



Reflections on the Adaptation of Orthographic Scripts Between Cuneiform and Kana: From Logogram to Phonogram

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Abstract. Cuneiform and Kana are representative in the scope of the world's writing system more ancient text system, both are derived from hieroglyphs, their prototype was the early Sumerian pictographs and Chinese characters, the two writing systems are different depending on nationalities and different language users used to record more language, which had a profound impact on Mesopotamia and east Asia civilization. Among them, the formed cuneiform script as a pure phonetic text is used to record Sumerian, Akkadian, Hittite and Old Persian, these involve other Semitic and Indo-European as well; with the introduction of Chinese characters from the Korean Peninsula, the almost unrelated Japanese absorbed Chinese logograms. The early Japanese users tried to use the combination of logograms and phonograms, with thousands of years of adaptation, which finally formed the modern Japanese writing system, namely Japanese characters (kanji), hiragana and katakana. Therefore, the two writing systems share many similarities, but the same intention used for the record pronunciations leads to two developing modes in different directions, which is worth discussing. This paper will try to discuss the features of two writing systems, phonetic features and morphological structure of those languages that used cuneiform and kana, and possible non-linguistic factors, aiming to provide a profound point of view on the relationship between logograms and phonograms.

Keywords: Cuneiform · Kana · Writing system · Logogram · Phonogram · Semantogram

1 Introduction

Cuneiform, a wedge-shaped script, is an ancient writing system which was firstly discovered in the Mesopotamia area, its prototype was the Sumerian hieroglyphs inscribed on clay boards developed by Sumerian people in the period from 8000 BC to 3000 BC. Around 2400 BC, those hieroglyphs were simplified into cuneiform signs as a 'logosyllabic mode' and other ethnic groups borrowed cuneiform and used it at that time, that is the reason why cuneiform was able to be passed down for thousands of years. Sumerian cuneiform was a complex writing system and it was impossible for other ethnics to

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adapt, after the end of the Sumerian civilization, Akkadian cuneiform, Hittite cuneiform and Old Persian cuneiform came into being, and they were modified into phonograms through a long process ending at 350 BC or so. In the later centuries, ancient Japanese people began to adapt Chinese characters to record their language. Originally, there was only one writing system, which directly borrowed Chinese characters, a writing system of logograms. Due to the fact that Japanese is not a dead language, it and its writing system are still being used nowadays. In this case, modern Japanese has 3 types of writing systems. This paper is going to discuss the features of two writing systems and discuss the possibilities of the tendency of how they evolved in an opposite direction [1, 2].

2 Scripts and Orthographic Features

Both Cuneiform and Kana, all share a similar origin of a prototype script, despite there being a huge gap between the original logogram and the adapted phonography script.

2.1 Cuneiform and Its Related Languages

Cuneiform is used in different ways, which could be written as a syllabic script or a logogram script that is greatly dependent on the adaptation in different languages. Cuneiform derived from the early Sumerian pictograph and developed into a more mature orthographic system which is known as the classical Sumerian cuneiform in the period of Gudea and Ur III (BC.2500–2000). In classical Sumerian cuneiform scripts, there are several types of categories in terms of Sumerian morphology which had been identified as an agglutinative language.

Cuneiform in Sumerian. According to the generalizations of Sumerian cuneiform, it contains (1) Logogram, which is used as word signs and mainly used to express nouns and verbs, and (2) Syllabogram, which is used as syllabic signs and mainly used to mark the pronunciations of the affixes. Also, there were types of signs used for (3) measurements and (4) determinations for identifying semantic phrases [3].

As the classifications presented, show that the Sumerian cuneiform scripts had sophisticated and comprehensive functions in recording the Sumerian language.

