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Junli Diao
CUNY York College

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In Search of China's First Library: Materials, Houses and Arrangement

Abstract

Historically, the origin of libraries has an intimate association with written records supporting administrative or ritual functions at the palace or temple. This article attempts to discuss the possibility of the existence of China's first library in the Shang dynasty (c.1570-1045 BCE) during the beginning of the formative period of Chinese civilization. The article analyzes and synthesizes both paleographical and archaeological evidence from the perspective of available materials, houses, and arrangement, which answers the questions of what the books were made of, where they were stored, and how they were arranged. The article ends with a conclusion that there is likelihood that China's first library might have existed in the Shang dynasty, which grew on a great foundation on the technical aspect. This article also points out that the exploration of China's first library is an ongoing process, considering new paleographical and archaeological discoveries in the future.

Keywords: oracle bone inscription, Chinese writing, book, house, arrangement, first library.

Introduction

Ever since Chinese oracle bone inscriptions (See Plate 1) were discovered at the end of the 19th century,¹ there has been a considerably long and vigorous discussion on whether the earliest Chinese writing documents should be considered as the origin of ‘archival records’ or ‘library books’ as we understand those concepts today.² Both archival and library studies are keen to harvest the credit and take the underground pits, in which oracle bones were originally excavated, as the historical starting point of the respective institutions.³ Oracle bones were excavated in an area close to the royal palace and temples and inscriptions were used as a divinatory language, which accordingly result in the stronger belief that oracle bone inscriptions had been involved in administrative and religious activities so as to serve the purpose of state management. Moreover, it is because the word ‘archive’ itself echoes a stronger sense of the remote past and high antiquity, that oracle bone archives, instead of oracle bone libraries, seem to be more frequently mentioned in the Chinese literature on information and culture.

In search of the origin of libraries in the Western world, Harris articulated that the distinction between archives and libraries is a relatively modern concept and they both share the same roots in ancient times.⁴ He believed that a proto-library, which held graphic materials arranged in a certain order in ancient times, could have come into being. He further indicated that the early religious and governmental institutions that held records could be considered as libraries essentially if we accept the definition that libraries are the collection of graphic materials arranged orderly for convenience by people who were capable of arranging things.⁵ On the discussion of scholarly research work about archives, Friedrich pointed out that libraries and museums could be regarded as ‘the fathers and brothers of archives.’⁶ It is the emergence of printing and press technology in the European Early Modern Period, which produced a massive number of administrative and legal documents in an unprecedentedly systematic way, that called for more sophisticated and independent archival practices of description, arrangement and preservation.⁷ Deriving my understanding from Harris’s and Friedrich’s articulations, I would agree that archives were originally seeded and conceived in a library culture in remote historical times, but divorced from how we conceive libraries in modern times, and grew into a separate and independent institution. Although I would agree that libraries and archives could be considered together historically before modern times, I also would argue that libraries existed as

a dimorphic institution in ancient times, which led to their being understood and elaborated by contemporary scholars from both perspectives. My argument that ancient libraries functioned as dimorphic institutions will help avoid the tug of war that keeps pondering over the differences through imposing contemporary definitions, but ignoring what both institutions fundamentally share in common. I will choose 'library' as the name proper to continue this article and I see this choice as a direct approach that helps remove the lock that either shuts the door or closes the channel for further explorative discussion.

In this article, I attempt to search for China's first (or the most remote) library in the beginning of the formative period of Chinese civilization—the Shang dynasty (c.1570-1045 BCE).⁸ I will concentrate my discussion on what fundamentally constituted the library that held written documents in early China. Generally speaking, writings commence the journey of the historical age of mankind. Writings are considered as the instrument that started the prevalence of text culture over oral culture, and kept the development and continuity of a particular society. If libraries originally functioned as storerooms, which housed materials bearing writings that documented human thoughts and activities, I would say that writings gave birth to libraries and libraries would not have come into being without writings. Therefore, I would pursue my search for China's first library in the earliest form of Chinese writing—oracle bone inscriptions.

Why Oracle Bone Inscriptions?

Oracle bone inscriptions have an intimate connection with the pictographs and signs used by Late Neolithic cultures along China's east coast.⁹ As a logographic writing system that combined both phonetic and semantic radicals, the origin of oracle bone inscriptions can be traced back to the communications and reckoning of craftsmen working in pottery workshops and jade factories in China's coastal Neolithic cultures, and their minds were strongly influenced by their hands that produced artifacts with sophisticated componential construction.¹⁰ With the inherited characteristics of the Neolithic graphs and signs, oracle bone inscriptions tend to be much less regularized and conventionalized in structure and presentation. This means that oracle bone inscriptions demonstrate a substantial number of pictorial elements that will show or suggest the meaning of the characters.

The total number of oracle bone characters remains controversial and different dictionaries provide different numbers. According to a comprehensive statistical estimation that eliminates character duplications and variations, there is a total number of 3,596 oracle bone characters, which include 2,462 recognizable graphs.¹¹ Among the rest of 1,134 graphs, some are controversial in meaning because the graphs themselves trigger various interpretations without having any clear resolution achieved, and some seemingly remain undecipherable at all for now. The majority of the recognizable characters can be explained as pictographs, ideographs, phonetic borrowings, and pictophonetic compounds. It is worth noting that the graphs not only function as independent pictorial or ideographical entities, they also demonstrate linguistic sophistication that takes advantage of semantic particles and phonetic attachments to increase the number of vocabularies and document new ideas and thoughts. Due to sophistication, therefore, oracle bone inscription constitutes a writing system.

