

Ideographic versus Phonetic

A Debate over the Nature of Chinese writing in the 1930s

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摘要

上个世纪 30 年代后期两个著名的汉学家 Creel 和 Boodberg 就汉字的性质问题展开了长达 5 年的辩论。这场辩论在西方汉字研究领域影响至今。本文着重探讨这场辩论的历史背景，分析并评价了双方的汉字观，并简略介绍这场辩论对西方汉字研究的影响，旨在对西方汉字研究的历史和现状有更深入的了解。

Introduction

In 1936, the famous American sinologist Herrlee Glessner Creel (1904-1994) published an essay with the title on the Nature of Chinese Ideograph, which engaged him into a debate over the nature of Chinese writing

with Peter A. Boodberg (1903-1972), also a renowned sinologist working at Berkeley University, California. The debate lasted for almost five years, during which the two of them argued hotly about the nature of Chinese writing: was it ideographic or phonetic. There was a series of essays, with each one having published two respectively: Creel, *On the Nature of Chinese Ideography* (1936); *On the Ideographic element in ancient Chinese* (1938) and Boodberg, *Some Proleptical Remarks on the Evolution of Archaic Chinese* (1937) and 'Ideography' of Iconolatry? (1940). The debate continued until the editor of *Tong Pao*, the journal where they published three of the four above-mentioned essays, called an end to it with a weak excuse that their discussion exceeded the intended scope of the journal because they both cited examples from cuneiform writing in their argument (DeFrances, 1984, pp. 86-87).

During the debate, the issue of compound ideograph in the Chinese writing system became a hot issue. The compound ideograph can be roughly defined as a class of Chinese characters wherein a typical example is composed of two or more components, each contributing to the meaning of the graph without playing any phonetic role. It was first defined by Xu Shen (67-148CE) in the preface to his *Shuowen Jiezi* 说文解字, the first etymological dictionary in Chinese (Duan Yucai, 1981). Typically the meaning of a character belonging to this category is represented

through a combination of the components. For example the character xiu 休 (to rest) is composed of two components: ren 人 (person) and mu 木 (tree) (ibid, p. 270). The two components are conjoined to form a picture of a man leaning against a tree, thus the meaning 'to rest' is evoked.

This paper will focus on a dispute between Creel and Boodberg's with regard to the nature of Chinese writing, followed by critical comments of my own, together with a brief discussion of the influence of their debate on the studies of Chinese writing among western scholars.

Creel's ideographic view of Chinese writing and the importance of the compound ideograph

1 Historical background

In the west, there have been two conflicting views about Chinese writing: Is it ideographic or phonetic? Western interest in Chinese writing started when the first catholic missionaries came into contact with Chinese writing in the early 16th century. The popular view till the mid 19th century was that Chinese writing was ideographic and that Chinese characters were invented to represent ideas directly without the interference of sounds. There were many attempts in the 17th and 18th century Europe to create 'universal characters', which was inspired by the then popular view: Chinese characters were composed

to express notions, not letters or words (Mungello, 1985). For example, Gutzlaff (1841) believed that Chinese characters could be used for successful communication by people who do not understand each other's own languages. Duponceau (1841) was perhaps the first scholar to conduct a serious investigation into this possibility. He viewed Chinese writing as an invention to represent words instead of ideas, just like an alphabetic script was invented to represent phoneme. He believed that Chinese writing is logographic and cannot be compared to an alphabetic script as the invention of the latter script involved analysis of sound. At the beginning of the 20th century the dominant view towards Chinese writing was that it was inferior compared to an alphabetic script, a product left unfinished. The popular view then was that the evolution of all writing systems should follow the same pattern: from pictographic to ideographic, finishing as alphabetic. Just as Manson summarized: the history of the art of writing the entire world over, among people of all races,....seems to have progressed along lines of growth practically identical with each other (cited by Creel, 1936, p. 86) [1]. Influenced by this view, the Romanization Movement for the Chinese writing system appeared in China in the early 20th century and was supported by some famous western Sinologists. Bernard Karlgren was one of them, as he advocated to be "Away with the ideograph, replace it with phonetic writing" (Karlgren, 1926).