Cuneiform in Non-Sumerian Languages. However, other non-Sumerian languages that had adapted cuneiform as their domestic writing system tended to adjust cuneiform simply as syllabic scripts. Taking Old Persian (OP) as an example, it had been written in cuneiform since the 6th century B.C.E and lasted for five hundred years or so. The cuneiform scripts of consonants of OP were combined with vowels, that is to say, every single graph conveys a syllable in the form of CV (a consonant with a vowel), such as <da>, <di>, <du>. Some consonant signs might not convey all three vowels, they could be written in other ways to trade-off. For example, the consonant sign ‘SA’ is an identical syllabogram, it can be presented as a syllable of <sa> because there is an inherent vowel in this consonant sign. Meanwhile, OP cuneiform did not have a single consonant sign to present <si>, thus, an additional phonogram is attached to that consonant sign, ‘SA’ with a vowel sign ‘I’, expressing <si> (in the way of ‘SAi’) instead of

<sai>. However, there were also certain exceptions of logogram that might have been borrowed from Sumerian or Akkadian but for only a few. Moreover, cuneiform adapted by ancient Persian people had only much fewer scripts than Sumerian and Akkadian languages. In other words, this kind of cuneiform writing system made it possible to mark the pronunciation of the words and phrases, especially for an inflectional language [4].

Those languages had adapted cuneiform scripts and possessed different phonetic systems, which led to the variations of scripts in order to fit grammatical rules. However, there were only three basic vowels in Akkadian, while OP and Hittite had different phonetic systems. When cuneiform was adapted to those Indo-European languages, new versions became syllabic signs to a large extent, and those different types of cuneiform were written as one of the subcategories comparing the classical cuneiform mentioned above. In Hittite, the syllabary signs of cuneiform were modified into syllabic scripts. For example, the transcription of the single signs ‘ba’ and ‘ab’ in the structure of a consonant plus a vowel and a vowel with a consonant respectively [5].

For Hittite language, to solve the problem of how to express an ending consonant, a CVC syllable can be structured as CV + VC, under the condition that two vowels must be the same. For example: a-ša-an-zi > ašanzi, na-at > nat. For stressing long vowels, the Hittite language also developed similar orthographic regulations compared with OP, ‘ma-a-an’ refers to ‘mān’ or ‘i-da-a-lu-uš’ refers to ‘idāluš’. Therefore, these non-Sumerian, Indo-European languages modified cuneiform into a more straight forwards syllabic and phonetic-based writing system [5].

Looking back to the Sumerian language, there were varieties of uses of manners in manipulating their words and sentences, in combination with logogram and syllabogram.

Example 1:

ka dumu-ne-ne-ka

ka.g dumu = ane = enē = ak = a

mouth child = her = PL(plural) = GEN(genitive) = LOC(locative)

‘in the mouth of her children’

Considering there is vowel assimilation, the syllables in italic are the syllabogram attached after the substantial nouns [6].

In this section, we have looked through the trend of evolution of cuneiform, it was first invented by Sumerian people with comprehensive uses combined with both semantogram and phonogram, then it was modified into phonogram, which has been simplified greatly for the convenience of phonetic spelling and only several logograms kept which only used to express particular words by Akkadian, Hittite and Persian people.

2.2 Types of Kana

Kana is the Japanese writing system, it can be generalized into different subcategories: hiragana, katakana and Man’yōgana, among which, Man’yōgana was written in Chinese characters, known as the sinographs, it has two subcategories, ongana and kungana. Ongana is a type of Man’yōgana that represented the pronunciation of Old Chinese

(OC) or Early Middle Chinese (EMC) and *Kungana* was the domestic word that borrowed Chinese characters to express. While hiragana and katakana are adapted from Chinese characters and used in modern Japanese. In contrast, the counterpart of the cuneiform from Mesopotamia is the sinographs. Specifically, those early orthographies were *ongana* and *kungana*, which played a role in phonogram and semantogram uses. Additionally, ancient Japanese authorities preferred using sinographs in recording official documents.

The Japanese orthography developed in three phases. The first period was the stage where logograms were fully used. Then, the second period was the invention of hiragana and katakana. Finally comes the last stage where the Japanese government made regulations in orthography that led to the establishment of a modern Japanese writing system.

Orthography in Old Japanese. The earliest Japanese scripts can be dating back to the fifth century but it was until the seventh century did the scripts began to be widely used [7]. Chinese characters, the sinographs, are also a sort of logogram which is similar to cuneiform, overwhelmingly being used to record the early Japanese classics, *Man'yōshū*, *Nihon Shoki* and *Kojiki*.

In this particular period, logograms were adapted only for phonetic purposes. Taking the character ‘安’ as an example, it means ‘peaceful’ or ‘easy’ in Old Chinese (OC) and the reconstruction of its pronunciation is [0ɑn]. This sinograph can be seen as a logogram and it has 2 types of usage, one is the *ongana* and the other one *kungana*.