Oracle bone inscriptions as a mature writing system can also be witnessed by the comprehensiveness of topics and subjects that they covered, which include ‘harvests, bad omens, the capture of prisoners, childbearing, the activities of Di 帝 (the high God) and other Powers, dreams, floods, military strategy, the issuing of orders, rain and sunshine, royal tours of inspection, sickness, sending men on a mission, settlement buildings, sorties and other trips, spiritual approval, assistance, harm, tribute payments, and so on.’¹² One can see that the Shang’s inscriptions are tightly connected with various aspects of the Shang society. It is not an exaggeration to acclaim oracle bone characters as living fossils, which means that the rich and valuable information of the Shang dynasty could be well captured and preserved alive in those words and texts. Therefore, the study of logographic characters provides us with meaningful insights into, and leads to a better understanding of, the Shang dynasty’s social and cultural constructions and conventions, including practices and habits in the aspect of textual culture.

It follows that there could be some kind of libraries that came into being after the emergence of the Shang’s oracle bone inscriptions, and my theory can be tested and verified through the analysis of characters associated with libraries in this writing system. When I say *library*, I follow the core of Harris’s working definition that ‘a library is a collection of graphic materials arranged for relatively easy use.’¹³ I see ‘graphic materials’ as having two different layers of meanings. Firstly, it indicates that writings in ancient times tend to be simplified or abstracted as picture-

like designs or picture-writing. Secondly, in terms of color and shape, this definition suggests that materials carrying such writing can be seen as ‘altered’ or ‘made’ visual art objects. Both ‘graphic writing’ and ‘graphic carrier’ are acts of creation that convey recorded ‘graphic information’ to viewers. In addition, this definition also implies that the collection of graphic materials has to be housed in a designated storage area or room. If such a library did exist in the Shang dynasty, there would be a large possibility that notions, as to what the Shang ‘books’ looked like, where they could be stored, and what was the possible approach of arranging them for easy use, could be captured at that time in those logographic characters and might be detected and traced from them now. Therefore, in this article, I attempt to answer the following three questions by analyzing related oracle bone characters:

1. What are the characters used in oracle bone inscriptions to depict the image of ‘books’? What materials were possibly used?
2. What are the characters that illustrate the image of houses, where the books could be possibly stored?
3. What are the characters that deliver a sense of category or sequence, through which books could be possibly grouped or arranged?

Materials

The strong and rich evidence of the Shang’s writing materials and writing practices can be inferred from four major oracle bone characters (See Table 1). (Ce) is a typical pictographic representation which shows that a few long and narrow objects are bound together by strings. Ce means volumes or copies generated for ritual and ceremonial purposes. Compared with cuneiform tablets excavated in the Mesopotamia area, this Shang graph speaks of a much more accurate concept of books: what composes a book is flat objects and the technique adopted to make a book is binding. If one looks at the history of books, one may note that these two fundamental aspects seem to be universally similar in both the West and the East and remain as they were for thousands of years! (Dian) is a typical ideographic representation illustrating a combined drawing that one Ce is being held up by two hands. It refers to a special document created at the rituals or prayers and held by people on the spot to show respect and honor. The image representation exactly emphasizes the unique value of these documents. In 尚書 (Shang

shu), the Book of Documents,¹⁴ 周公 (*Zhou gong*), the Duke of Zhou,¹⁵ remarked that 惟殷先人, 有典有册 (*Wei Yin xianren, you dian you ce*), which is translated as ‘The Yin (Shang) people who lived prior to us had volumes (*Ce*) and documents (*Dian*).’ This notion is frequently taken as a strong paleographical proof that ‘books’ had already existed in the Shang dynasty.

The verb constantly used before *Ce* is 𠄎 (*Zuo*), which means making a document/documents under the circumstance of holding ritual ceremonies and sacrifices for ancestors (both male and female) or creating documents at the time of military alliance or mass mobilization.¹⁶ *Zuo*, frequently connected with *Ce*, consists of two elements: 𠄎 (a knife) and 𠄎 (marks or signs in the bone). 𠄎 (*Shu*) in oracle bone inscription means ‘to write,’ which is an ideographic display composed of three elements: a hand 𠄎 on the top right, a brush 𠄎 in the middle, and an object 𠄎 at the bottom. Three elements put together indicate the action of a hand holding a brush and delivering writing on an object. The writing is suggested by the little dot in the center of the object. 𠄎, which evolves into 書 (*Shu*) in traditional Chinese character, still retains its original ideographic expression ‘to write’ and at the same time developed into a new meaning ‘book’ in contemporary Chinese. *Zuo* suggests that the Shang characters were carved into bones by specialists with knives; however, *Shu* provides valuable information that alternative writing materials and tools, rather than bones and knives, could have been used in the Shang time.

Ce, *Dian*, *Zuo*, and *Shu* suggest that two fundamental elements that constitute written documents had already been in existence in the Shang’s material culture: objects selected to carry information and instruments designed to inscribe information. What kind of materials selected and reshaped as the long and narrow ‘pages’ for both *Ce* and *Dian* leads to a discussion as to what was utilized for the first ‘paper’ proper in the earliest ‘book’ in China. Some scholars speculated that those objects resemble sawed and polished bamboo or wood slips.¹⁷ The reason is twofold. First, the climate in North China at that time was much wetter and warmer than the present day, which produced a more favorable environment for the growth of bamboos and trees.¹⁸ Second, archaeological evidence shows that both brush-pens and inks were already in use for writing texts on the bones prior to the process of carving characters in them.¹⁹ Bamboo or wood strips, together with brush-pens and inks, were most likely adopted by the Shang people to keep a

record of non-divinatory activities. Compared with scapulae and shells, those materials are highly fragile and too perishable to be preserved to the present. Possibly they either decomposed, or they could remain preserved under extremely perfect conditions.

