

# Encounter between Present Female Characters and Neolithic Inscribed Symbols Prior to Oracle-bone Inscriptions

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**ABSTRACT:** Inscribed symbols of Neolithic Age were sometimes suspected to be initial writing prior to developed writing system. The earliest developed writing system in China was Oracle-bone inscriptions (OBIs) of Bronze Age and researchers have long sought its predecessor. Here, we reported that two continuous symbols on a stone ax of Neolithic Liangzhu culture found their identical duplicates in a unique writing system on brocade belts woven by present women in Shanghai suburb. Women in this group duplicated the hereditary text for weddings only once each generation in the past, and they can still interpret these two characters, implying that the two identical Liangzhu symbols may have the similar meanings. The meanings and patterns are both similar to those in OBIs, suggesting that Liangzhu symbols might be one of the predecessors of OBIs. Integrating philology, genetics, linguistics, and folklore, we discussed that special small population may inherit both the genetic structure and convert culture for extremely long time, such as this population in southern Shanghai.

**Keywords:** Female characters; Inscribed symbols; Writing script; Oracle-bone inscriptions



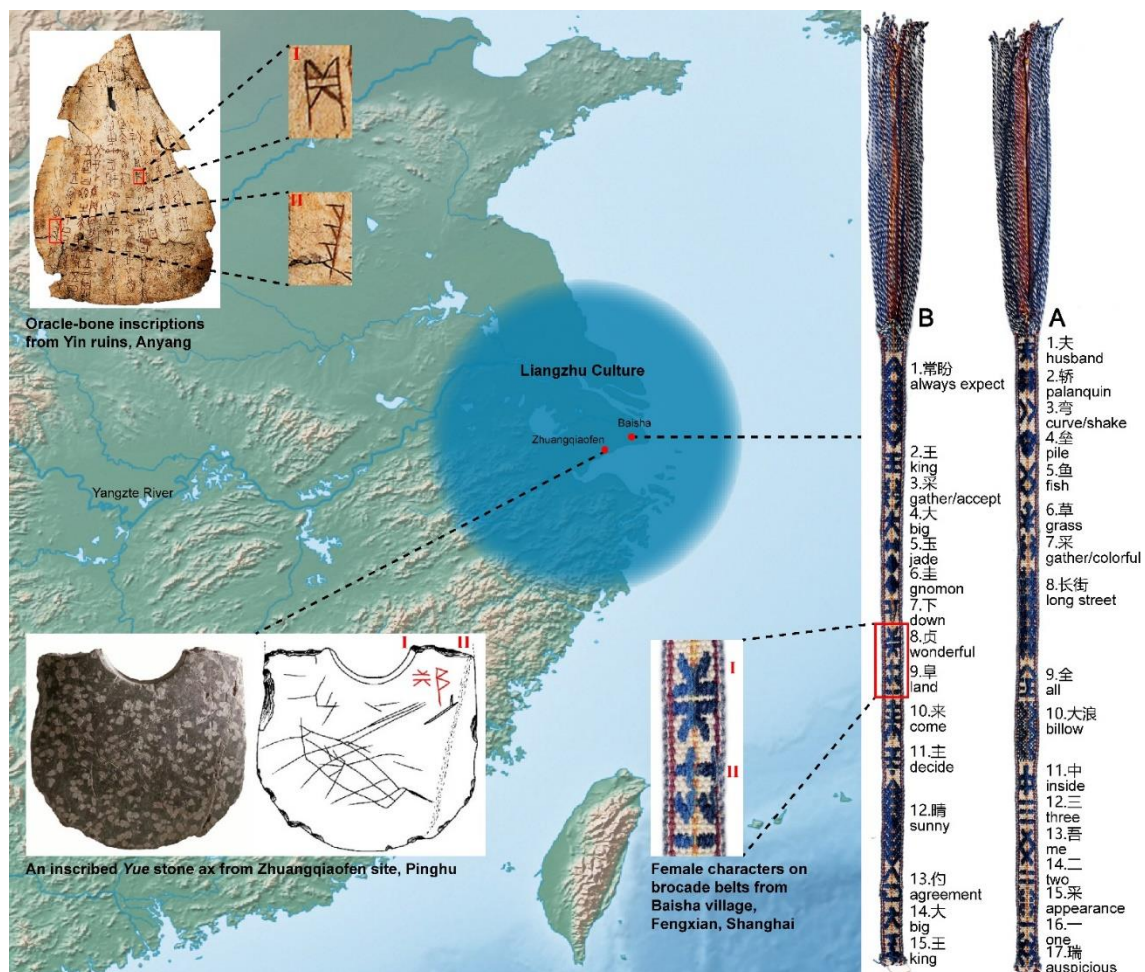
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Initial writings were inferred to exist generally before developed writing systems, e.g., symbols inscribed on a block in Mexico's Olmec civilization [1] were much earlier than Maya characters [2]. In China, it is widely believed that oracle-bone inscriptions (OBIs) from around 3500 years ago were the earliest known writing system [3]. However, many stone-carved symbols prior to OBIs were discovered in China, with little evidence to support whether or not they were written script to interpret. Here, we report a character system on brocade woven by females, among which there are two characters highly similar to two inscribed symbols found at Zhuangqiaofen site around 1500 years earlier than OBIs.

