criteria for identifying precursors to Shang script, the paper concludes that cord knotting does not qualify as writing in the strict sense, functioning instead as a mnemonic aid for counting and verification. Claims that rope impressions, such as those at Dadiwan, represent archives of records are re-evaluated and more plausibly interpreted as constructional remains, though they still confirm rope’s availability in the Neolithic.

At the same time, a narrower stylistic influence is proposed in line with Keightley's 'visual pun' model, whereby script signs schematize familiar tools and practices. Early forms of 糸 and related graphs (夷, 專, 傳) may encode the cord, the knot, the knot-keeper, and the act of transmission. Other graphs tied to numbers, contracts, and genealogy (e.g., 廿, 卅, 卌, 貫, 貸, 世, 孫) plausibly echo domains where knot records were used—tallying, valuing, and marking descent. This does not imply a linear derivation of writing from cords, but rather that knotting culture provided visual and conceptual resources for scribes.

Cord knotting is therefore best understood as a parallel technology that was eventually supplanted by graphemic writing, yet left stylistic fingerprints in early Chinese script, particularly within silk-classifier graphs and administrative vocabulary. While perishable materials make direct proof unlikely, archaeological preconditions—rope production, counting needs, and social complexity—support the plausibility of such systems. In this light, writing in China developed independently but might have absorbed aspects of cord knotting's visual and semantic logic.

Keywords: cord, rope, knot, cord knotting, rope knotting, Chinese writing, Chinese characters, oracle bone inscriptions, bronze inscriptions, seal script, 結繩, 結繩記事

Introduction

The main focus of this paper is on cord knotting as a counting device in ancient China and its potential influence on Chinese writing. Intriguingly, the term *jiesheng*¹ 結繩 tying knots, functions in modern Chinese as a synonym for accounting, particularly in economic contexts. This invites critical questions: Is this linguistic link merely a reflection of modern archaizing tendencies that romanticize the past? Or could it signal a deeper, historically rooted association? To evaluate this, we must first establish three foundational questions: Did functional cord knotting systems exist in ancient China? If so, did they meaningfully influence the development of Chinese writing? To what extent might later cultural perceptions (like the modern accounting term) reflect historical reality versus retrospective projection? Addressing these requires rigorous examination of archaeological, textual, and palaeographic evidence.

The well-known Chinese knot and its tying techniques gained popularity during the Song 宋 dynasty (960–1279 CE), however, if such knots were ever functionally connected to accounting, that role was subsequently abandoned. What exactly constitutes cord or rope knotting?

¹ For the sake of consistency, tone marks have been omitted throughout the paper, except in Sections 3.7 and 3.8, where they are retained due to their relevance to phonological and etymological analysis.

1. Cord knotting around the world

To be able to put ancient Chinese cord knotting into context first we have to define what it is and how other cultures looked at it.

Cord knotting is a device that consists of knots tied on a single strand of rope or more strands of ropes made by grass, thatch, reed, vine, bark or other natural materials used by people. By a broader sense of definition, one could easily categorize rosaries as a type of cord knotting tools, but to understand what knots on ropes mean and how they work we first turn to Cyrus L. Day² who provides a detailed account on cord knotting around the world, and differentiates three types of knots on ropes on the basis of purpose or usage examining more than a dozen of knotting systems from different places around the world, including Khonds- and Stantali people of India, the Japanese *warazan* from Ryukyu Islands, the Makonde people of East Africa, the Wagogo People of Central East Africa, the Baganda people of Uganda; the Pueblo Indians, the Siouan tribes, the Maidu people the Arapaho tribes all from North America; the Peruvian Incas, the Guiana tribes and Orinoco Indians in Venezuela; the people of Marquesas Islands in Polynesia, the Hawaiian tax collectors, the Philippine Negritos and the Nauru Islanders all from the Pacific Islands.

The first type is related to magic and religion; the second type is the mnemonic type with two sub-categories and last the third type is the practical knots. The magic knots are presumed by primitive people to have power over:

1. the weather;
2. health and disease;
3. sex including love, marriage, conception, and childbirth;
4. spirits, demons and deities.

The influence of magic knots may be:

1. maleficent or beneficent;
2. intentional or spontaneous;
3. effective at close range or at a distance;
4. effective at once or after a lapse of time;
5. the work either of a layman or of a professional, like a witch, a wizard, or a medicine man.

In various cultures, knots have been used in rituals to influence natural elements like wind and rain. Rainmakers often avoid using knots, believing they inhibit rainfall; instead, they perform actions mimicking rain, such as dripping water

² Day 1957, 2021.

through leaves. Conversely, wind brokers, or witches, have historically claimed to control winds by tying knots in cords. Sailors would purchase these knotted cords, with the belief that untying the first knot would release a gentle breeze, the second a stronger wind, and the third a tempest. This practice was noted in regions like Finland, Lapland, Denmark, and various parts of the British Isles. The concept also appears in literature, such as Homer's *Odyssey*, where Aeolus, the king of winds, provides Odysseus with a bag containing bound winds. These traditions highlight the symbolic power attributed to knots in weather-related folklore.

Throughout various cultures, knots have been integral to traditional healing practices, symbolizing the binding or releasing of ailments. In the Punjab, a remedy for haemorrhoids involves tying a five coloured cotton thread around the big toe at night for a fortnight, concluding on a Tuesday. The Veddas of Ceylon address snake bites by reciting a charm and securing a string made of human hair above the wound. In Togoland, medicine men utilize black and white cords, wrapping them around the arms of the ill to expel evil spirits. Similarly, in the Scottish Highlands, black and white threads were wound around individuals or animals believed to be afflicted by the evil eye. The Musquakie Indians donned magic headbands to alleviate headaches, while the Apache's sacred *izze-kloth*, or medicine cord, was believed to perform various miracles, including healing the sick. In modern Egypt, the [دَقْعُ] (*ukād* [sic]³), a woollen cord with seven knots, each imbued with a charm and a magician's breath, is used to treat colds and fevers, typically worn around children's necks.

Throughout history, knots have been imbued with protective and apotropaic qualities, serving as amulets to ward off illnesses, malevolent spirits, the evil eye, and other negative influences. Unlike curative knots, which aim to heal existing ailments, apotropaic knots are pre-emptively tied to safeguard against potential dangers. Linguistic evidence underscores the deep-rooted association between knots and amulets. In Russian, for instance, the words for 'amulet' [на́у́з] (*náuzû*) and 'knot' [у́зел] (*úzelû*) share a common origin, and a term for 'wizard' is [узольник] (*uzol'nik*), meaning 'knot-tier'. Similarly, in Hebrew, the term for a charmer or enchanter is [הוֹבֵר הַחֵבֶר] (*hober haber* [sic]⁴), translating to 'a man who ties (magic) knots'.

Day's second type of knots are the mnemonic knots and their purpose is to aid the fallible human memory. According to him primitive man utilized mnemonic knots in two major ways by function:

1. Numerical knots
2. Cultural knots

³ In standard scholarly transliteration, it would be 'uqad'

⁴ In standard scholarly transliteration, it would be 'hōvēr hāvēr' or more simply 'hover haver'.

Numerical knots were used to record dates and numbers. In this category he mentions knot-calendars, by contrast the cultural knots are more complex to understand than simple numerical knots. Day mentions examples for the use of cord knotting from ancient times. Herodotus provides us probably the earliest known account of a knot calendar. In his narrative, the Persian King Darius, during his campaign against the Scythians tied sixty knots in a thong, and calling the despots of the Ionians to an audience he told them: 'Ionians, I renounce the opinion which I before declared concerning the bridge; do you now take this thong and do as I command you. Begin to reckon from the day when you shall see me march away against the Scythians, and loose one knot each day: and if the days marked by the knots have all passed and I have not returned ere then, take ship for your own homes'.⁵ Day then continues with examples of accounts from different places like the Makonde Plateau in East Africa, Rajamahall in Bengal in India, a Dravidian tribe called Khonds of southern India, the Pueblo Indians of New Mexico and Arizona, American Indians in Virginia and North Carolina Piedmont, the Huichol Indians of Mexico, a Yakima Indian of the State of Washington, Solomon Islands in the South Pacific. All these accounts share the same method of tying knots on a line of rope symbolizing the unit of time being measured, which can either be days or full moons depending on the length of time that needed to be measured. After each unit of time has passed a knot has been untied on the line of rope. By this easy method people from early times to even the 20th century could measure the passing of time.