Other scholars, however, believe that the long, narrow and flat objects used in both *Ce* and *Dian* represent modified, smoothened, flattened and drilled scapulae or turtle plastrons bearing divinatory texts.²⁰ They consider scapulae or plastrons, instead of bamboo or wood strips, as the ‘paper proper’ of the earliest books in China. Their argument is supported by tangible archaeological evidence. Upon excavation, quite a few scapulae and plastrons bearing holes and even texts were found to be piled and stuck together, presenting to the public a view in a set of four or other numbers.²¹ Archaeological reports did not indicate whether any remnants of strings, leather or fiber in any form, were discovered on the spot. It is fairly reasonable to speculate that scapulae and plastrons could be either arranged together or bound together with strings going through holes before they were transferred to the pits. Regardless, not a single piece of bamboo or wood strip remains has been discovered in archaeological excavations, let alone ones with drilled holes for binding. From the paleographical perspective, quite a number of oracle bone characters contain the compounding element 𣎵 (for bamboos) and 𣏟 (for trees), but they appear to have strong and close linguistic connections to food containers and vessels, musical instruments or other tools. In oracle bone inscriptions, the linguistic association of bamboos and trees with writing culture seems extremely rare or nearly non-existent. Perhaps it implies that bamboo or wood strips had not been fully used to bear texts yet. Considering both archaeological discoveries and paleographical elaboration, the present writer tends to agree that *Ce* and *Dian* more likely represent bundles of scapulae or plastrons, providing an embryonic image of what the earliest Chinese ‘books’ looked like. One may argue whether the Shang diviners and kings could obtain a sufficient number of raw materials to make oracle bones or not. According to statistic estimation, the total number of divinatory scapulae adds up to 14,763 pieces and turtle shells 27,743 pieces.²² Just as clay is to cuneiform tablets in Ebla—‘the world’s oldest library,’²³ I would say that the materials used for creating and disseminating writing culture in the Shang time existed in abundance. In this aspect, the foundation of the Shang’s materials culture for writing was not built low. In the spiritual realm, ‘paper’ was manipulated and ‘pens’ were exercised by diviners who wrote down the question-and-answer interactions with High Powers or kings’

ancestors. In the secular world, the Shang craftsmen inherited the cooperation, collaboration and communication approaches from Neolithic pottery workshop and transferred them with improvements and refinements into the bronze factories, which helped enhance the richness of linguistic context and increased the varieties of Chinese writing graphs. The Shang kings brought the spiritual realm and the secular world into alliance through their monarchic control, which gave impetus to the creation of the ‘books’ of the time and kept the Shang civilization sustaining and continuing in its collective and textual memory.

Houses

An examination of writing materials reflected in oracle bone inscriptions gives us an understanding of what the Shang’s ‘paper’ or ‘books’ could look like. An investigation of houses in the Shang’s community settlements will provide us an insight into the possibility of where those ‘books’ could be stored. This possibility is also supported by Keightley’s notion that ‘it is likely, however, that, on the death of a king, his old oracle-bones – which might have been stored above ground, in a temple, perhaps, during the course of his reign – were consigned to underground pits.’²⁴

The paleographical analysis provides visual evidence of the Shang’s architecture (See Table 2). The base element is a vivid pictorial representation of buildings with walls and roofs, which is shared by a network of characters, for instance, (Zong), (Shi), (Gong), (Bing) and (Jia), in the Shang oracle bone inscriptions that undertake ritual, political, social and domestic functions (See Table 2 for individual meaning). A few other characters, such as (Gao) and (Jing), illustrate the structure of the Shang’s certain prominent buildings founded on a platform high above ground. Constructing such houses and buildings require bringing together skilled labor forces, which reflect that such architectures alike were the outcome of personal wealth and social status or an administrative consideration for the state management. They stood high and provided dwellers and occupants with spectacular views in the Shang’s wind and rain.²⁵ They either undertook certain practical functions, or spoke of a monumental expression and projected some spiritual atmosphere.

The Shang called its cities or community settlements as 邑 (Yi), which appeared in oracle bone inscriptions more than 200 times.²⁶ Each settlement had its political and economic obligation to the capital city or 大邑商 (Da Yi Shang) ‘The Great Settlement of Shang,’ which is a center that gathered the religious forces and political power of the Shang elites.²⁷ The Shang established a geo-political dichotomy between the ‘center,’ which they inhabited, and ‘Four Directions,’ where natural disasters in the adjacent areas or possible foreign invasions from remote distances emerged.²⁸ Such a notion also suggests that the concept of ‘center’ gives the Shang people a strong sense of security and stability in contrast to the uncertainty and potential dangers imposed by the surrounding world. If one shifts the focus from the big picture that conceptualizes the political and religious functions of ‘The Great Settlement of Shang’ to a snapshot that captures human activities within buildings, one will be fascinated by the Shang people’s attempt to know themselves and their places in the world. Guards stood on top of the tower 高 (Gao) and stayed alert for the possibility of enemy invasion; captives in prison 圜 (Yu) howled for being selected as tomorrow’s sacrifice; older men taught young ones calculation with sticks at the school 學 (Xue); peasants harvested millets, drilled them, and put them in the storage 倉 to avoid rain and moisture; delegates rested in the hotel 賓 (Bing) waiting to be summoned by the king; in the palace 宮 (Gong), the king suffered a toothache and, therefore, he doubted whether the number of sacrifices offered at the ceremony was a correct one to please his ancestors; in the shrine house 宗 (Zong), the diviner observed the crack in the oracle bone, screaming to the sky that the High Power would bring sufficient rain next month. All these human activities were engineered together either by following prescribed procedures and rules or leaving it to the chance of instant and spontaneous thoughts. The city became an alive being, in the process of constructing and transforming and in the operation of flux, continuity and complexity. If divination was part of the city mechanism that was mixed with procedures and spontaneity, it is fairly logical to ask ‘What was the next step relating to the bones after divination?’ or ‘Where did the diviners keep or maintain all these inscribed scapulae and plastrons after they fulfilled their purposes?’