Zhuangqiaofen is a Neolithic Liangzhu culture site located in Yangtze River delta. This site covers more than 2000 m<sup>2</sup> and contains 236 graves as well as ~2600 funerary objects such as potteries, stone tools, jades [4]. The site was widely focused because 267 inscribed symbols have been identified [5], becoming one of the earliest known prehistoric ruins with numerous inscribed symbols in Liangzhu culture (total of 656 symbols) [6]. These symbols were inscribed on 238 potteries and nine stone tools, among which many symbols frequently occurred [7]. Intriguingly, two of the symbols inscribed on the upper right corner of a stone ax called *Yue* were similar to OBIs (Figure 1), namely *Zhen* (steadfast or divine to prognosticate, etc.) and *Fu* (upland or many, etc.) in modern Chinese characters [8]. The cross motif in the center of the *Yue* stone axe represented the division of land property and symbolized power. Furthermore, *Yue* stone axes installed on sceptres represented power in Liangzhu culture [9], consistent with the meaning of the motifs. However, unlike those in OBIs, Liangzhu *Zhen* lacked the downward strokes on both sides, and Liangzhu *Fu* and that in OBIs were mirror symmetry. Because of these discrepancies, the two Liangzhu symbols were unidentified to be initial writings prior to OBIs.

Recently, we discovered identical symbols of the suspected Liangzhu *Zhen* and *Fu* in a character system woven on brocade belts by females in Jinhui town, Shanghai (Figure 1). This system was handed down from mother to daughter or duplicated between women, which can be defined as female characters. Female characters were first discovered embroidered on a piece of blue kerchief in the countryside of Jiangyong county, Hunan province in 1982 [10]. This character system was a secret from men, and only spread among women to record their ritual and festival performances, as well as their daily lives [11]. Philologically, Jiangyong female characters are phonograms [12] while Jinhui female characters are ideograms, indicating that they are independent systems. Jinhui characters were only woven on brocade belts with colorful cotton thread. These belts were mostly used on wedding dresses and

usually in pairs. Almost every woman in this region wove brocade belts in the past, either copying the traditional texts or creating her own poems. Unfortunately, this tradition has been given up for more than forty years, and most of the belts with texts were burnt when the authors passed away. Thus, we realized that the remaining belts were extremely important and then collected them before disappearance. More than 100 documents were collected and around 350 characters were recognized. Remarkably, we found that two Belt characters were identical in shape and order to the two Liangzhu symbols. The two characters were on a pair of belts woven by Shem from Baisha village. She copied this hereditary text from her mother in the 1960s. According to Shem's description, the first character means wonderful [ʈə̌lʈə̌ʌ], and the second means land [vuːldɔ̌˩] (extended from upland). Therefore, these two characters have the similar meaning of the characters in OBIs, while their glyphs are almost the same as the two Liangzhu symbols. The *Zhen* is totally identical between Baisha and Liangzhu, and the *Fu* is rotated 90°. The two characters were in the same order as the Liangzhu symbols, which can be hardly explained by coincidence. As a result, we argued that Belt characters might be developed from the Liangzhu symbols, and that the Liangzhu symbols found at Zhuangqiaofen site with an age of 5000 years might be characters to interpret.



**Figure 1.** Hereditary female characters encounter with Neolithic inscribed symbols. The geographic region of Liangzhu culture is shown in the blue. Two of the hereditary female characters on a pair of brocade belts (**right**) are almost identical to the Neolithic inscribed symbols on a Yue stone ax (**lower left**), and also similar to oracle-bone inscriptions (**upper left**, picture from National Museum of China) of Bronze Age Shang Dynasty. I: *Zhen*, II: *Fu*.