Regarding mnemonic knots Day mentions George Keate's 18th century account of the Palau Islands, where Captain Wilson and his crew following the loss of their ship leaving the island behind in their newly obtained ship from the native king Abba Thulle, his second son, a boy named Lee Boo accompanied them to England and measured time with an above-mentioned knot-calendar measuring thirty moons. Extraordinary he moreover attempted to use another string of line of knots for entirely something else. He wanted to know the name and country of origin of every passing ship he saw at sea, so every time he saw a new ship he tied a knot on his rope and memorized the name and country of the ship. After each passing day, he repeated all the ship's information by using his hand on the rope. The crew misinterpreted this as he was reading his journal from his rope. Lee Boo's rope was merely just an external mnemotechnical aid based on the counting method with the knots on the rope.

Similarly to Lee Boo's account Day furthermore provides a detailed account on the *Marquesas* Islands records, where ropes were used to help to remember genealogies, folk-songs and legends. Every knot was identified with the name

⁵ Day 2021: 2.

of an ancestor. Karl von den Steinen even saw a *Marquesan* knot-genealogy that went back 159 generations (note that by counting thirty years for a generation this would bring us back to about 2870 BCE). A typical Marquesan knotted cord consists of a hollow plaited core, called the *toó*, to which appendages, including knotted strings, were attached. The priest who could ‘read’ the cord was called *tuhuka*.

In a Samoan folk tale, the small fish called *mano* ‘o challenges a porpoise to combat. As the porpoise approaches, hurling insults, the *mano* ‘o leaps into its nostril and wriggles, causing the porpoise to concede defeat. King Tapakea then praises the *mano* ‘o’s bravery and instructs the onlookers to mark its victory by setting up a coconut leaf with a knot tied at the top. This act reflects a common practice among South Sea Islanders, who used knotted cords or objects to record and remember events in the absence of a written language.

In 1822, Tyerman and Bennet observed a unique ‘tax-gatherer’s memorandum cord’ in Hawaii. This cord, approximately 2,400 to 3,000 feet long, was used by tax collectors, who, despite being illiterate, maintained precise records of collected items. Different sections of the cord represented various districts, distinguished by knots, loops, and tufts of diverse shapes, sizes, and colours. Each taxpayer had a specific segment, with the type and quantity of their contributions, such as dollars, hogs, dogs, sandalwood, or taro, indicated through these markers. This method resembles the quipus of ancient Peru, where knots and cords recorded historical data. Unlike Marquesan cords, which could only be interpreted by their creators or those instructed by them, this Hawaiian system allowed anyone familiar with the code to ‘read’ the information, as the varied knots and objects provided specific details beyond mere reminders.

Ancient Egyptian culture provides further testament to the significance of knots as protective symbols, from about thirty hieroglyphics that symbolize ropes or cords, around five have meanings related to amulets. The hieroglyph , representing a rope or a hobble for cattle or a string of magic knots also conveys the meaning for amulet and protection. The *ankh* symbol (☥), resembling a looped cross, signifies ‘life’ or ‘living’ and is frequently depicted in the hands of deities and individuals, emphasizing its association with vitality. A variant known as the *tyet* amulet , often referred to as the Isis knot, symbolizes life and welfare and appears in art as early as the Third Dynasty (c. 2686 BCE – c. 2613 BCE). These symbols highlight the Egyptians’ belief in the protective and life-affirming powers of knots.

The Greek term *δεσμός* means knot or spell or charm and its derivative *κατάδεσις* translates to binding fast and enchantment. The word *ἄμμα* signifies knot, while the compound word *περίαμμα* denotes something worn around the body or amulet. In Latin, *fascia* and *fascinum* refers to both band or bandage,

while *fascino* meaning to bewitch and the word *fascinatori* means enchanter. This linguistic interplay suggests that the ancients perceived a profound connection between the act of tying knots and the invocation of protective or magical forces.

Regarding the third type, the practical knots Day writes that modern civilization's tools stem from ancient inventions passed down through generations. He highlights that before the Age of Stone, humanity relied heavily on wood, which was abundant and essential for survival. Many tools, such as clubs, bows, and canoes, were originally made from wood, though their perishable nature has left little archaeological evidence. Primitive societies also utilized materials like vines, bark, and animal sinews for binding and construction, making the so-called Stone Age merely a late phase of a much longer Age of Wood, or even an Age of String.

Day argues that knots are among humanity's oldest tools, though their perishable nature leaves little archaeological evidence. Early humans likely used lashings and simple knots for practical purposes, and as their skills evolved, they developed more complex knots like the granny knot, square knot, and lark's head. Ethnographic evidence suggests that many indigenous cultures continued using basic knots for daily survival. However, historical and anthropological accounts often overlook knots, making it difficult to trace their precise origins and cultural variations. Additionally, some societies, such as sailors and indigenous groups, guarded their knot-tying knowledge, treating it as specialized expertise passed down through generations.

In his conclusion, Day posits that the use of mnemonic knots was likely a universal practice among prehistoric peoples. He suggests that these practices are of such ancient origin that the debate over whether they spread through cultural diffusion or arose independently becomes irrelevant. Day further speculates that as early humans migrated from a common origin, they likely carried with them essential tools, including various types of knots, magical, mnemonic, and practical.⁶

1.1 The Inka *quipu*

Gary Urton⁷ building on the important contributions of Locke, Ascher and Ascher and Conklin provides a detailed explanation about the Peruvian Inka cord knotting system. Urton concludes a differentiation has to be made between rosary, message stick and a *khipu* or *quipu*. A rosary is a series of beads on a string, a message stick consists of incisions on a stick, while a *quipu* is an

⁶ Day 2021.

⁷ Urton 2003, Urton–Brezine 2005, Urton 2014.

arrangement of cotton or wool strings made of alpaca, llama or other camelid fibers. Some of these strings or all of them may be dyed in complex colours, and they have been either Z-spun/S-plied or S-spun/Z-plied and attached recto or verso to a common, primary string and bear knots tied in a decimal-place fashion using three different types of knots: single knots, long knots and figure 8 knots. A *quipu* consists of a main or primary cord to which pendant strings are attached. Pendant strings may have secondary or subsidiary strings, which may have other subsidiary or tertiary strings attached. Some *quipus* have top strings, which hangs in the opposite direction of the pendant strings. Some *quipus* have end ornaments, referred to as *pachacamanta* meaning about or concerning a hundred, which became the synonym for labour groupings (*ayllu*) in Inka administration.

Related to the Inka *quipu* Urton mentions two different types of jobs, the master dyer and weaver, who organized the process of dyeing yarn, and the *kipukamayuk*, the knot maker or knot keeper, who was an official in charge of the knot accounting system, organizing, transferring and overseeing the labour days, wages paid, censuses, tribute, ritual and calendrical organization, genealogies and other matters.

Urton furthermore argues that the Inka *quipu* was a binary encoded writing system, utilizing the combinations of spin, colour and knot types, and these coded series were read or interpreted on the basis of values assigned to these coded sequences.⁸

According to Charles C. Mann⁹ the *quipus* date back to the Spanish colonial period in the 16th century, but unfortunately many of these evidences were destroyed, and only 600 *quipus* survived the Spanish conquest. 20% of the surviving *quipus* appear to be non-numerical, suggesting a possible writing system. In 2000, an Australian lab using mass spectrometry dated a *quipu* from the Miccenelli collection and placed it between the 11th and 13th century. Archaeologist Ruth Shady Solis¹⁰ of the National University of San Marcos in Lima states, that the *quipu* found in Caral, an archaeological site in Peru that dates back to around 2600 BCE to the *Caral* civilization or *Norte Chico* civilization, is possibly the oldest known *quipu* or even a proto-*quipu* and may be about 4500 years old. This suggests that *quipus* were in use long before the Inka empire.