The Shang emerged from China’s Late Neolithic cultures and its early period demonstrated signs of Neolithic inheritances. The low class, like Shang peasants or commoners, lived in cave

dwellings or semi-subterranean houses. The ruling classes and elite groups inhabited houses built above ground with various elevations, perhaps the kings living at the highest, which represented power and authority. During the late Shang period, the construction techniques were greatly improved, which was inferred from the study of the foundations and pillars holes or other traceable signs and layouts.²⁹ The practice of rammed earth provided deep and solid foundations; the combination of rammed earth and timber-framed construction technique made walls go wider and higher; the application of wood structure helped expand houses' space; the utilization of the shadow of sunlight to determine orientation and water to measure horizontal direction assisted in the construction in accordance to Chinese cosmological values and beliefs.³⁰ In other words, the archaeological evidence give us an important indication that 𠄎 (Zong), 𠄎 (Gong), or 𠄎 (Shi) built in the Shang period could not be modest in size and space. Based on the study of foundations, the reconstructed houses in the palace area of the capital city also corresponds to some paleographical accounts, which demonstrates massive size and sophisticated arrangement with roofs, walls, beams, windows, and steps (See Plate 2 and 3).

What makes Ebla, the world's oldest library excavated in Syria, so outstanding is that the clay tablets were kept intact in the original rooms after wood shelves were burnt and roofs fell in war. The provenance of the room was largely retained and a substantial number of clay tablets were remarkably preserved in their original order. However, the Shang oracle bones did not have such misfortune and fortune. They did not suffer from warfare but were huddled together and then consigned into pits scattered in the Shang kings' temple and palace area, which makes the provenance completely lost in the transition. Those pits are either built in the shape of a pot with descending walls or with walls standing up straight. Neither did they have steps leading to the bottom, nor were any holes discovered in the wall providing assistance for ascending and descending. They were buried together with broken and fragmented animal remains and sea shells. All these signs lead to the conclusion that those pits are not the original places where inscribed oracle bones were kept. It would be very hard to imagine, after proposed inquiries had been performed and verified and the results inscribed, that the Shang diviners just carried those oracle bones wherever they went or just randomly threw them into the corner of the house. If one considers the space and size of those houses and buildings, it would be very reasonable to speculate that the Shang diviners would designate some special space for oracle bones in the

spacious 冂 (Zong), 冂 (Gong), or 冂 (Shi) where divinations were probably performed. Perhaps, some equipment was created especially for maintaining them or even some primitive system was designed, which prefigured the practice of arranging oracle bones for the sake of convenient use.

Arrangement

Keightly indicated that ‘the diviners or their assistants certainly appear to have used some form of filing system for storing and retrieving at least certain plastrons or bones.’³¹ He does not elaborate on the filing system in detail, which leaves some interesting but substantial space for both library and archival professionals, who have a historical mindset, to continue this topic. What system could be used to file oracle bones? For any three-dimensional objects, the most obvious and instantly noticeable attributes are their color and shape. Color and shape could be seen as natural instruments of describing, identifying and classifying things. If a substantial number of objects are accumulated together as the passage of time, certain inherently pragmatic attributes, for instance, temporal sequence that determines the order of operations, will come to the forefront and play a more crucial role in making arrangement. In these three aspects, oracle bones are not inherently different from any other three-dimensional objects.

Etymologically speaking, the contemporary Chinese character for color 色 (Se) derives from the oracle bone graph 𠂔 (Se), which, however, embodies a completely different meaning. 𠂔 (Se) is a vivid portrayal of sexual intimacy between a female and a male. The conceptual and general term used to represent colors as a whole family has not been discovered in oracle bone inscriptions yet. What really existed in the Shang era were eight specific color terms, which are animal-based and ritual-service-oriented (See Table 3). The eight colors were reconstructed through analyzing the semantic context of the Shang kings’ divinations; their basic models of color configuration and naming were closely tied to ritual services or animals chosen as sacrifice.³² The analysis of semantic context of these colors not only demonstrates a linkage between how a color was perceived and what psychological response could be triggered accordingly, but also a complicated grammatical usage other than adjectives, which means they were also used as verbs, particles, personal or place names, too.³³ It is very unlikely, at least not practical, that color could be chosen for the purpose of grouping and categorizing inscribed oracle bones. Oracle bones are made of local cattle’s scapulae, or turtle plastrons paid as tributary by southern and southwestern

peripheral states.³⁴ Perhaps, both scapulae and plastron materials, after being processed, were still too homogeneous in color and appearance to be differentiated, or in another way to say, the necessity of classifying and arranging oracle bones on the base of color was not significantly crucial at the time at all.

In oracle bone inscriptions, characters used to describe the shape attribute of an object are fairly few (Table 4). As the consequence of natural evolution, cattle scapulae and turtle shells grew naturally into similar shapes respectively, fitting in the selected and designated purposes by Mother Nature. Before divination was performed, cattle and turtles were worshipped and slaughtered. Then scapulae and plastrons were selected, cleaned, degreased, cut or sawn, flattened, smoothened, polished, and drilled. The large-scale production of decorative bone pins suggests that the Shang elites employed highly-skilled craftsman in the pursuit of specialization and standardization.³⁵ Perhaps, craftsmen working in the foundry for processing oracle bones could have followed the same principles to guide their work for achieving mass production, which means scapulae and plastrons could end up with similar shapes respectively. In the ruins of the Ebla Library, the archaeological evidence shows a strong linkage between the shape of clay tablets and the content of the text: round tablets were used for economic and administrative texts but square tablets for texts of all kinds.³⁶ It is not likely that the Shang diviners thought of things and did things in a similar pattern, taking advantage of the shapes to arrange oracle bones. However, the Shang diviners might have tried a different approach. The study of archaeological reports reveals that the Shang scapulae and plastrons, both inscribed and uninscribed, were accumulated and centralized together before disposal; however, they were mostly buried in separate pits (See Plate 4).³⁷ If this phenomenon could provide one with a similar logic that one can draw upon, he will have a reasonable speculation that the Shang diviners might categorize divination materials by their kinds: scapulae aggregated together in one place and plastrons grouped together in another.