2 Creel's viewpoint about Chinese writing and his criticism of Xu Shen's 'Liushu' theory

Not in tune with the popular view in the 1920s that Chinese writing is primitive because it is ideographic, Creel argues that Chinese writing followed a unique course in its development, roughly, it began with picture writing, then there was conventionalization of pictographs and the combination of the conventionalized pictographs to form compound ideographs. In this way, the ancient Chinese people chose to invent a writing system that deliberately avoids complete phoneticization, instead of accidentally failing to do so. Creel launched a serious, albeit laconic, criticism of the traditional 'Liushu' theory of Xu Shen, and pointed out pertinently that to "admire Xu Shen's work is one thing, but to follow blindly is another" (Creel, 1936, p. 127). In fact, it was Creel who became the first person in history to conduct a serious critique of the Liushu, a matter hitherto ignored by many Chinese scholars [2]. Among his criticism two points should be mentioned here 1) the inadequate study of the category 'compound ideograph'; 2) the more or less arbitrary classification of characters into semantic-phonetic compounds [3].

According to Creel, the category 'compound ideograph' is of most importance to Chinese writing as they are the



combination of pictographs without considering their phonetic value – thus proving the ideographic nature of Chinese writing. He suggested that the category ‘compound ideograph’ is divisible into several sub-classes, for there are great and significant differences in the ways in which pictographs may be combined to form new characters. This should be one of the most important facts to be recognized in the study of Chinese characters (ibid, p. 98). He does preliminary work on this sub-categorization. According to him, there are compound ideographs that are produced by combining two pictographs together to highlight a common feature. Examples of this category cited by Creel are 明 (bright) and 鮮 (delicious) . 明 is the combination of 日 (sun) and 月 (moon) , and the feature common to the two are bright, which is the meaning of the character 明; 鮮 combines 魚 (fish) and 羊 (sheep) , because the meaning ‘delicious’ is regarded as the common feature of fish meat and sheep meat. The other sub-category listed by Creel is the formation of compound ideographs by the principle of place value. To illustrate his point, Creel used as an example a pair of characters, 育 and 好 (ibid, pp. 99—101). In the oracle bone inscriptions (hereafter the OBI for short), the two characters were combined using the same components, but representing different meaning. The two components are 女 (woman) and 子 (child). When the component 女 (woman) is put above an inverted child, depicting ‘giving birth to’, we get the

graph 𠄎育. The position of the two components, when representing the above meaning, is fixed. In the case of the character hao 好, the two components 女 and 子 are juxtaposed, with no place value attached. Actually in the OBI, the character was sometimes written as 𠄎 with 女 on the left and 子 on the right, just as it is written today in modern Chinese, but it was sometimes written as 𠄎 with 子 on the left and 女 on the right.

Creel criticized Xu Shen for his often-erroneous classification of characters as the semantic-phonetic compounds, thus contributing to the false assumption that the majority of Chinese characters belong to this category; he referred to this as the ‘radical-semantic myth’. Based on his study of the new data from the OBI, Creel proposes that a large number of characters that were classified by Xu Shen as semantic-phonetic compounds should be reclassified as Compound Ideographs. A list of characters with 韋 as a component is given by Creel to illustrate his idea. The following are two of them.

𠄎 (the OBI) 𠄎 (the OBI) 韋 (the Small Seal Script)

Xu Shen's analysis is that the graph is a semantic-phonetic compound, with 舛 (be contradictory) as the semantic classifier and 冂 (the enclosure) a phonetic determinative, the meaning represented is 'be against each other'. Creel correctly pointed out that the grapheme in OBI shows two feet on either side of 冂 (the enclosure), in one allograph three feet are depicted, with the original meaning of the character as 'surround, protect'

 (the Bronze Inscription)  (the Small Seal Script)

Xu Shen's explanation is that this graph is a semantic-phonetic compound with 辵 (to leave) as a semantic classifier and 韋 as a phonetic indicator. Creel explained that it is a compound ideograph representing the meaning 'to leave, transgress, disobey'. It is composed of 韋 plus 辵, the latter as a semantic determinative meaning 'to go' to indicate the going out of or into a guarded or forbidden place, thus the meaning 'to leave' and to 'disobey (ibid, pp. 153-156). However, a recent research suggests that Creel's categorisation of this particular character as compound ideograph is arguable. As is shown from the graph in Bronze Inscription given by Li Gefei (1990), the components in this graph are 韋, together with 彳



(road) and 止(foot), all having something to do with ‘go’, thus justifying the meaning ‘to leave’.