When this logogram is used as a phonogram, it presents the phoneme of /a/, as in ‘安倍’ /abe/, a family name in Japan. Whereas this logogram is used as a *kungana* in Old Japanese (OJ), the phoneme it conveys changed, it presents the meaning exactly the same in OC, that is to say, the logogram functions as a *kungana* will not represent a phoneme or a syllable based on OC or Early Middle Chinese (EMC), in this case, its pronunciation is /yasu/ and this logogram conveys a semantic meaning. Additionally, the semantogram ‘安’ can also be transcript into phonograms, consisted two syllabograms ‘也須’ (EMC pronunciation: [jǎsǔ]).

Orthography in Middle Japanese. There were two new types of kana came into existence. Hiragana and katakana derived from *Man'yōgana* during the times of Heian period [7]. That is to say, both hiragana and katakana were created based on the form of Chinese characters. Hiragana was firstly simplified from *Man'yōgana* and each script might also derive several variations which are known as *hentaigana*.

The early usage of hiragana is for phonograms in poets. In middle age, hiragana was used with kanji, Chinese characters, aiming to express domestic language in the native classical works. Here is an example of the scripts in hiragana with kanji.

Example 2:

御室にまうでて

Mi-muro = ni maude-te

HON(honorific)-abode = ALL(allative) come[HUM](humble)-SUB(subordinative gerund)

‘He came to the Prince’s abode, and...’ [8]

Whereas katakana was adapted later than hiragana, used for the purpose of grammatical marking. This is called kundoku (訓読), which is to help read out ancient Chinese passages and Japanese official documents in a way for Japanese people easy to understand. Here is an example of the function of katakana in kundoku from a work of Mengzi.

Example 3:

魚我所欲也。

魚ハ我ガ所レ欲スル也。

Uo = wa wa = ga dokoro hossuru nari.

Fish = TOP(topic) I = POSS(possessive) place [the thing] = (transposition mark) desire

be = FIN(final verb form).

魚は、我が欲する所なり。

“Fish is the thing that I want.”

In this phrase, hiragana ‘ハ’ is to point out the theme word ‘fish’, ‘ガ’ is to mark the subject ‘I’, ‘レ’ is to suggest that two characters need to switch their positions. ‘スル’ added is to make a connection with a noun after a verb.

Orthography in Modern Japanese. The Japanese government began to reform their writing system in order to make speeches that corresponded to writings after the reformation of the Meiji Emperor during the Meiji Period (1868–1912). The combined uses of kanji, hiragana and katakana became fixed statically. Hiragana expresses the phoneme of the attached components and marks the pronunciation of a kanji. Whereas the function of katakana changed greatly, it became a separate writing system to spell the loanwords from western countries. Additionally, some modern Japanese words may consist of different types of kana and kanji could also represent a domestic word or Chinese word in terms of the way how it pronounces [9, 10].

2.3 Summary

This section looked through the course of how cuneiform and Japanese writing systems developed. Cuneiform scripts were firstly used in a comprehensive way with logogram and phonogram, then modified into phonograms for phonetic purposes. While Japanese firstly used logogram only for conveying phonetic syllables and a mixture usage for semantogram and syllabogram totally in Chinese characters, after which, the sinograph used for spelling syllables derived hiragana and katakana, which prompted the comprehensive writing systems being used for recording domestic languages and became regulated at the early modern times.

3 Further Observation in Phonetics and Morphology

Japanese and those Indo-European languages have enormous differences in their writing systems in aspects of phonetics and morphology, which lead to two writing systems

developed into two dimensions, cuneiform from a mixture uses of logograms with semantograms and phonograms to phonograms representing only, whereas Japanese writing system is an inverted one that from phonograms purpose to mixed use with 3 identical scripts.

3.1 Phonetic Differences

Differences in sound systems in various languages led to varieties of modified writing systems. Trade-offs can be traced through these differences. According to BJ in his work, scholars had to reconstruct the Sumerian sound system through its loanwords in Akkadian [6]. Similarly, to identify the OJ sound system also needs to refer to the historical pronunciations of Chinese characters.

According to the reconstruction of the Sumerian sound system, there were 3 labial consonants, 8 dental consonants, 2 palatal consonants, 4 velar consonants, 2 glottal consonants and 4 pairs of vowels which consisted of a short and a long one in each pair in Sumerian sound system.