In addition to correlating the shapes of clay tablets with the subjects of text content, one significant collection arrangement activity observed in the ruins of the Ebla Library is listing things, which could be names of kings, gods, places, animals and professions.³⁸ Hattusas Library in Turkey, in existence 3,200 years ago, had a more sophisticated list of titles taken from the first lines of texts, a primitive form of catalog.³⁹ It appears that listing things and noting the first line

of texts played a significant role in getting materials organized in Western ancient libraries. One can not know for sure whether the Shang diviners were good at making lists of things or were capable of creating a primitive catalog. However, what had happened in ancient Western libraries can be used as an interesting inference to further analyze the arrangement of oracle bone inscriptions.

A full divinatory inscription is composed of preface, charge, crack notation, prognostication and verification.⁴⁰ The preface presents the day-date, the action of crack-making, and the diviner's name. Day-date is a systematic terminology that determines the passing of days and it involves the coordination between two independent series of counters. These two counters became later known as ten Heavenly Stems 天干 (*Tiangan*) and twelve Earthly Branches 地支 (*Dizhi*) (Table 5). The Stems include 甲 (*Jia*), 乙 (*Yi*), 丙 (*Bing*), 丁 (*Ding*), 戊 (*Wu*), 己 (*Ji*), 庚 (*Geng*), 辛 (*Xin*), 壬 (*Ren*) and 癸 (*Gui*), and the Branches contain 子 (*Zi*), 丑 (*Chou*), 寅 (*Yin*), 卯 (*Mao*), 辰 (*Chen*), 巳 (*Si*), 午 (*Wu*), 未 (*Wei*), 申 (*Shen*), 酉 (*You*), 戌 (*Xu*), and 亥 (*Hai*). The Stems take the lead in the coordination and sixty days forms one cycle, which involves six repeats of the ten Stems and five repeats of twelve Branches. One circle of ten Stems from *Jia* to *Gui* is called a 旬 (*Xun*) week. The use of two sets of cyclical signs is considered far more archaic and its conception could be traced back to astronomical observatory activities during pre-Shang Neolithic cultures.⁴¹ It is also observed that the ten Stem names have graphical connection and phonetic linkage with numeral characters from one to ten.⁴² During the Shang time, the two sets of cyclical counters grew mature and were used in combination and coordination, evolving into a conceptual mode that responded to the demand of recordkeeping of divination calendar and graced the living Shang kings' ancestors with posthumous temple names. Day-date was employed to lead in the divination inscriptions, which was a purposeful action of keeping a record of what day the event actually happened. In addition, I postulate that the leading day-date demonstrates a remarkably perfect spot where the text (literary work) and the application of order (science) meet.

Even more strikingly, a few pieces of oracle bones inscribed with a complete and sequential 'list' of 60 combined Stem-Branch terms have been discovered (See Plate 5). These bones do not bear any drilled holes, nor do they have any pyromantic signs. Clearly, these lists of non-divination

texts were not made for inscribing divination texts, but for a special purpose, which allows for instant consultation so as to save users' time and effort. I would not easily reject the possibility that such a list can be regarded as the first textual reference material in the history of information and culture in China. This kind of list could be enshrined in a prominent but easily-accessible place in the house where divination was conducted and divinatory texts were collected. In this case, it might not be totally true, but it is perfectly possible that the argument whether China's first library existed or not seems to point to a positive conclusion.

The Shang diviners were the time managers and order makers of their time. Mastering such a calendric system and navigating within the system easily definitely requires intelligence, training and memorization. It proves that diviners of the Shang were 'educated' and 'intelligent' persons who were good at mathematical calculation and imposers of order. In contrast to the Shang's divination viewed as Shamanism,⁴³ Keightley considered it as a science and technology that offered diviners a practical platform to test their hypotheses in a deductive, binary, and balanced formula and to find the relationship between predictions and results.⁴⁴ Diviners' epistemological optimistic approach increased certainty with particular attention paid to pattern and regularity; they were careful mathematicians while negotiating the meaningful linkage between the number of sacrifices and ancestors' temple name days; they embodied the soul of both scientists and artists simultaneously when carving the inscriptions with a symmetrical balance and calligraphic aesthetic.⁴⁵ As Keightley summarized, what the Shang diviners practiced was not modern Western science, but the science of 'ancestors,' which provided cosmological and theological explanations and justifications when the Shang kings were confronted with illness, disasters and invasions in particular, and the unknown surrounding world in general.⁴⁶ Divination was an instrument that helped build a psychological realm of comfort and assurance, which transformed uncertainty and chaos to becoming predictable and organized with meaning and coherence. Diviners were users and manipulators, perhaps even reformers, of such an instrument, who wore shamanic attires but owned craftsmen's soul that was obsessed by patterns and regularities. Therefore, could it be possible that, after divination was wrapped up, the diviners spent a moment pondering all the inscribed oracle bones with their mathematician's logic and reasoning and artists' acuteness and instinct? Could it be possible that they were momentarily infused with a sudden thought that they wanted to make the bones beautifully 'organized' for the

king? Could it be possible that the Shang diviners transferred the knowledge for sequencing ancestral order and the calendar cycle into organizing inscribed oracle bones, specifically arranging them by taking advantage of the leading day-date sequence or grouping them under the corresponding individual ancestors?