⁸ Urton 2003.

⁹ Mann 2005a, 2005b.

¹⁰ Solis 2001.

1.2 The Japanese *warazan*

Closer to China another cord knotting system existed, the so-called Ryukyuan knotted straw cords or *warazan*. According to a paper by Kinjō Matsuei 金城松栄 and Kotagiri Tadato 小田切忠人,¹¹ who gathered local researches and did field work and interviews, on the Ryukyu Islands (modern day Okinawa) in Japan, states that in the Okinawan dialect the word *sanmin*, which stands for counting comes from the Chinese *suanming* 算命, to tell fortune. The *warazan* (Miyako dialect: *barazan*) is a form of knotted cord counting and a tool used for arithmetical calculations or recording numbers by tying knots in ropes. The term *warazan* (literally meaning straw counting) comes from its primary material, straw. However, if ropes were made from other materials, such as aerial roots of the adan tree or orchid fibers, they were also referred to as *warazan*. The paper mentions an account from 1477 by a Korean visitor to the *Ryukyu* Islands, who do not mention a writing system, implying that *warazan* either did not exist or might not have been widely used yet. Some records suggest the use of *warazan* began between 1477 and 1637, likely linked to the head tax system introduced in 1637. The spread of formal education and the introduction of the *soroban* (Japanese abacus) led to the gradual disappearance of *warazan*. It is said that on Taketomi Island in the 12th year of Shōwa (1937), *warazan* were burned, and despite their grandchildren's *soroban* (abacus) results being correct, many elderly people were surprised by this. The author believes the elders realized that science cannot be overcome, so they accepted the burning of the straw bundles. In 1969–70s an elderly woman in Okinawa was reportedly still using *warazan* in her store as possible the last user of it in modern days Japan.

To understand the place of cord knotting in ancient China we have to understand the origins of the Chinese writing system.

2. Briefly about the evolution of Chinese writing

2.1 Evolution of characters

In her paper, Csikó¹² provides a detailed summary of research on Chinese writing's evolution. As established, writing emerged independently in four ancient centres: Mesopotamia (3400–3300 BCE), Egypt (3200 BCE), China (1200 BCE), and Mesoamerica (900–500 BCE).

¹¹ Kinjo – Kotagiri 2009.

¹² Csikó 2022.

The earliest Chinese evidence appears in late Shang oracle bone inscriptions (OBI, 1200–1045 BCE), ritual devices used by imperial shamans to communicate with the spirit world. Notably, many excavated bones contain drill holes and fire marks without inscriptions, suggesting the primary ritual language was non-scriptural, with Chinese characters serving a secondary recording function.

Demattè's analysis of writing origins examines the gradual versus sudden development theories. Like Sumerian cuneiform and Egyptian hieroglyphs, Chinese script shows signs of progressive evolution. The sophistication of OBI implies earlier developmental stages supported by Neolithic archaeological finds, favouring gradualist explanations over isolated invention.¹³

This aligns with Xu Shen's 許慎 (c. 55–149 CE) traditional account attributing writing's creation to Cang Jie 倉頡, who allegedly progressed from pictographic patterns taken from nature to characters incorporating phonetic elements.¹⁴

Modern scholarship, however, challenges romanticized narratives of script standardization. As Galambos demonstrates through rigorous re-examination of Han sources (*Shuowen jiezi*'s postface and *Hanshu*'s *Yiwenzhi*) contrasted with epigraphic evidence.

Standardization was gradual, beginning pre-Qin and continuing centuries post-unification, evidenced by variance between Qin bronze inscriptions vs. *Shuowen* small seal script; inconsistencies in Qin-era script itself; non-uniform Han small seal script (e.g., Yuan'an stele 袁安碑 vs. *Shuowen*); persistent irregularities in Mawangdui manuscripts despite reforms.

Shuowen's prescriptive nature reflected Han cosmology. Xu Shen sought to 'restore' an imagined innocent script amid perceived moral decay. *Liushu* categorizations served as pedagogical mnemonics for character memorization, not evolutionary principles. The dictionary functioned as examination preparation tool, freezing character forms to curb innovation.¹⁵

Political symbolism over linguistic reality, where script standardization represented the Han 'projection of cosmic order onto writing'; an ideological stance where correct writing signified moral virtue; continuous state efforts spanning Qin edicts to Han punishments for nonstandard characters.¹⁶

Thus, the Qin-Han script reforms constituted not instantaneous imposition but centuries, long negotiation between administrative pragmatism, pedagogical needs, and cosmological ideology, a process continuing long after the Han era.

¹³ Demattè 2010: 211–213.

¹⁴ Bottéro 2002: 24.

¹⁵ Galambos 2006: 40.

¹⁶ Galambos 2006: 62.

2.2 Criteria of writing systems

A writing system should be able to communicate from simple to complex, concrete and abstract thoughts with a set of symbols carved, painted etc. on a medium. Bagley mentions that the Shang oracle bone inscriptions from around 1200 BCE count as a full writing system because it is able to record connected discourse. When discussing the divinations further on the excavated oracle bones he writes that specialists agreed that it is considered full writing for the reason that the Shang scribe could probably have written pretty much anything he could say.¹⁷

In his review, Packard summarizes Boltz's analysis of the four universal stages in the development of writing, as cited from Campbell.¹⁸ In stage one the use of logographs, where each graph uniquely stands for a single word. In stage two Boltz terms graphic multivalence where one graph may have multiple meanings with the help of visual rebus writing, where the words are different in meaning but homophonous in pronunciation, technically speaking paronomasia. In the next stage, stage three, which he calls the determinative stage, where determinatives are secondary graphs, which solve the problem of ambiguity. In stage four, which Chinese never reached, is the phonetic stage, where graphs become fully phonetic symbols.¹⁹

I argue that in this first stage several concrete objects (both natural and man-made) have been implemented in the visual formation of the first characters of Chinese language, just like footsteps, birds, sun, mountain, tree and the knotted silk, which in this case might be a just simple grass rope (see Chapter 4.6. and 4.7. for further details). So, if cord knotting ever existed in China it was not a prerequisite for the development of the Chinese writing system, rather an earlier, decentralized tool for counting, which was not reliable anymore due to its slow process and as the postface to the *Shuowen jiezi* 說文解字 mentions (see Chapter 4.1 for further details) with the growing numbers of fraud and forgery, so ancient book keepers had to leave this method behind and switch over to the newly and widely developing writing system. It was not a prerequisite for writing, but it existed before and inspired it, with the emphasis on Chinese writing would have developed independently of rope knotting.

But before trying to place and connect cord knotting with writing systems first, we have to look at the definition and prerequisites of what makes a writing system what it is. For this exact reason Demattè outlines four criteria for distin-

¹⁷ Bagley 2004: 190, 198.

¹⁸ Campbell 1984.

¹⁹ Packard 1996.

guishing Neolithic signs potentially ancestral to Chinese writing from those that are not. These criteria include:

1. intentionality and structural coherence, with distinctive shapes and systematic use,
2. a logical developmental connection with later Shang bronze or bone scripts,
3. forming a regional system expanding over time, and
4. emergence during socio-political complexity.

Demattè acknowledges that while some Neolithic signs could be related to the development of Chinese writing, others might not be. These criteria help in differentiating between significant early signs and other early forms of communication like basic signaries and counting systems.²⁰

From this we can understand that cord knotting does not fulfil the requirements of Demattè to be a writing system.

3. Review of Chinese sources

3.1 Citing the classics

Unfortunately, archaeological evidence regarding cord knotting in China is limited, only remnants of different kind of ropes, such as the later mentioned structural reinforcement ropes kind of ropes or such archaeological finds as arrow heads indicate the usage of bow, which required a string, which are available to us. Many scholars, like Xu Jiming 徐繼明, Jin Qingwan 靳青萬, Zhuang Jiandong 莊建東, Ji Shaoyu 嵇紹玉, Liu Zhengying 劉正英, Liu Zhiyuan 劉志遠 or the venerable Xu Zhongshu 徐中舒 all turn to the classics and mention the following sources in different variations. The most prominent of them all is the *Book of Changes* and its commentary the *Yi · xici zhuan* 《易·系辭》²¹ :

In high antiquity, governance was conducted by tying knots; in later generations, sages replaced this with writing (and carving). Officials used them to govern, and the populace used them for inspection.