3 Critical comments

Creel can be regarded as a strong supporter of the ideographic view of Chinese writing. To him, the impetus to the development of Chinese writing in the early stages lies exclusively in the representation of meaning, while the representation of sound is comparatively unimportant [4].

According to Zhao Cheng (2005), the principle of phonetic borrowing in the OBI is quite important, over 70 percent of all the deciphered graphs were used to write another word with the same pronunciation but unrelated in meaning, a fact obviously overlooked by Creel, as he interpreted phonetic borrowing as a temporary solution that was discarded after the invention of the ‘compound ideograph’ (Creel, 1936, p. 93). As a result, his interpretation does not conform to the actual evolution of Chinese writing. According to Li Xiaoding (1986), the number of compound ideographs in all the deciphered 1125 characters in the OBI is 398, about 32%, and the number of semantic-phonetic compounds in the OBI is 334, about 27%; In *Shuowen Jiezi* or *说文解字*, a dictionary compiled about 1000 years later than the use of the OBI, of 9475 characters included, 1167 are compound ideographs, about 12%

and semantic-phonetic compounds number 7697, over 81% (ibid, p. 21). Many, though not all, of the semantic-phonetic compounds are formed in two steps: first an existent graph is used phonophorically to write another word related in pronunciation but unrelated in meaning, termed as ‘phonetic borrowing’ in traditional Chinese philology; next a semantic determinative is added to the borrowed graph, thus creating a semantic-phonetic compound (Qiu Xigui, 2000; Tang Lan, 1949). Allowing for some misinterpretations by Xu Shen of the formation of characters, we still cannot deny the fact that a large number of characters are formed to represent the sound, not meaning.

Creel stressed that throughout the history of the Chinese language there has been a steady though no doubt unconscious insistence upon retaining the ideographic value of the characters (Creel, 1936, p.115) There are indeed examples when after a formerly pictograph lost its pictographic feature in later stages of Chinese writing, a semantic indicator would add to it to form a new character with the same meaning. A case in point is the character 蜀 (a kind of worm). In the OBI, the character was written as  , a pictograph resembling a worm, in the western Zhou Bronze Inscriptions, the character was written as , with a 虫 added to it (Li Gefei, 1990, p. 1338). The usual explanation is just as

Creel pointed out: to ‘retain the ideographic value of the character’. However, there are also many pictographs added with phonetic indicators to form semantic-phonetic compounds. A case in point is the graph 𣎵 (disaster). It was first a pictograph, consisting of three wavy lines to depict the flood 𣎵, frequently used from the first period to the third period of the OBI, roughly from 1200 BCE to 1131BCE while from the fourth period (c 1130-1116 BCE) a phonetic indicator 才 was added to it, creating a semantic-phonetic compound 𣎵 (Yu Xingwu, 1996, pp. 1274-1275). Another example is the character 齒 (tooth). In the OBI it was written as 𪗗, a pictograph A phonetic indicator 止 (toe) was added to it in the Bronze Inscriptions, creating a new graph 齒 (Zhao Cheng, 2005). Examples like these are good evidence to argue that at least some characters are formed to represent the sound of the language, a point not fully realised by Creel.

Perhaps it was these highly arguable concepts of Chinese writing that gave Boodberg a reason to challenge Creel and to present a different view of his own.

4. Boodberg’s phonetic view of Chinese writing and the nonexistence of compound ideograph

The divergences about the Chinese writing system between Creel (1936; 1938) and Boodberg (1937; 1940) can be roughly summarized into the following four points:

- 1) While Creel held that Chinese writing is ideographic in nature, Boodberg viewed it as phonetic;
- 2) Creel outlined unique evolutionary stages experienced by Chinese writing, whereas Boodberg thought that any logographic writing system experienced the same developmental stages, to which the Chinese writing system was no exception;
- 3) Creel hailed the category 'compound ideograph' as a solution to save the Chinese writing from fully succumbing to phoneticization, Boodberg totally rejected the concept of compound ideograph, claiming that what were classified into this category are just phonetic compounds with the phonetic value unnoticed;
- 4) Creel emphasized the importance of the semantic value bore by the components in compound characters, Boodberg, on the other hand, stressed that the phonetic value of the graph holds the key to the understanding of Chinese writing.

The following discussion will focus on Boodberg's interpretation of the creation of two types of Chinese characters: the traditional compound ideograph and pictograph, which will help to get a glimpse of Boodberg's viewpoints about Chinese writing.