During the transition period, which means after the divination was completely performed and before oracle bones were consigned to pits, we do not have sufficient archaeological and paleographical evidence that could lead us to make a strong and concrete argument about what exactly happened to oracle bones. The possibilities proposed above are built on the assumptions that one bone was used for divination once for all and one bone exclusively carried one inscription as the result of that divination. Such assumptions can be challenged by the archaeological evidence that one oracle bone can be used multiple times at different points of time, which result in the fact that one scapula or plastron may carry multiple divinatory inscriptions. However, considering that the emergence of divisions of labors and specialized artisans during the Shang period, I would say that these proposed possibilities are plausible, be it either out of a random and spontaneous concern or a product of logic and rational thinking of those Shang specialists. On the other hand, what the current archaeological evidence provides us is a fragmented representation and partial narrative of the Shang life. Ideally, it is hoped that materials, such as wood and bamboo tablets bearing the Shang's non-divinatory texts, really existed and are still preserved under extremely perfect condition, waiting to be discovered and brought to the public view in the future. Additionally, in the dictionaries of oracle bone inscriptions, over one thousand characters remain to be deciphered, clarified and confirmed in their meanings. Considering that new archaeological discoveries will bring new materials to the table and more characters will be eventually decoded someday, I would argue with good reason and great anticipation that what we assumed we have already known about the Shang's life and culture will be likely expanded or even rewritten in the future.

Conclusion

The Shang era marks the beginning of the formative stage of Chinese civilization, which triggers much historical research that focuses on probing the origins or the earliest forms of a Chinese cultural phenomenon or a social institution. My search for China's first library involved the

investigation of the three crucially important elements that constitute a library in the Shang time: materials, houses, and arrangement. These three elements examine the possibilities of what the 'books' were made of, where they should be stored and how they could be arranged in a certain order. Conceivably, it is very challenging, if not impossible, to pin down these three questions in the specific answer responding to what, where and how. The synthesis of paleographical analysis and archaeological evidence demonstrates that there is a large possibility that China's first library in the Shang period did indeed occur, or at least existed embryonically with a great foundation on the technical aspect. This library, or prototype library, should be conceived in the emergence of numerous written records and rich writing culture, which was made possible by the application of abundant raw materials and sophisticated tools for writing, was secured by the rise of elevated houses and was arranged through the implementation of a primitive system. The value of searching the possibility of China's first library lies not in the attempt to specify and articulate its physical and tangible existence. Rather, such effort will enable us to better understand and appreciate more the importance of the earliest Chinese writing system and its cohesive connections concerning some fundamental questions on what constitutes a library at the threshold of a Chinese historical period.

There is no doubt that libraries are built *by* people and *for* people. It is equally true that one could argue that my argument is only built on the foundation that focuses on researching material culture and technical capacity, which leaves out the examination of readers and readership. Therefore, the existence and location of China's first library is still worth further contemplation and investigation. The full picture relies on paleographers' further endeavors and archaeologists' expanded discoveries in the future. The search for China's first library will continue to be relevant as an ongoing process.

Table 1.Characters Related to Writing

	Meaning	Etymology
册 Ce	Volumes or copies	Strips bound together
典 Dian	Classic and special books	Strips bound together and held by two hands
書 Shu	To write	A hand holding a brush and writing on an object
作 Zuo	To make	A knife with engraved marks or a

Note: In Table 1, 2, 3, 4 and 5, the first row from left to right includes oracle bone characters, the corresponding Traditional Chinese characters, and pinyin Romanization. Please note *all* the oracle bone characters in these four tables come from <http://www.vividict.com>, which were last accessed on November 6th, 2018.

Table 2.Characters Related to Housing and Buildings

	Etymology	Function
六 Liu	A house with walls and roofs	Ritual/Political/Social/
宗 Zong	A house that holds ancestor's shrine or tablets for worshipping	Ritual
室 Shi	A house with a person inside	Ritual/Residential
宮 Gong	A house with multiple windows, probably for the kings	Political
賓 Bing	A house to entertain guests/delegates from peripheral state	Social
家 Jia	A house where domestic pigs are raised	Social
京 Jing	A ceremonial building	Ritual
倉 Cang	A house that stored food	Logistic
稟 Bing	A temporary storage built in the field	Logistic
高 Gao	A tower-like house erected high above the ground	Military
墉 Yong	A wall-enclosed living area with two watch towers	Military
圉 Yu	A prison where houses are enclosed by walls	Legal
學 Xue	A school where hand-on teaching of calculating sticks are performed	Educational
亞 Ya	An inter-connected and orientational settlement	Community
邑 Yi	A big wall-enclosed living area or settlement	Municipal/Capital

Table 3.Characters Related to Colors

	Color type	Etymology
赤 Chi	Red	A human figure and a fire. Used for horses and referring red color
騂 Xing	Red-yellow	A sheep on the top and an ox at the bottom. Used for reddish-and-yellowish animals for sacrifice
白 Bai	White	Used for men from the Bai-tribe and men with light skin
𤟎 Zhi	Brown	Used for animals with brown color
黃 Huang	Yellow	An abnormal human figure, perhaps from a shaman cult
黑 Hei	Black	Points to dirt or ink on a human face
幽 You	Dark-red	Threads on a fire
𤟎 Wu	Multicolor	Used for ritual animals with mixed color