上古結繩而治,後世聖人易之以書契;百官以治,萬民以察。

²⁰ Packard 1996: 802.

²¹ This commentary is one of the ‘Ten Wings’ traditionally appended to the *Book of Changes*, providing interpretative insights and philosophical context to the hexagrams and their judgments.

Or to quote Xu Shen's 許慎 postface to the *Shuowen Jiezi xu* 《說文序》:

Upon the time of the Divine Farmer (Shennong) tying knots was the means of governance, overseeing (uniting) his affairs. As tasks (jobs and businesses) became numerous so did deceit (and forgery) proliferate. Cang Jie 倉頡, the scribe of the Yellow Emperor, observed the tracks of birds and beasts, realizing that distinctions could be made, and thus initially created writing by carving wood. By this the hundred officials were regulated, and myriad entities (commodities) were (could be) inspected.

及神農氏結繩為治,而統其事,庶業其繁,飾偽萌生。黃帝之史蒼頡,見鳥獸蹄迹之跡,知分理之可相別異也,初造書契;百工以乂,萬品以察。

Or to mention the western Han scholar Zheng Xuan's commentary on the *Book of Changes* Zheng Xuan *Zhouyi zhu* 鄭玄《周易注》:

For important matters tie large knots in the cord and for minor matters tie small knots in the cord.

事大,大結其繩,事小,小結其繩

Or a longer version of the same passage:

In ancient times, when there was no writing, people used knotted cords for agreements and pledges. For major matters, they tied large knots; for minor matters, they tied small knots. The number of knots varied according to the quantity of things recorded. Each party would hold a copy for mutual verification, which was sufficient for governance.

古者無文字,其有約誓之事,事大大結其繩,事小小結其繩,結之多少,隨物眾寡,各執以相考,亦足以相治也。

Or in the *Literary Mind* and the *Carving of Dragons* by Liu Xie 劉勰 it is written that *Wenxin Diaolong* 《文心雕龍》:

Written symbols were arranged as (the time of) knotted cords moved on, and bird tracks became clear as written characters have been created.

文象列而結繩移,鳥跡明而書契作。

Or to mention *Zhuangzi Quqie Pian* 《莊子·胠篋篇》：

In ancient times, during the reigns of Rongcheng, Dating, Bohuang, Zhongyang, Lili, Liliu, Xuanyuan²², Hexu, Zunlu, Zhurong, Fuxi, and Shennong, the people used knotted cords (for record-keeping.)

昔者容成氏、大庭氏、伯皇氏、中央氏、栗陸氏、驪留氏、軒轅氏、赫胥氏、尊盧氏、祝融氏、伏橫氏、神農氏 當是時也民結繩而用之。

While the Chinese authors mentioned above refer to classical sources and accept them without question, they overlook international research and accounts of other minority groups in China who also used cord knotting. For example, *The Early History of Tibet: From Chinese Sources* mentions the ancient tribe called *Qiang* 羌 and states:

They have no written characters. Notched pieces of wood and knotted strings are used in covenants. Although there are officers, they are not constantly employed, being only appointed when there is stress of business. For collecting warriors, they use gold arrows.²³

and

The Yangt'ung first communicated with China in the year 641, when they sent envoys to the imperial court. They were divided into Lesser and Greater. The latter people were settled on the plateau to the south of Khotan, having the Lesser Yangt'ung on their west, the Tufan on the east. 'Their country was 1000 li from east to west, and they numbered between 80,000 and 90,000 fighting warriors. They were a nomadic people, who plaited their hair into a queue hanging down behind, and dressed in felt and fur. Wind and snow prevailed, and ice more than ten feet thick. 'They had no written characters, only cut notches in sticks and tied knots in cord.'²⁴

3.2 Xu Jiming 徐繼明

In his paper, Xu Jiming 徐繼明 refers²⁵ to the discovery of horizontally arranged straw ropes embedded in the walls of House No. 405 at the Dadiwan site in Qin'an, Gansu 甘肅秦安大地灣. Without citing specific sources, he claims

²² Alternative name for the Yellow Emperor.

²³ Bushell 1880: 440

²⁴ Bushell 1880: 527.

²⁵ Xu 2002.

these were used for ‘knotted cord recording’ and suggests the ropes were stored in six or seven layers along the walls, interpreting this as evidence of a storage system for cord-based records.

According to archaeological excavations, on the walls of House No. 405 at the Dadiwan site in Qin’an, Gansu, horizontally arranged straw ropes were observed spanning between every two wall-supporting columns... Based on this, some experts have speculated that *jiesheng jishi* (cord-knot recording) not only truly existed but also had centralized places for storage and safekeeping.

據考佔發掘研究發現，在甘肅秦安大地灣發掘的405號房屋內的牆上，看到在每兩根附壁柱上，佈滿了橫向排列的草繩...有專家推論：“結繩記事”不但真實存在，而且，還有集中存放和保管的地方。²⁶

He further asserts, again without citing his source, that the tradition of knotted cord recording was still in use among ethnic minorities in southwestern China as late as the 1950s:

According to modern sources, even as late as the 1950s, some ethnic minorities in southwestern China continued using the traditional method of *jiesheng jishi* (knotted cord recording) to track time calculations and record important family or clan events.

根據現代資料介紹，就是歷史發展到了現今的五十年代，在我國西南地區的少數民族中也還有繼續使用著“結繩記事”的傳統方法，用來記載時間的推算以及家庭或家族中的重大事情。²⁷

In addition, Xu draws an interpretive link between the archaeological record and a historical official title used in Confucian texts, namely *zhu xia li* 柱下吏 (‘scribe under the pillar’), suggesting a possible connection between ropes and bureaucratic recordkeeping. However, the archaeological report he cites, Qin’an Dadiwan 405 hao xinshiqi shidai fangwu yizhi 秦安大地灣405號新石器時代房屋遺址 by Zhao Jianlong 趙建龍, makes no such claim. It only describes structural features:

The pillar leans 35 degrees to the south, causing the northern residential surface to bulge upward and crack. The wooden pillar was burned, leaving behind a grass and mud casing on the ground, 0.15 meters high, 0.81 meters in diameter, and 6.5 centimetres thick. The casing has two layers, and between them are impressions

²⁶ Xu 2002: 109.

²⁷ Xu 2002: 110.

of grass ropes, spaced 4.5–5 centimetres apart. The exterior is coated with a layer of white lime.

柱身向南傾斜35度，致使北部居住面向上隆起破裂。木柱已燒毀，地面殘存草泥包皮，高0.15、直徑0.81米、厚6.5厘米，分兩層，兩層之間有草繩纏繞痕跡，繩痕間距4.5–5厘米。外表塗抹白灰面。

These impressions likely result from construction techniques rather than recordkeeping. Thus, while the presence of ropes indicates their technological existence in the Yangshao 仰韶 culture (3rd–5th millennium BCE) or earlier, the evidence does not support the claim that these ropes served as a writing or accounting system.

3.3 Liu Zhiyuan 劉志遠

Liu Zhiyuan 劉志遠 in his paper²⁸ argues that in order for knot recording to work three conditions were necessary:

1. Availability of Rope: people first had to produce rope.
2. Knotting Skills: They needed the expertise to tie knots in various ways.
3. Ability to Create Pictorial Symbols: The knots had to take on specific forms that could symbolize or represent particular objects, events, or ideas.