4.1 What the traditional 'compound ideograph' should be?

According to Boodberg, all compound characters were created to represent a certain sound, to explain otherwise is simply unacceptable and out of common sense. As to the traditional explanation of compound ideograph, Boodberg's explanation is that in archaic Chinese, there were many Chinese characters that had more than one reading, which was termed by Boodberg as polyphony phenomena. Boodberg reiterates his point that polyphony is an important and widespread phenomenon in the early stages of any writing, which has been overlooked by many scholars and led to the misconception of the existence of the category 'compound ideograph' (Boodberg, 1937, pp333-336).

According to Boodberg, if we accept the concept of polyphony phenomena and apply it into the analysis of the formation of the graphs belonging to the so-called 'compound ideograph' category, we will easily draw the conclusion that: "the majority (of that category) have to be immediately re-classified as phonetic

compounds” (ibid, p. 345) . He analysed one by one the ‘ten most adduced examples of ‘compound ideograph’ including 年(year), 明(bright), 鲜(delicious), 名(call, name), 家(home), and tried to prove through his own demonstration that eight of them belong to the category ‘phonetic compound’, except for the graphs 晃 (bright), 杳 (out of sight), which made their appearance due to the mythological significance attached to the explanation of the graph 東 as a ‘sun rising behind a tree, with the components mu 木 (tree) and ri 日 (sun) (ibid, pp. 345-349).




A typical example of Boodberg’s explanation of the formation of these so-called ‘compound ideographs’ 年 is illustrated in this paragraph. Xu Shen analysed this character as consisting of he 禾 (grain) as a radical, and qian 千 (thousand) as phonetic. It is now usually accepted that this character is a ‘compound ideograph’ because in the OBI, the two components are he 禾 (grain) and ren 人 (man) , meaning ‘man carrying grains’ and combined together to conjoining the meaning ‘a good harvest’ (Xu Zhongshu, 1989, pp. 782-783). Boodberg gave a different explanation to the formation of this character based on his own polyphony theory. As in modern mandarin, nian 年 and qian 千 are slightly different in pronunciation (with the only difference in initial consonant), he justifies Xu shen’s explanation that qian 千 acts as a phonetic indicator of the graph nian 年, citing Liu Xi’s exposition

in Shi Ming释名as年：进也 (make progress). In his book, Liu Xi explained the meaning of one word using another with the similar sound, thus nian年 must be pronounced the same with jin进 at that time. Boodberg constructs an archaic sound for千 as **tsnien, which could well serve as a phonetic for nian, for the archaic form which eventually evolved into ancient nien As to another alleged written form composed of ren人 as is shown in the OBI, Boodberg's explanation is that ren人 also had the pronunciation **znien, and could serve as a phonetic determinative just as qian千, he further tried to prove that ren仁, a character derived from 人 and with the same pronunciation, is a compound of千 and xin心 (heart), with the former as the phonetic indicator. Obviously Boodberg here tried to use this character to serve as an indirect example to show that 人, 千 had the same pronunciation.


In some OBI, however, 年 is written with just 禾. Boodberg's explanation to this is that: "the necessary conclusion that we are obliged to draw from these facts is that 禾 was a polyphone (being also read tsnien in the sense of 'harvest' and that the essential role played by the second element added to 禾 was that of a semantic-phonetic determinative to limit it in the sense of 'harvest' (Boodberg, 1937, p. 338). This semantic-phonetic role means that the determinative must have the same or similar pronunciation with the pronunciation of the character, at the same time, the

meaning it represents must be relevant with the meaning represented by that character. That is why Boodberg further proves himself that 人, 仁 has the meaning ‘kernel,’ ‘seed of grain’.

One problem with Boodberg’s interpretation of the graph 年 seems to be that he assumes that all the different graphemes were created to represent the same phonological system.

 (the OBI)  (western Zhou bronze inscription) 
(the small seal script)

年 is a very common character in the OBI, meaning harvest. It is composed of 人 and 禾. In Western Zhou bronze inscriptions, the same graph is still used together with another two graphemes, one is composed with 人 and 千, and the other is composed of 人 and 壬. One explanation to the small seal grapheme is that the component 千 was a deviation of 壬 (Yu Xingwu, 1996).

 is first used in the OBI, representing the phonological system of Shang from the year 1200 to 1045 BCE, while the other two should represent the phonological system of western Zhou. 人 was pronounced as *njin and 壬*njim and as 年*nin (Baxter, 1992, pp. 779-784). At present there has been no systematic reconstruction

of the phonological system of late Shang. But from Baxter's reconstruction of Old Chinese, the Chinese language of the early and mid Zhou dynasty (eleventh to seventh centuries BCE), 人 and 壬 might be a phonetic indicator as they were pronounced similar with 年, the initial consonant have the same articulation point and the finals are in the same rhyme groups [5]. If this view is accepted then there seems no need to design a polyphonic role to the graph 人.