Table 4.Characters Related to Shapes

	Shape type	Etymology
大 Da	Big	A human figure standing with open legs or striding with big steps, which symbolize an adult

小 Xiao	Small	Tiny sand particles, symbolizing things are small
圓 Yuan	Round	The round mouth of bronze vessels
長 Chang	Long	A human figure with long hair

Table 5.The Stem-Branch Cycle

	甲 Jia	乙 Yi	丙 Bing	丁 Ding	戊 Wu	己 Ji	庚 Geng	辛 Xin	壬 Ren	癸 Gui
子 Zi	1 Jiazi		13 Bingzi		25 Wuzi		37 Gengzi		49 Renzi
丑 Chou		2 Yichou		14 Dingchou		26 Jichou		38 Xinchou		50 Guichou
寅 Yin	51 Jiayin		3 Bingyin		15 Wuyin		27 Gengyin		39 Renyin
卯 Mao		52 Yima		4 Dingma		16 Jima		28 Xinma		40 Guima
辰 Chen	41 Jiach		53 Bingch		5 Wuch		17 Gengch		29 Rench
巳 Si		42 Yisi		54 Dingsi		6 Jisi		18 Xinsi		30 Guisi
午 Wu	31 Jiawu		43 Bingwu		55 Wuwu		7 Gengwu		19 Renwu
未 Wei		32 Yiwei		44 Dingwei		56 Jiwei		8 Xinwei		20 Guiwei
申 Shen	21 Jiashe		33 Bingsh		45 Wush		57 Gengsh		9 Rensh	

n										
酉 You		22 Yiyo u		34 Dingyo u		46 Jiyo u		58 Xinyo u		10 Guiyo u
戌 Xu	11 Jiaxu		23 Bingxu		35 Wuxu		47 Gengxu		59 Renxu	
亥 Hai		12 Yihai		24 Dinghai		36 Jihai		48 Xinhai		60 Guihai

Note: This table is revised on the basis of Table 1 in *The Ancestral Landscape*, page 144. The right Stem-Branch combination is achieved through matching one stem to one branch. The first match begins with the Stem Jia to Branch Zi, then the second Stem Yi to the second Branch Chou, and so forth. After one cycle of Stems is used up, then the second sequence begins with the Stem Jia to eleventh Branch counter Xu.

Plate 1.Divination of the Shang King Wu Ding's Military Operation. Yin xuJiagu wen shiyongzidian, Ma Rusen (Shanghai: Shanghai da xuechu banshee, 2014), page i.

Plate 2. Foundations and the Corresponding Restored Houses. Yin xu de faxianyuyanjiu = Archaeological Excavation and Researches in the Yin Ruins, Zhongguo she huikexueyuankaoguyanjiusuo (Beijing: Fang zhichu ban she, 2007), p. 54.

Plate 3.A Restored Ceremonial Pavilion with Foundation Right On the Top of the Shang King's Mother Lady Hao's Tomb. Yin xu de faxianyuyanjiu = Archaeological Excavation and Researches in the Yin Ruins, Zhongguo she huikexueyuankaoguyanjiusuo (Beijing: Fang zhichu ban she, 2007), p. 67.

Plate 4. Excavated Scapulae in the West of Xiaotun. Yin xu de faxianyuyanjiu = Archaeological Excavation and Researches in the Yin Ruins, Zhongguo she huikexueyuankaoguyanjiusuo (Beijing: Fang zhichu ban she, 2007), plate 20, no.3.

Plate 5.A List of 60 Stem-Branch Combinations. Yin xuJiagu wen shiyongzidian, Ma Rusen (Shanghai: Shanghai da xuechu ban she, 2014), page unnumbered.

¹Oracle bones were originally known as “dragon bones” and used as medicine after being ground into powder. It was 王懿荣(Wang Yirong) (1845-1900), a government official and scholar of Qing dynasty (1644-1912), who recognized the characters engraved in the bones as the earliest Chinese writing.

²D. Ni, “‘Jiagu wenzai Shang daifei dang an shuo’zhiyi,” *Dang an xueyanjiu*, 4 (2006), 38-41; M. Cheng, *Yinxubu ci zongshu* (Beijing: Zhonghuashuju, 1988), p. 46; G. Zhang, ‘Jiagu wen zai Shang daifei dang an shuo,’ *Dang an xueyanjiu*, 2 (1999), 64-68. Y. Zhao et al., ‘Jiagu wen, jian du yiji Dunhuang wen yishushi bus hi dang an,’ *Dang an guan li*, 6 (2008), 52-54.

³X. Lai, *Zhongguotushushi ye shi* (Shanghai: Shanghai ren min chu ban she, 1990), p. 13; X. Zhou, *Zhongguo dang an shi ye shi* (Beijing: Zhongguoren min da xue, 1994), p. 10.

⁴M. Harris, *History of Libraries in the Western World*, 4th ed. (Lanham, Maryland: The Scarecrow Press, 1999), p. 3.

⁵ Ibid.

⁶ M. Friedrich, *The Birth of the Archive: A History of Knowledge* (Ann Arbor: University of Michigan Press, 2018), p. 8.

⁷Ibid., 13.

⁸D. N. Keightley, ‘The Shang: China’s First Historical Dynasty,’ in *The Cambridge History of Ancient China: From the Origins of Civilization to 221 BC*, ed. by Michael Loewe and Edward L. Shaughnessy (Cambridge: Cambridge University Press. 1999), p. 243.

⁹ P. Dematte, ‘The Role of Writing in the Process of State Formation in Late Neolithic China.’ *East and West*, 49, no. 1/4 (1999), 241-272; D. N. Keightley, ‘Archaeology and Mentality: the Making of China.’ *Representations*, 18 (1987), 91-128.

¹⁰Keightley, 1987, 112.