Based on archaeological evidence (for example, composite tools from sites in today's Shanxi 山西 and Hebei 河北 showing that ancient people already used rope to fasten stone arrowheads to wooden shafts), the author asserts that as early as the Neolithic period, humans had mastered rope-making and knotting. These skills were then applied to various aspects of life, gradually developing into a system that not only assisted memory before writing existed but also evolved alongside the development of pictographic writing. The evolution of cord usage proceeds with everyday needs and practical usage like tools for construction. Rope was used in making composite tools (e.g., bows, arrows) by tying together wood, stone, and rope. Another usage was related to navigation and hunting. Hunters carried a short rope with which they could tie knots. In unfamiliar hunting grounds, they would use red-dyed (with animal blood) ropes knotted on visible objects (such as tree branches) or laid on the ground to mark paths and directions, ensuring they would not get lost. A third usage was time

²⁸ Liu 1996.

keeping to measure the passage of days, months and seasons to optimize agricultural production.

Furthermore, the author sees this method as not merely a mnemonic device used before the advent of writing but as a parallel development that contributed to the emergence of pictographic writing. He links the progression from simple knotting to the affixing of symbols on cloth and eventually to carved inscriptions, thus positioning rope knotting as an integral step in the evolution of Chinese written language.

Although the author's reasoning is consistent and follows a clear progression and cites archaeological finds, but altogether due to the perishable nature of rope direct archaeological evidence is limited. The argument rests on inference and interpretation of later symbolic systems rather than direct proof and connects cord knotting with the evolution of writing linearly backwards in time rather than building up the connection through evidence.

3.4 Ji Shaoyu 嵇紹玉

Ji Shaoyu 嵇紹玉 presents²⁹ cord knotting as a transformative innovation that emerged around 5000 years ago, a breakthrough that 'pierced the chaos' much like a lightning bolt, marking humanity's transition from a state of raw survival into the realm of civilization. Although cord knotting for record keeping occurred after spoken language had developed and before formal writing appeared, its influence extended well into later eras. The author's argument is built on several key ideas starting from basic survival needs (clothing, food, shelter), where cord knotting was a new innovation, which evolved into record-and time keeping tool. The author highlights that Chinese cord knotting was distinguished by an emphasis on the shape, size, and arrangement of knots. Unlike other cultures (for example, ancient Persians, who associated different colours with specific meanings), early Chinese practices relied on the physical form of the knots to encode information. This focus on form influenced the later development of Chinese characters. The author notes that patterns found on Neolithic pottery, such as circular water ripple designs and grid like arrangements, reflect the early application of mathematical principles. These patterns, reminiscent of cord knots, suggest that rational, even numerical, thinking was present at the time when cord knotting was used. This rational approach helped ensure that the knots could reliably record quantities and structured information. Even after the invention of writing, cord knotting retained its cultural resonance. Over time, its

²⁹ Ji 2020.

function evolved from mere record-keeping to becoming a carrier of emotional and social meaning. Specific knot forms (like the *tongxinjie* 同心結 for ‘unity in love’) came to symbolize interpersonal bonds and social cohesion. The very language of connection, terms like *jieyi* 結義 (‘forming brotherhood’), *jiebai* 結拜 (‘sworn brotherhood’), and *tuanjie* 團結 (‘unity’), derives its imagery from these ancient practices.

The author effectively ties the practice of knotting to a range of later cultural achievements, from the formation of writing systems to the establishment of communal rules and even emotional symbolism. The tone of text is speculative and poetic. While this makes the narrative compelling, it also means that many of the claims are interpretative rather than strictly evidentiary. The imagery, though evocative, sometimes obscures concrete details and relies on a speculative reconstruction of events due to lack of direct archaeological evidence.

3.5 Liu Zhengying 劉正英

Scholar Liu Zhengying 劉正英 in his paper³⁰ based on the classics mentioned above, and archaeological finds, like the Shiyu people’s ruins in Shanxi province (*Shanxi shiyuren yizhi* 山西峙峪人遺址) dating back 28000 years, reveal that early peoples not only made knots but also produced pictures and incised symbols, indicating that methods like pictographs, incisions, and knot records had already undergone a long development. The author then turns to the mysterious and legendary diagrams of *hetu* 河圖³¹ and *luoshu* 洛書³² as the starting point of Chinese culture and civilization. The author proposes an interesting connection by combining the *hetu* and *luoshu*, along with the Eight Trigrams, *bagua* 八卦, ancient people could encode information of names, dates, locations onto knots. The author provides a speculated simulation example on how recording an event could have worked using knots on a rope with the help of the above-mentioned diagrams. He records the event ‘this year an earthquake occurred in the southwest’ by assigning numeric values and directional indicators (using different knot sizes, distances, and sequences) to represent the time (‘spring’), location (‘southwest’), and the event (‘earthquake’). The author reexamines

³⁰ Liu 2000.

³¹ *Hetu* 河圖, often called the River diagram, is said to have emerged from the Yellow River. It is associated with the ordering of the cosmos and the principles governing nature, often linked to the concept of the Five Elements (wood, fire, earth, metal, water) and yin-yang dynamics.

³² *Luoshu* 洛書, known as the ‘Luo writing’, is famously represented as a 3×3 magic square where every row, column, and diagonal sums to 15. According to legend, it appeared on the shell of a mystical turtle in the Luo River. This diagram has influenced various aspects of Chinese thought, including divination practices like the *Yi Jing* and even aspects of *Feng Shui*.

several ancient legends (for example, the myths of Nüwa 女媧, Fuxi 伏羲, Shennong 神農, and Huangdi 黃帝) by considering them in the context of knot record-keeping. This reinterpretation implies that these legendary figures were originally record keepers or administrators who used knot systems to manage and pass down important tribal or clan information. The eventual development of written language then naturally replaced the knot-record method.

The paper's reasoning follows a clear trajectory, as once the basic prerequisites (rope, knotting skills, and a need to record) were met, the system naturally evolved from simple mnemonic knots into a complex, rule-based method capable of recording numerical and event information. This progression is further linked to the eventual emergence of written language. Although the connection between writing and cord knotting is explained, however it is not supported with evidence. The paper hypothesizes that ancient Chinese knot record-keeping *élél* was far more sophisticated than the simplistic 'big knot for big events' model, and it integrated symbolic systems like *hetu* 河圖, *luoshu* 洛書 and numerical, directional schemes, forming a precise method for recording and transmitting information.

3.6 Zhuang Jiandong 莊建東

The author Zhuang Jiandong 莊建東 in his paper³³ proposes a new theory on the origin of Chinese characters by highlighting the role of cord knot record keeping as a transitional stage toward symbolic record keeping. He reviews various ancient legends and theories (see sources in Chapter 4.1) and argues that the practical needs of early Chinese agricultural society (such as record-keeping during large-scale warfare) drove the development of increasingly complex methods to record events.

According to the article, cord-knot record-keeping (as attested in texts like the *Book of Changes*) provided the foundational method for recording information before the advent of writing. Over time, record keepers evolved this method by adding inscribed bamboo or wooden tablets to the knots, a process personified by the figure of Cang Jie 倉頡. This method not only ensured accurate recording and transmission of important events but also eventually led to the development and unification of Chinese characters. The author supports his theory with references to ancient texts, archaeological discoveries (such as bone artifacts with rope traces and engraved symbols), and ethnographic parallels,

³³ Zhuang 2008.

arguing that the need for complex record was the primary driving force behind the creation of writing.

Although the author presents a plausible scenario for the evolution from cord knot record keeping to symbolic writing, much of this reconstruction is speculative. The absence of direct, unambiguous archaeological evidence for a transitional Cang Jie phase means that the theory, while coherent, cannot be conclusively proven at present.

3.7 Jin Qingwan 靳青萬³⁴

Jin Qingwan 靳青萬 in his paper³⁵ stresses the significance of cord knot record systems as an important developmental stage in human civilization, and hypothesizes oracle bone inscriptions have revealed traces related to rope-knot record methods. In particular, four oracle bone characters (𣎵、𣎵、𣎵、𣎵 糸、亼、專、傳 respectively) appear to be directly linked with the rope knot recording process and may even reflect its internal operation. The author, based on comparative research between different oracle bone inscriptions, argues that the shape of the OBI character *mi* (originally *si*, as in *si* 絲, ‘silk’) 糸, found on different oracle bones, like: 𣎵、𣎵、𣎵、𣎵、𣎵, all consist of two intertwined lines, resembling a rope rather than a fine thread. These entanglements can also be viewed as knots on the rope. The author argues that in early times there was no separate character for *sheng* 繩, meaning ‘rope’, because adding phonetic components (in this case the part *měng* 黽, originally depicting a toad, of the character *shéng* 繩) or the phono-semantic stage was a later invention, so the character for rope, *sheng* 繩, could not exist in early times. However, since its importance in daily life, there had to exist one character for rope, so the original meaning of *mi* (or *si*) 糸, instead of fine silk as defined³⁶ in the *Shuowen jiezi*, should be *sheng* 繩, rope.