In addition, the geographical distance between the Zhuangqiaofen site and Baisha village is less than 50 km, indicating an *in situ* inheritance of over 5000 years. However, it would be unlikely if the population in this area was replaced while the culture such as writing was inherited. Interestingly, our previous study has revealed a unique genetic structure of the population in Jinhui town. The frequency of the Y chromosome haplogroup O1-M119 associated with the Tai-Kadai speakers is over 50% in Jinhui town, while it is around 27% in other suburban populations of Shanghai, and less than 10% in urban residents as well as Han Chinese populations from other provinces [13]. Among Neolithic populations, a high frequency of haplogroup O1-M119 was also found at Liangzhu culture sites [14]. To investigate whether there was a genetic continuity from Liangzhu culture to present in southern Shanghai, a Y chromosome analysis was performed on the samples from Liangzhu period (c. 5.3 to 4.3 ka B.P.), Maqiao period (c. 3.9 to 3.2 ka B.P.), Warring States period (c. 2.4 to 2.2 ka B.P.), and Ming dynasty (1368 to 1644 A.D.). High frequency of O1-M119 was found in all of these periods, as well as in modern population in Jinhui town [14], supporting the genetic continuity. It was proved that the collapse of Liangzhu culture might have resulted from the inundation approximately 4300 years ago and a

megadrought starting 4000 years ago, instead of population replacement [15]. Furthermore, populations in present Shanghai suburbs are not homogenous, people to the east of Huangpu River are much less admixed than those to the west of Huangpu [16]. People from Jinhui town are mostly indigenous population. This might have explained why female characters on brocade belts were only found in Jinhui town and the adjacent villages.

Linguistic and archaeological evidence supports that the diversification of Proto-Austro-Tai languages was associated with the development of the Neolithic cultures in the lower Yangtze River, including the Majiabang (c. 7.0 to 5.9 ka B.P.), the Songze (c. 5.9 to 5.3 ka B.P.), the Liangzhu, and the Maqiao cultures (later developed into Bai-Yue/Tai-Kadai). Linguistic studies indicated that Tai-Kadai, with the first split taking place no more than 4000 B.P., is a subgroup rather than a sister phylum of Austronesian, indicating that they probably descended from a single common ancestor termed Proto-Austro-Tai [17]. From an archaeological perspective, Dabengkeng culture (around 5000 B.P.), the earliest known Neolithic culture across Taiwan strait, was believed to be left by the earliest Austronesians. The feature of Dabengkeng culture was highly similar to those of the Neolithic cultures around Shanghai, i.e., press marked pottery and sectional stone adzes [18,19]. Genetic studies support that the Austronesian language family occurred in the later period of the Majiabang culture (c. 5.9 ka B.P.), and the Tai-Kadai language family was derived from the Liangzhu culture consisting of a large “capital city” [20,21]. Researches on maternal mitochondrial DNA and paternal Y chromosome demonstrate a common ancestral relationship between Tai-Kadai and Austronesian speech communities [22,23]. Although both communities have migrated far away from the lower Yangtze River, there will still be some remains, such as the aforementioned indigenous populations from Jinhui town. Besides genetic structure, they also remain the special articulation of Tai-Kadai, i.e., shrink initial and glottal plosives ([ʈ], [dʈ], and [ɟ]) as well as some shared vocabularies ([ʈɔ] walk, [põn] fly, etc.) [24].

Philological and linguistic studies argued that numerous researches on the origin of the Chinese characters focused on whether they are phonic, ignoring the continuity between initial writing and developed writing with respect to the social institutions [25]. Given that the Belt characters are a form of ideogram, the evolution of its glyphs or motifs is mostly independent of phonic changes or even language replacement. From the perspective of folklore, the stability of these two characters on belts might be explained by the nature of its usage. Females were mostly oppressed from going to school in ancient China because of patriarchy [26], thus they developed their own characters which were seldom influenced by general Chinese character. The Jinhui females copied the hereditary texts only before weddings, which meant that there was mostly one duplication for one generation. Therefore, low frequency of duplication caused low frequency of mutation.

Archaeological findings are occasionally inexplicable, such as lost symbols. In this case, we employed living belt characters to interpret prehistoric symbols, providing the evidence of the existence of initial writings prior to developed writing systems.

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## Author Contributions

Conceptualization: H.L.; Investigation: H.L., L.W. and Q.Y.; Writing—Original Draft Preparation: L.W.; Writing—Review & Editing: H.L.; Visualization: L.W., Q.Y. and H.L.; Funding Acquisition: H.L.

## Ethics Statement

Not applicable.

## Informed Consent Statement

Not applicable.

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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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