As to the other grapheme of the graph 仁, composed of 千 and 心, some scholars believe that it is a grapheme used during the Warring States period, belonging to the six states scripts, a period described as “言语异声, 文字异形” (people speak different languages and use different scripts) by Xu Shen in the preface to *Shuowen Jiezi* (Duan Yucai, 1981, p. 758). It is possible that they represent different phonological systems. If so, one may have good reason to question Boodberg's assumption that the grapheme has the same reading with 仁.

It is reasonable to assume that the identification of the time when a graph was invented is the first essential step when analysing the process of the formation of the character in question, especially from a phonological perspective, as Boodberg did. As is shown clearly in the above case of the character 年. It is obvious that the different allographs were invented in different times and most likely represent different phonological system.

Boodberg failed to do so with the above example. There is evidence that he ignored that essential point with all the examples he cited in his work.

4.2 Boodberg's 'graphic phonetization'

Just as Creel took a strong standpoint to argue for an ideographic explanation of Chinese writing, the same can be said of Boodberg when it comes to the phonetic explanation of Chinese writing system. To Boodberg, every Chinese compound graph, some pictographs included, was created to represent a sound. He coined the term 'graphic phonetization' (Boodberg, 1937, p. 353), the inner modification of a graph to represent sound, to explain a common phenomenon in early Chinese writing that some pictographs were written with one part grossly exaggerated. One of the examples Boodberg cited is 𠂇馬 (horse). As found in the OBI, the graph 馬 (horse) was written with 目 (eye) occupying the whole head. According to Boodberg (1937, p. 352), through pictorial emphasis on the eye, which he reconstructed to be pronounced as **mog , the early graphologists of China were endeavouring to indicate pronunciation of an early pictograph” .

It is not unusual to find in the OBI that some pictographs, especially these represent animals, were written with one part exaggerated. Creel (1936, p. 94)

discussed this phenomenon explaining that in this way, it was easy for the ancient Chinese to write these characters, at the same time, highlight the meanings they represent. Compare the following two pairs of

characters in the OBI: 𠂇 牛 (cow) and 𠂆 羊

(ram), 𠂇 犬(dog) and 𠂇 豕(pig). The only difference between 牛 and 羊 in the OBI is the highlighted horns, with the cow's u-shaped and the ram's curved. With 犬 and 豕, the only difference lies in the tail, with the dog's tail curling up, while the pig's tail drooping down. To me, Creel's explanation is more reasonable than Boodberg's.

4.3 Critical comments

In his interpretation of the traditional compound ideograph, Boodberg depends heavily on his theory of polyphony phenomena, which was caused, according to him, by the initial consonant clusters in Old Chinese. These initial consonant clusters were split, giving rise to two different pronunciations. Although it was referred to as the 'unmistakable fact' by him (Boodberg, 1937, p. 337), the existence of the initial consonant clusters in Old Chinese is still questioned almost half a century after Boodberg published his essay, at least among some scholars in China. In 2003, Zhengzhang Shangfang published a book the *Phonetic System of Old Chinese*,

in which he manages to demonstrate that there existed a complicated and extensive initial consonant complex. Two years later, Pang Guanghua published a book *On the Nonexistence of Initial Consonant Complex in Old Chinese*, as the title suggests, Pang totally denies the existence of such a phenomenon in the Chinese language [6]. While some other scholars, both Chinese and western, acknowledge the existence of initial consonant clusters, they admit at the same time that the nature of initial consonant clusters has yet to be defined. “At the present time, while no one doubts the existence of initial consonantal clusters in Old Chinese, there is a considerable controversy over how to reconstruct them correctly” (Norman, 1988, p. 45). He Jiuying (1995, p. 262) expresses the similar viewpoint, albeit in Chinese. Even Boltz, a student of Boodberg and a strong supporter of the phonetic nature of the Chinese writing system, when discussing the same phenomena, says: “A rich and complex system of initial consonant clusters ... must have existed at the old Chinese stage [We] know only to a very small extent what nature of that system of initial clusters was, and how it devolved into later stages of the language” (Boltz, 2003, p. 93).