The author as a supporting argument examines the interrelationships with other characters, and shows that the oracle bone form 𣎵, and its graphic variants 𣎵、𣎵、𣎵、𣎵 later identified as *zhuān* 亼, meaning to entangle, seems to be derived from the above mentioned 𣎵 rope character by adding a cross *shi*

³⁴ All special characters, glyphs, and oracle bone inscriptions reproduced in this paper are taken directly from the reviewed author’s original article. Any characters that could not be digitally rendered or typed have been represented as faithfully as possible based on the source material.

³⁵ Jin 1996. Characters in this section stem from the same article.

³⁶ Section *mi* 糸 (silk): *mi* 糸 means ‘fine silk thread’. It depicts the form of a bundle of silk threads. All characters belonging to this category follow the *mi* 糸 semantic key. It is pronounced like *mi* / *mò* 覩. 《糸部》糸：細絲也。象束絲之形。凡糸之屬皆從糸。讀若覩。(Xu 2010: 271).

十, meaning ten, component to it, and argues that this is the ancient symbol for knot on the rope. Following this the author argues that the oracle bone form  *zhuān* 專 and its graphic variants , , ,  are also shown to be derived from the above-mentioned rope with a knot by adding a hand component to it. This component symbolizes the individual tasked with tying the knot and, crucially, memorizing the information encoded in it. Thus, *zhuān* 專 came to denote not only the act of knotting but also the role of the dedicated record keeper within the society. The author supports his claim by the meaning of the following expressions all originate from the above-mentioned character *zhuān*-*mén* 專門 ('specialist, specialized'), *zhuānyī* 專一 ('concentrated'), *zhuānxīn* 專心 ('to focus one's attention, to concentrate on doing something').

The final character analysed is  and its graphic variants ,  *chuán* or *zhuàn*³⁷ 傳, whose form typically includes elements such as a 'hand' holding or pointing at a knot and a smaller human figure. This composition is understood to represent the process of passing on or transmitting the knotted record (either physically or the stories, matters, names etc. quasi-stored with the help of the rope) from one person to another. It encapsulates the dual function of reciting or 'explaining' the recorded content as well as formally handing it over to a designated successor. The author supports his claim by the meaning of the following expressions all originate from the above-mentioned character *chuánshòu* 傳授 ('to pass on'), *chuánshuō* 傳說 ('to repeat from mouth to mouth, legend, folk tale'), *chuándì* 傳遞 ('to pass on to somebody else'), *chuánshù* 傳述 ('to relay, to retell'), *chuánchéng* 傳承 ('to pass on to future generations; passed on from former times').

The author argues that the four characters together form a coherent sequence:

-  – *mì* (or *sī*) 糸 – 繩, for the physical rope (recording material),
-  – *zhuān* 專, for the formation of the knot (record symbol),
-  – *zhuān* 專, for the specialized person who ties and memorizes the knots, and
-  – *zhuàn* (or *chuán*) 傳, for the transmission of this recorded information.

³⁷ Note that coincidentally (or not) the two modern phonetic value represent two similar meanings related to cord knotting. *Chuán* means to pass on something (like the stories or names of relatives from the rope), while *zhuàn* is the noun, the biography itself.

The author argues that this sequence not only corrects past misinterpretations of the oracle bone script but also reveals the sophisticated internal structure of the cord-knot record system. It supports the idea that the system was a fully functional method for record-keeping, a precursor to later writing systems.

While arguing for the sophistication of the cord-knot system, the paper also realistically assesses its limitations, such as the heavy reliance on a specialized memory keeper and the inherent difficulty in reading the symbols without prior training. This balanced view lends credibility to the argument. The reasoning extends beyond mere character analysis. By connecting the cord-knot system to later developments in writing and state organization (e.g., the institutionalization of historians or storytellers), the author suggests a continuous cultural evolution from prehistoric record-keeping to historical documentation in later dynasties.

3.8 Xu Zhongshu 徐中舒

Xu Zhongshu 徐中舒 in his paper³⁸ provides a detailed account on the topic including the above-mentioned classic citations, socio-complexity requirements, accessibility to ropes, moreover based on the historical account of Liu Xie 劉勰 mentions the Qiang 羌, Hu 胡 used tying knots, moreover points out the Yao 瑤 people in Guangxi 廣西, who in his own time, still used knotted cords for keeping accounts.

As indirect evidence the author further examines how the following ancient Chinese characters derive from depicting a line of rope:

Shēn 申: In oracle bone and bronze inscriptions, this character is shown with a form that resembles a bending or bifurcated rope 𠂔, 𠂕, which is the original character for *shēn* 紳, to tie or bind an object; and the character *shēn* 伸, meaning to stretch, and the character *diàn* 电, meaning lightning, are both derived from the shape (as a line in the sky) and nature (to be able to stretch and extend) of the rope.

Tún 屯: Presented in bronze script as 𠂔 depicting a rope that not only bends and splits into strands but also shows a knot. The knotting signifies difficulty or obstruction, leading to meanings such as difficult or hesitate, hence the modern meaning to pause (*dùn* 頓).

Zhōng 終: Its *guwen* 古文 form in *Shuowen jiezi* is 𠂔, and its bronze script form is 𠂔 said to mimic a rope with knots at both ends, symbolizing completion or depicting the end of the ropes as finality, and giving rise to the

³⁸ Xu 1998. Characters in this section stem from the same article.

notion of a rope tied on both ends as in ending or culmination. The character meaning winter *dōng* 冬 also comes from this ancient graph, symbolizing the end of the year.

Additional characters are analysed for their resemblance to rope forms or actions associated with ropes, such as *dé* 德 and *guān* 關. The author analyzes that the key element in *dé* 德 is *zhí* 直, which in its OBI form , and bronze script form  consists of a rope and an eye looking at it. Supporting his claim with historical accounts he concludes that the rope refers to a carpenter's line marker (chalk reel or chalk line), which even today is still in use for construction to mark a straight line. Reinforcing the idea that many ancient glyphs were inspired by the physical attributes of rope and its use in binding or measurement. *Guān* 關 in bronze script appears as  關, illustrating two doors each tied with a cord, indicating closure by linking and tying or binding together. According to the author Xu Shen's analysis of having ear, *ěr* 耳, as a semantic component is erroneous.

The author realizes the limitations of this method and mentions several characters that have a similar component, that looks like a rope with a cord (a dot on a line), but acknowledges that they are not related to cords or ropes, and each character should be investigated separately.

The paper explains that one of the primary uses of cord knots in antiquity was for counting. Because numbers are easily forgotten or misremembered, knots provided a reliable mnemonic device. The discussion highlights several numeral characters:

Jí 計: Originally meant to count or calculate and is linked to the act of knotting. It consists of the semantic components speech *yán* 言 and ten *shí* 十, but the component ten here is not restricted only to the number ten, since in its bronze form  it resembled a knot on a rope, which could both mean the number ten and to calculate. The small dot later in its seal form became a short horizontal line thus losing the resemblance to the knot. But note that in its OBI form the dot was also missing , the author explains that this is due to the fact that in early times carving a round shape was difficult.

Niàn 廿: The character for 20 in its OBI form can be observed as U shape, while in its bronze inscription form  can be observed with two knots in the middle of the rope, hence the meaning 10+10 = 20.

Sà 卅: The character for 30 in its OBI form can be observed as  shape, while in its bronze inscription form  or  can be observed with three knots in the middle of the rope, hence the meaning 10+10+10 = 30.