According to the reconstruction of the Akkadian sound system, there were 19 consonants and 4 pairs of vowels. Probably we can assume that Akkadian had more consonants than those in Sumerian [11].

OP had 21 consonants, 3 pairs of single vowels, a schwa and 2 pairs of diphthongs, which possessed the most sophisticated sounds among the languages that adapted cuneiform. Additionally, OP had /f/, /θ/, /x/ and many other vowels that did not exist in Sumerian [4].

Considering the logogram gradually being less used in the later languages, it could explain the phonetic differences caused the exclusiveness of using semantograms to become less dominant in cuneiform for the later period. The tendency from the use of logogram to phonogram reveals that the necessity of modifications was actually to seek a more suitable writing system to fit their phonetic system.

However, the situation in the development of the Japanese writing system is an inverse one compared to cuneiform. That is because, the OJ sound system had fewer phonemes than EMC, which means Chinese characters were abundant enough for ancient Japanese people to borrow to express their own phonemes and syllables.

3.2 Morphological Differences

The result of modifying the writing system partly relates to the typology of that language. According to the illustration of different types of scripts, it can be inferred that hiragana and katakana belong to the syllabogram, a subcategory of the phonogram [12]. Sumerian and Japanese are agglutinative languages, this means the meanings of phrases or sentences are determined by suffixes that appear next to words. In this circumstance, it is necessary for these languages to adapt a writing system to distinguish content words and suffixes, Sumerian did so when they began using cuneiform signs. On the contrary, ancient Japanese did not have their own writing system and as the features mentioned above, they made it possible to modify logograms into 3 sorts of usages these days. That is to say, the creation of kana is an example of made logograms fitting with an

agglutinative language. Based on the history of the Japanese writing system, before kana was invented, early classics were written in OC or combined uses of logograms and phonograms at the stage of OJ.

4 Non-linguistic Factors

There are two non-linguistic factors that lead to the different endings of the two writing systems. Cuneiform is no longer used anymore, while Japanese writing systems are passed down and still being used. One is about the writing tools and the other is about the historic factor.

As the cuneiform was preserved on clay boards, which means it would be time-consuming to write cuneiform and it was rather difficult to record and carry. This limits its mobility. However, Chinese characters were recorded on paper and were written with a sort of writing brush which made it possible for the Japanese writing system to convey [12].

According to historical facts, Mesopotamia was a place where happened plenty of wars and turbulence. The first settlers in Mesopotamia were Sumerians, then Amorites united Mesopotamia and they built Babylon Kingdom in 1800 BC after which was conquered by Hittite in 1595 BC, Hittite kingdoms collapsed about 1200BC and eventually were seized by Assyrian and became a part of the Assyrian empire in around 710 BC. Medes were a group of people who spoke an Indo-European language, found their country paralleled to Assyrian Empire, was overturned by ancient Persian people who were under the control of Medes at that time, and they established Persian Empire in 550 BC, stopped to exist in 330BC. Compared to ancient Japan, there was no such scruple about getting invaded by foreigners. To some extent, Japanese writing systems were well developed in a peaceful period, despite there being domestic turmoils that nobles obtained much more power against to Japanese emperor. Though Yuan Empire intended to capture Japanese islands, it was not until kana were invented [13–16].

5 Conclusion

To sum up, the two writing systems evolved in an inverse way depending on which languages they modified into. Particularly, this is associated with phonological and morphological differences. In specific, Sumerians and Japanese have fewer phonemes in their phonetic system and are acknowledged that they are agglutinative languages, creating a mixture of uses of logograms and phonograms. Whereas, inflectional languages with case declension and verb conjugation modified cuneiform into phonograms. Although ancient Japanese people attempted adapting characters into phonograms, it turned out to be low-efficient to record OJ, the invention of kana made it possible to make a balance where logograms and phonograms elaborate efficiently in expressing meanings, and the combined uses of logograms and phonograms. In addition to linguistic factors, the phenomenon of these two different types of scripts have different endings involving the writing tools, outdated materials and writing methods, being used in an unstable area with thousands of wars throughout the period led to the extinction of cuneiform. On the other hand, Chinese logograms were introduced into Japan based on more advanced

writing tools, with almost no threats from other nations, Japanese language and culture continued blossoming and kana became one of the most unique writing systems in the modern world.

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