Summary

Boodberg aimed to build up a theory to explain the formation of Chinese characters from a phonetic

perspective in an attempt to prove that Chinese writing is phonetic in nature. The above discussion suggests, however, there are some issues in his theory that need further studies. In spite of that, his idea that the Chinese writing system is phonetic in nature has been supported by many sinologists since the 1940s. See Boltz (1986; 1996; 1999; 2003), Chao Yuenren (1940), DeFrances (1984; 1989) and Schafer (1974).

During the debate, Chao Yuenren supported Boodberg by publishing a short essay *A Note on the Early Logographic Nature of Chinese Writing*. Schafer (1974) in a brief introduction to Boodberg's works writes: "This study, ... supported the view, now adopted almost universally, that Chinese graphs did not and do not represent 'ideas' or 'concepts' but stand for words and morphemes, and that many of their components have hitherto unsuspected phonetic value". Pulleyblank (1979) considered Boodberg's work as food for thought "rather than demonstrated conclusions or even well-founded principles to be followed as a model". Nevertheless he holds that Boodberg's "insistence on the importance of the phonetic elements in understanding the script was sound".

As to Creel, it would be fair to say that despite his rather extreme viewpoint, Creel deserves more recognition for his work on Chinese writing. He was the first scholar to

conduct a systematic critique of the traditional ‘Liushu’ theory and the first to object openly, against the prevailing view of his time, to the Romanization Movement for Chinese. His sub-classification of compound ideographs, though far from being perfect, was innovative if we take into consideration of the fact that it was not until half a century later that Qiu Xigui (2000) did a similar job. Nevertheless his contribution to the study of Chinese writing has been largely ignored both in China and in the west. There is no mention of his work and the debate even in his obituary, which seems to have cited all his important works [7].

Over half a century passed since the debate between Creel and Boodberg, the two divergent viewpoints about Chinese writing still exist among western Sinologists. See Hansen (1993) and Boltz (1986; 1996; 1999; 2003). Hansen can be considered as a representative of those who hold that Chinese writing is ideographic in nature, while Boltz can be considered as an advocate of the phonetic nature of Chinese writing. Boltz’s work can be regarded as a systematic and theoretical development of Boodberg’s theory about half a century ago. It is not the intention of this paper to discuss the different views on the nature of Chinese writing system among contemporary scholars. Although there is no sign that the differences between the two schools will reach an agreement in near future, they do provide different perspectives on Chinese writing system.

Endnotes

[1] Gelb (1952) expressed the same opinion about all the writing systems in the world in his seminal book *A Study of Writing*, which represents a dominant view about Chinese writing among the west in the 1950-1960s.

[2] It is usually regarded among Chinese scholars that Tang Lan is the first scholar who conducted a comprehensive and systematic criticism on Xu Shen's 'Liushu' theory (He Jiuying, 1995). Tang Lan's book was first published in 1948, which was more than ten years later than Creel's *On the Nature of Chinese Ideograph*.

[3] The category 'semantic-phonetic compound' is another kind of Chinese characters defined by Xu Shen. They are also compound characters usually with one component represent the general meaning of the character and the other part plays the phonetic role (Qiu Xigui, 2000).

[4] Creel (1938) admits to too much adherence to the meaning representation of Chinese writing, while overlooking the phonetic value of the graph. "I was not sufficiently conscious of the bearing of phonetics on some of the important problems in the development of Chinese writing". Nevertheless, his main position on Chinese writing remains unchanged.

[5] There is no agreement to the criterion of a graph used as a phonetic indicator in another compound character. Generally it is acknowledged that the initials are of the same articulation position and the finals in the same rime groups. But Zhao Cheng (2005) holds that a graph must be have the same pronunciation with the character in order to play the phonetic role .

[6] See

<http://www.jwc.fudan.edu.cn:8080/yayan/showArticle.php?key=50> for introduction to Zhengzhang Shangfang's book and for the introduction to Pang Guanghua's book, please refer to http://.bookschina.com//mianfeisd.asp?book_id=1342055

[7] For more information about his Obituary, refer to the website <http://.uchicago.edu//.shtml>

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