¹¹ N. Chen, ‘Yinxujiagu wen ci huigaishu.’ *Zhejiang shi fan da xuexuebao (she huikexue ban)*, 31 (2006), 40-45.

¹²Keightley, 1999, 232.

¹³Harris, 3.

¹⁴尚書 (*Shang shu*) is one of the Five Classics of ancient Chinese literature.

¹⁵周公 (*Zhou gong*) was the fourth son of the king 周文王(*Zhou wen wang*)(1152-1156 BCE) and an excellent politician of 西周(*Xi zhou*), Western Zhou (1046-771 BCE)

¹⁶ W. Su, ‘ZailunJia Jin wen zhong de “Dian” “Ce” jijian du chuxian de shidai,’ *Gujizheng li yanjiuxuekan = Journal of Ancient Books Collation and Studies*, 1 (2015) 86-89.

¹⁷ G. Liu, *Introduction to the Tsinghua Bamboo-Strip Manuscripts*. Translated by Christopher Foster and William N. French (Boston: Brill, 2016), 4; T. Tsien, *Written on Bamboo and Silk; the Beginnings of Chinese Books and Inscriptions* (Chicago: University of Chicago Press, 1962), 90-91; G. Liu, *Introduction to the Tsinghua Bamboo-Strip Manuscripts*. Translated by Christopher Foster and William N. French (Boston: Brill, 2016), 5.

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- ¹⁸ D. N. Keightley, *The Ancestral Landscape: Time, Space, and Community in Late Shang China (ca. 1200-1045 B.C.)* (Berkeley: Institute of East Asian Studies, University of California, Berkeley, 2000), p. 1.
- ¹⁹ D. N. Keightley, 'Art, Ancestors, and the Origin of Writing in China,' *Representations*, 56 special issue, the new erudition (autumn 1996), 68-69.
- ²⁰ Q. Xing, 'Cong jiagu wen "ce" zishuo qi,' *Huaxia wen hua* 4 (2008), 32-33; L. Yuan and X. Guo. 'Lunjiagu wen zai Zhongguotushushishang de di wei,' *Hengyang shizhuanxuebao (She huixue ban)* = *Journal of Hengyang Teachers' College (Social Science)*, 4 (1998), 101-104.
- ²¹ Y. Wang and Y. Xu, *Shang Zhou jiagu wen* (Beijing: Beijing wen wuchu ban she, 2006), p. 75.
- ²² *Ibid.*, 101.
- ²³ H. H. Wellisch, 'Ebla: The World's Oldest Library,' *The Journal of Library History* (1974-1987), 16.3 (1981), 488.
- ²⁴ D. N. Keightley, 'Marks and Labels: Early Writing in Neolithic and Shang China,' in *archaeology of asia*, ed. by Miriam T. Stark (Malden, MA: Blackwell Publishing, 2006), 195.
- ²⁵ Wind and rain were frequently divined by the Shang kings and were regarded as 'ordinary manifestations of the forces that shaped their world.' See D. N. Keightley, *The Ancestral Landscape: Time, Space, and Community in Late Shang China (ca. 1200-1045 B.C.)*, 1-9.
- ²⁶ Z. Song, *Xia Shang sheng huoshi = History of Social Life in the Xia and Shang Periods* (Beijing: Zhongguo she huikexuechu ban she, 1996), 32.
- ²⁷ K. Chang, 'Urbanism and the King in Ancient China,' *World Archaeology*, 6.1 (1974), 1-14; N. Steinhardt, 'China,' in *The Oxford Handbook of Cities in World History*, ed. by Peter Clark (Oxford: Oxford University Press, 2013), 105-124.
- ²⁸ Keightley, 2000, 55-79.
- ²⁹ S. Wang, 'Shang daijianzhujishukao,' *Yin du xuekan*, 2 (1986), 8-12.
- ³⁰ *Ibid.*
- ³¹ Keightley, 2006, 195.
- ³² T. Wang, 'Colour Terms in Shang Oracle Bone Inscriptions,' *Bulletin of the School of Oriental and African Studies, University of London*, 59.1 (1996), 63-101.
- ³³ *Ibid.*, 97.
- ³⁴ Wang and Xu, p. 101-105.
- ³⁵ R. B. Campbell, et.al. 'Consumption, Exchange and Production at the Great Settlement Shang: Bone-working at Tiesanlu, Anyang,' *Antiquity*, 85.330 (2011), 1292.
- ³⁶ Wellisch, 491.
- ³⁷ Wang and Xu, 77.
- ³⁸ Wellisch, 490-496.
- ³⁹ L. Casson, *Libraries in the Ancient World* (New Haven: Yale University Press, 2001), 6.
- ⁴⁰ R. L. Thorp, *China in the Early Bronze Age: Shang Civilization* (Philadelphia: University of Pennsylvania Press, 2006), 179-181.

⁴¹ D. W. Pankenier, 'Getting "Right" with Heaven and the Origins of Writing in China,' in *Writing and Literacy in Early China: Studies from the Columbia Early China Seminar*, ed. by Li Feng and David Prager Branner (University of Washington Press, 2011), p. 19.

⁴² E. G. Pulleyblank, 'The Ganzhi as Phonograms and Their Application to the Calendar,' *Early China*, 16 (1991), 76.

⁴³ K.C. Chang, *Art, Myth, and Ritual: The Path to Political Authority in Ancient China* (Harvard: Harvard University Press, 1988), 44-45.

⁴⁴ D. N. Keightley, 'The "Science" of the Ancestors: Divination, Curing, and Bronze-Casting in Late Shang China,' *Asia Major* (2001), 143-187.

⁴⁵ Ibid, 168-177.

⁴⁶ Ibid.