Xì 卅: The character for 40 in its OBI form can be observed as  shape, while in its bronze inscription form  can be observed with four ropes tied into one, hence the meaning $10+10+10+10 = 40$.

The author continues that above forty, they started to use compound characters, e.g. for the number 50 there is 5 and 10 placed on top of each other .

In the next category the author demonstrates how cord knots were employed to record various types of transactions and agreements such as sales, gifts, and loans.

Mài 賣: Bronze inscriptions show a form  that mimics a person using a knotted cord  to signal a sale. This practice is still observed in some regions, like in today's Sichuan 四川, where objects for sale are marked with tied materials.

Guì 貴: The character's structure in bronze inscription form  consists of the semantic component , which has the following semantic element inside it  showing two hands holding a rope with a knot, symbolizing the assessment of value, implying that valuable items were marked with specific knot patterns.

Sòng 送 and *yìng* 媵: The bronze form of these characters  and  respectively, are analysed for their component  (yìng 併), which in its bronze inscription form shows  two hands holding up a rope with a knot, later an eight, *bā* 八, component has been added to it  emphasizing the meaning of the threads being stitched, as it can be seen even more enlarged in its small seal form . These elements reminiscent of knotted cords originally conveyed meanings related to delivering or transferring something, in contexts such as gifting or bride price.

Gòng 共: In bronze script, the character appears as  or , both depicting two hands holding two ropes, symbolizing offerings or contributions. Since offerings were typically made to those of higher status, *gòng* 共 extended its meaning to signify respect and later evolved into *gōng* 恭, meaning reverence.

Yè 叶, *xié* 叶, *zhī* 汁: The author argues that these three characters were historically interchangeable with *xié* 協 meaning to unite, and in this case all their phonetic value is *xié*. While in their bronze inscription form , ,  respectively looking more complex forms, in its OBI form 协 was depicted in its simplified form as . The component *fēng* 丰 in these characters resembles the notches carved into bamboo or wood, symbolizing contracts or agreements. The symbol  represents the shape of a knotted cord, while  and  depict containers used to store such contracts. The clerical script form of *yè*/*xié* 叶 is a variant of , . The forms of *xié* 叶 and *zhī*/*xié* 汁 are simplified versions of , .

The author argues that in ancient times, recording events with knotted cords was limited in complexity. Therefore, carved wooden contracts were sometimes necessary. As noted in Zhou Qufei's *Lingwai daida* 周去非《嶺外代答》the Yao 瑤 people used wooden contracts:

The Yao people lack written language; for important agreements, they carve matching notches on two wooden boards, with each party keeping one. They trust these deeply. When submitting petitions to local authorities, they also use such wooden contracts.³⁹

瑤人無文字,其要約以木契合二板而刻之,人執其一,守之甚信。若其投牒於州縣,亦用木契。

Shì 貰 to sell on credit and *dài* 貸 to lend: The author argues that the character *shì* 貰 in bronze script derives from *shì* 世, which resembles a knotted rope attached to a stopping point, suggesting a record of credit or deferred payment (for explanation see genealogies). The character *dài* 貸 in bronze script appears as , also symbolizing a knotted rope, reinforcing the idea that loans and credit transactions were recorded using rope knots.

The knots served dual functions, not only to count but also to authenticate and memorialize the details of exchanges, providing a durable, non-written record in societies that had not yet fully developed a written language.

The author then moves onto the third category of cord knot character type. With the deep-rooted practice of ancestor worship in China, cord knots were also used to record family lineages and generational succession.

Gǔ 古: Bronze inscriptions illustrate a form that, through its knot-like features, symbolizes antiquity and the continuity of ancestral records. The character is explained as being derived from knot imagery. Its bronze inscription form shows  a knot on a rope above a mouth. Then it is compared to the semantic component *gǔ* 古 in the character *gǔ* 姑, which shows as . Inside the upper part of it one can observe the knotted cord. The author emphasizes that the two shapes  and  indicate two different types of knots, a simple knot and a more complex knot, which align with the classic model big knot for big matter, small knot for small matter. Moreover, the author argues that the definition provided by Xu Shen, that the character old *gǔ* 古 consists of the semantic components ten *shí* 十 and mouth *kǒu* 口, and explained as what is passed down through ten mouths is ancient, is too metaphysical and does not reflect the original meaning of character creation. The author argues that the Xu Shen's explanation is too abstract and doesn't reflect the original, practical origins of the characters for

³⁹ Xu 1998: 260.

ancient *gǔ* 古, to sell *gū* 沽, and ruthless *kù* 酷, and suggests that they all carry the meaning of selling, which should also derive from the practice of tying knots.

Shì 世: The author critiques the *Shuowen jiezi* for its explanation of this character, as it is defined as thirty years make one *shì* 世, generation (*sanshi nian wei yi shi* 三十年为一世[世]) and is explained that the character is derived from *huì* 卉, meaning plants, with an extended stroke. However, according to bronze inscriptions, the character *shì* 世 is derived from *zhǐ* 止, foot and not from *huì* 卉. The author argues that the *Shuowen* relies on a later form of the character, which is unreliable. In bronze inscriptions, *shì* 世 is written as , depicting *zhǐ* 止, foot and a knotted rope. *Zhǐ* 止 refers to the footprint or trace of a foot. The author cites the *Book of Songs Shījīng* 《詩經》 poem *Xià Wǔ* 《下武》, which states: ‘繩其祖武’, which means ‘Following [to mark by ropes] the footsteps of their ancestors’, the commentary explains, that here *wǔ* 武 means ‘footprint’ (武,迹也). The author argues that this refers to the traces left by feet and this is the accurate interpretation of the character *shì* 世. It is likely that in ancient times, ancestral altars were adorned with knotted ropes to record genealogies. Thus, the *Book of Songs*’ poems *Yì* 《抑》 and *Zhōngsī* 《蠡斯》 mention ‘宜爾子孫繩繩兮’, meaning descendants continuing in an unbroken line, which is a factual record of this practice.

For the character *sūn* 孫 (‘descendant’ or ‘grandson’) the author argues that the semantic component is *xì/jì* 系 (‘to relate’ or ‘to tie’), which also resembles the shape of a rope, which signifies the succession from father to son as a ‘generation’, where the son’s generation is tied to the father’s footprint. This is why people today still say stepping into the ancestors’ footsteps, a remnant of ancient customs.

Additionally, the characters for *xiān* 先 (‘before’) and *hòu* 后 (‘after’) are also derived from the classifier *zhǐ* 止 (‘foot’) and the shape of a rope. In bronze script, *xiān* 先 is written as , with *zhǐ* 止 above a person. *Hòu* 后 in bronze script is written as , with the semantic component , inverted foot, tied below a rope.

The archaic variant character *zhēng* 烝 of *zhēng* 蒸 (a sacrificial offering) in bronze script is written as , depicting two hands holding a ritual vessel *dòu* 豆 in front of two feet. The author cites the commentary in *Rites and Ceremonies, Yǐlǐ · pìnlǐ* 《儀禮·聘禮》, which states: 凡饌以豆為本。Which roughly means all offerings are based on the ritual vessel *dòu* 豆. Jia’s annotation Jiǎ · Shū 賈《疏》 explains: 凡設饌者,皆先設豆,乃設餘饌。When setting up offerings, the ritual vessel *dòu* 豆 is placed first, followed by the rest. Thus, holding the ritual vessel in front of the feet symbolizes worshiping ancestors. Since *shì* 世 (‘generation’) resembles knots on a cord  the character *xiè* 紼 is interpreted as a long rope.

The character *yìn* 胤 (‘progeny’) signifies the continuation of descendants, with the meat semantic component *ròu* 肉 indicating bloodline. It is derived from 𠂔, and shares the same meaning as *sūn* 孫 (‘descendant’) and *hòu* 后 (‘after’).

The character *shén* 神 (‘deity’) derives from *shēn* 申, which resembles the shape of a rope. Initially, it likely referred to ropes hung at ancestral altars to record generational order, later extended to refer to all deities.

The character *jǐ* 己 (‘self’) is explained that it also resembles the shape of a rope, curved like *shēn* 申, but without diverging ends. The argument is that generational succession was recorded with ropes in ancient times, so *jǐ* 己 must also represent this with a rope, hence *jì* 紀 (‘record’) means to chronicle.

Whenever generations or eras are recorded, they are marked with knotted ropes. Thus, twelve years make a *jì* 紀, generational succession is called *běnjì* 本紀 (‘biographic sketch of an emperor’), *shìxì* 世系 (‘genealogy or family tree’), *jìtǒng* 繼統 (‘continuation of lineage or to succeed on the throne’), or *shàoxù* 紹緒 (‘inheritance of tradition’), all conveying this idea.

The author’s argument is that many Chinese characters related to ancestry, succession, and rituals are rooted in the ancient practice of using ropes to record generational order and mark significant events. This reflects a cultural emphasis on lineage, continuity, and the preservation of tradition. The author uses etymological analysis of characters in bronze script to support this claim, linking their forms to the symbolic use of ropes in ancient rituals and record-keeping.

The author concludes that although written characters eventually supplanted cord-knot methods, many of their features survived within the script. The influence of the earlier system can still be detected in the form and meaning of Chinese characters, reflecting a rich and complex cultural evolution.

3.9 Plausibility of visual pun method

Both Xu Zhongshu 徐中舒 and Jin Qingwan 靳青万 raise an interesting approach to support the claim to ancient cord knotting, which is the analysis of visual forms of oracle bone-, and bronze inscriptions with the help of later etymological explanations. The theoretical background is explained in great detail by David N. Keightley.

In his paper⁴⁰ Keightley argues that the Chinese script did not simply evolve from naturalistic pictures but was born out of a sophisticated system of coded, aesthetic signs. In his analysis, the characters are seen as much more than mere

⁴⁰ Keightley 1996.

pictograms, they are logographs that record spoken words through a process of abstraction and schematization.

Keightley explains that early Chinese characters often emerged by replacing a naturalistic image with a simplified, conventional symbol that still recalled the original object. For example, the OBI show instances where the image of an eye or an ear is not depicted in full realistic detail but is instead represented by a schematic graph that functions as a visual pun. In these cases, the visual element serves a dual purpose: it provides an aesthetic reference to the original object while simultaneously acting as a code for the corresponding word.

Building upon the prior character analysis and the visual pun methodology, it would be a compelling avenue for future research to investigate all characters associated with the silk component. After conducting a brief visual similarity search on characters in the OBI dictionary, I suggest future researches should put emphasis on the following characters: lì 吏 ('minor government official'), shì 事 ('affair, matter'), shǐ 使 ('envoy'), shǐ 史 ('annals, history, official historian'), which in their OBI form show , , ,  respectively. The above-mentioned characters in their early forms all resemble a knot on a rope and a hand showing it, or pointing at it. Upon the logic of the reviewed authors, one could say that the above-mentioned modern terms all root in ancient cord knotting practice, as a person telling the stories memorized with the help of the knots, as the Inka *khipukamayuk*.

Conclusion

The question of the origins of writing, especially in China has always been a fascinating topic among scholars. However little archaeological evidence there is for the origins of writing in China. Chinese scholars argue that ancient Chinese legends about the origins of writing are largely credible. Although these legends (like those involving rope-knot record-keeping and the creation of characters by Cang Jie 倉頡) mix myth with historical memory, they still contain valuable insights into early record-keeping practices. A major point is that the development of writing was driven by the need to manage increasingly complex societal affairs, especially during times of large-scale warfare and social stratification. This necessity, rather than a widespread, popular movement to invent writing, spurred the creation of more sophisticated systems.

While no knotted cords themselves survive, convergent evidence strongly suggests their probable use: cord-impressed walls at Neolithic sites (e.g., Banpo), rope-patterned pottery motifs, textual accounts of *jiesheng* 結繩 in classical literature, and crucially, the silk classifier 糸, whose interlaced form provides the

most compelling graphic echo of knotted cords in the writing system. Though direct material proof remains elusive, these indicators collectively point to cord knotting as a plausible prehistoric practice.

This phenomenon can be described as a form of textual primacy bias. In this context, many Chinese scholars tend to rely heavily on classical texts, treating their descriptions as self-evident historical facts, without demanding independent, hard archaeological evidence. In other words, because ancient texts mention practices like cord knotting for record-keeping, these accounts are accepted at face value, even though there is little to no physical proof to corroborate them. This uncritical acceptance of traditional literary sources often leads to conclusions about ancient practices that remain speculative rather than empirically verified. Scholars must interpret these texts carefully, as they may reflect ritualized, mythologized, or theoretical aspects of cord knotting rather than everyday practical use. We must also tread carefully when dealing with folk etymologies and the virtually limitless homonymic associations within the Chinese lexicon—otherwise, we risk circular reasoning, as in the popular notion that Cang Jie, the “storer of knots,” must therefore have invented writing. His name, *Cāng Jié* 倉頡, happens to be homophonous with *cáng* 藏, ‘to store’ and *jié* 結, ‘to tie’ or ‘knot’), a coincidence that, while intriguing, illustrates how easily retrospective interpretations can become self-confirming myths—when in reality it is merely another linguistic artifact of a phonemic inventory comprising approximately four hundred syllables in modern Chinese.

Unfortunately, these grass cords compared to other writing mediums like wood or bones decompose relatively quickly, so the chance of actually finding such evidence from ancient times is very low, unless it was hidden and sealed away airtight (e.g. in a storing container clay pot, just like the Inkas did store them in their archives). Naturally, let us not forget that in the early stages of China’s writing history people drew what they saw, such as cowry shells, which formed the first medium of exchange and later became the symbol for money and value (*bèi* 貝). It is plausible that, from this same era of creating new characters, bookkeeping, or simply put, counting with the help of knots on ropes, was also depicted by early people, leaving its mark in today’s character classifiers (e.g., *mì* 糸) and in characters related to certain numbers or genealogy. Moreover, a closer examination of the silk classifier suggests that while its primary association is with silk and textiles, some of its graphical elements might also reflect the ancient practice of cord knotting. Rather than all characters containing the silk classifier being a direct representation of silk, it is possible that the abstract forms of some characters were partly influenced by the visual imagery of knotted cords. The intricate patterns produced by tying knots could have contributed

to the evolving aesthetics of early Chinese script, embedding within these characters subtle echoes of an earlier, practical record-keeping system.

Much attention has been given to character-creating methods in Chinese linguistics; however, these approaches are problematic, and the currently available evidence regarding the six principles remains ambiguous. Consequently, our focus should shift more toward the origins and formative periods of Chinese characters. If Keightley's theory on the visual pun method is correct, then it might be plausible that during the early stages of Chinese writing development, when cord knotting was still in use, this practice influenced the evolution of writing itself (as suggested by the above-mentioned characters). In this view, the eventual disappearance of the cord knotting system could be attributed to the evolution of counting methods (for instance, with the adoption of the abacus), much like the transition observed in the case of Japanese *warazan*.

This hybrid origin underscores how early Chinese culture may have merged everyday practical activities, such as counting and record-keeping with ropes, into the symbolic vocabulary that eventually became a cornerstone of written language.

While many arguments in the cited literature remain speculative, core pre-conditions for cord knotting systems are archaeologically attested in ancient China. These include:

1. Material availability: widespread rope production evidenced at Neolithic sites like Banpo and Hemudu,
2. Socioeconomic complexity: emergence of stratified societies during the Longshan period,
3. Demonstrated counting needs: mathematical markings on oracle bones and pottery.

Moreover, while the later attested knotting practices of neighbouring groups cannot serve as direct evidence for ancient periods, they demonstrate the technique's viability in culturally adjacent milieus.

For logical reasons the practice of cord knotting is a significant cultural element for China and its people, however without the discovery of sufficient number of knotted cords and a Rosetta stone (or rather a Rosetta cord) like deciphering medium, empirically proving the existence of cord knotting in ancient China remains nearly impossible.

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