

Ligature as a common pattern of written character creation in Japan and Europe

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Introduction

The study of writing systems based on the Latin alphabet and on Chinese characters has been noted to lack a common framework¹. Lately there has been research focusing on this problem, for example:

- Whitman (2010) proposed an international vocabulary for research in vernacular readings in Chinese texts (漢文訓読);

- Lurie (2011) pointed that “in medieval Europe Latin texts were glossed with diacritics and other markings supporting translation into local vernaculars, in striking parallels with the reading annotations in Japanese and Korean manuscripts” and mentioned that “logographic Chinese-style writing served as the “Latin of East Asia”.

In our work we would like to extend these ideas and demonstrate the existence of common mechanisms in the adaptation and use of script in Europe and the Sinosphere through the example of ligatures. Several works on ligatures can be found in Japan² and in the West³, however most of them are focused on one kind of script: either roman letters, *kanji* or *kana*. The fact that this topic requires further investigation is also demonstrated, for example, by the definition of the term “ligature” in the “Encyclopedia of Chinese characters” (漢字百科大事典). “Ligature” (合字) is there defined as the “combination of 2 characters into a single one while keeping their original readings”. It is also mentioned that there are “two kinds of ligature: either consisting of 2 *kanji* or of 2 *kana* characters”. From this definition it follows that ligatures are always formed by 2 characters. However, as we can see from such examples as 𠂔 (ligature made from 3 characters *ka* 力 *ta* 田 and *na* ナ to represent the word “katana”), one ligature can be formed by more than 2 characters. That is also the reason why in the West, as Gaskell (1976) mentioned, the term “ligature” has prevailed instead of the other commonly used term, “double letter” (see “A Nomenclature for the Letterforms of Roman Type”, p. 5). Finally, it also follows from the encyclopedic definition of ligature that it is specific to *kanji* and

¹ 中村完「文字総説」『漢字とは』1988, p. 2.

² 「日本における合字の出現」 in 笹原 (2003), 谷光忠彦「合字に関する一試論——「」・ノ・氏・并を中心——」(1990), 高梨 素子「変体仮名指導の課題：(付)合字」(2012).

³ Herrick “A taxonomy of Alphabets and Scripts” 1974, Gaskell “A Nomenclature for the Letterforms of Roman Type” 1976, Brekle H.B. “Zur handschriften und typographischen Geschichte der Buchstaben-ligatur ß aus gotisch-deutschen und humanistisch-italienischen Kontexten” 2001, etc.

kana only, even though there exist examples proving otherwise even in the Japanese language. We will introduce these and other examples in Section 2.

The paper is structured as follows. After discussing the problems with the definition of ligatures we will propose a definition and a classification for ligatures, which can be applied to both Chinese characters- and roman letters-based traditions of writing (Section 1). In Section 2 we focus on orthographic ligatures and provide similar examples in the creation and use of ligatures in Japan and Europe. Examples of subculture ligatures in both traditions of writing will also be shown.

1. On the problem of the definition of “ligature”

Several problems need to be discussed for defining the term “ligature”. The first one is related to *kanji-ligatures* in Japanese writing and consists in distinguishing “ligature” from such concepts as *kokuji* 国字 (Japanese made *kanji*), *ryakuji* 略字 (simplified form of characters) and so on, with which it may be confused due to the particularities of *kanji*’s internal structure⁴.

● Ligatures (go:ji 合字) ≠ Japanese made *kanji* (*kokuji* 国字)

In the “Encyclopedia of the Japanese language”, *kanji-ligatures* are mentioned as a type of *kokuji*. However, as Sasahara (2003) mentions, “such concepts as *ligature* and *kokuji* intersect partly, but are not equal” (『国字の位相と展開』, p. 49). Characters formed by a ligature mechanism can be found in Chinese writing as well⁵, and therefore can be seen rather as a universal pattern than something specific only to characters made in Japan.

● Ligatures (合字) ≠ compound ideographs (会意文字)

Ligatures can also be confused with compound ideographs (*kaiimoji* 会意文字). According to the classic Chinese classification of characters (六書) compound ideographs represent a semantic combination of two characters to represent a certain concept. Typical examples of *compound ideographs* are 信 “truthful” (formed from 人 “man” and 言 “speech”) or 森 “forest” (formed from three “trees” 木).

Contrary to such semantic joining of characters, *kanji-ligatures* are formed by combining characters which are usually written next to each other. They thus represent the reading of a character rather than its meaning. For example in the *kanji-ligature* *kume* 桑, which stands for a Japanese family name, the original readings of both joined characters (*ku* 久 and *me* 米) are kept.

● Ligatures (合字) ≠ simplified form of character (略字)

Because of the presence of such ligatures as ゅ (ligature of *hiragana* symbols よ and り to represent the word “yori”) or 𛄦 (ligature of *katakana* symbols ト and キ to represent word

⁴ Most Chinese characters (more than 90%) already consist of several elements (部首).

⁵ Ligating several characters into one was already occurring in China during the Yin dynasty (from around 16-11c. BCE). Examples of such ligatures can be found in the “Oracle bone script dictionary” (甲骨文編), which has a special section for ligatures (合文).

“toki”) ligatures are also sometimes being confused with *ryakuji* 略字 (simplified form of character)⁶. In the examples of ligatures given above several characters are joined into one by simplification of some parts. Clearly, most of the ligatures have a function of simplification. However we argue that there can be other reasons for joining several characters. For example early European typefaces had many ligatures in order to imitate handwriting, which can be explained by design purposes rather than saving space only. Two characters can be fused into one for an orthographic reason, for example when two (or more) characters represent one language unit: one phoneme in the case of roman letters-based ligatures (e.g. w or german ß) and one word in the case of *kanji* and *kana* (奎、彙、㐁 etc.) .

Our definition of ligature

In view of what has been said in this section and to avoid confusion with other terms used for *kanji*, we define ligature as:

The combination of two or more characters which are frequently placed next to each other into a single character, for orthographic, stylistic, or other reasons.

Ligature classification

It is also important to distinguish ligatures from the point of view of linguistics and typography. For example, there are symbols such as *me:toru* メートル (metre), *heisei* 平成 (heisei period - the current era in Japan) or *kabushiki gaisha* 株式会社 (joint-stock company) frequently used in Japan. Linguistics does not view these examples as single characters because they are not part of the language's orthography. In Typography however, since several characters are placed into one piece of type or, in the case of digital media, each has its own code, they can also be called ligatures⁷.

In our paper we would like to propose a classification of ligatures, inspired by Gaskell (1976), which could solve the dilemma given above and be applied to both Chinese characters- and roman letters-based traditions of writing.

1. Orthographic ligature (一般合字): compound characters which are part of a language's orthography. Roman letters examples: æ (ae), œ (oe), w (vv), or ß (sz) in German; *kanji* examples: *maro* 磨, *kume* 彙, *moku* 奎; *kana* examples: *toki* 帀 (トキ), *yor* 㐁 (より), *koto* 㐂 (こと).

To this category we added two subcategories:

1.1 *Symbols* (記号) - ligatures which are commonly used by writing systems of different languages and have a status of an international symbol: ampersand & (et) or at-mark @ (at).

1.2 *Subculture ligatures* (位相合字) - ligatures which are frequently used by a certain group of

⁶ 谷光忠彦「合字に関する一試論」、p. 222.

⁷ James Felici “The Complete Manual of Typography”, p. 202.

people, but are not accepted as a part of “standard orthography”. Symbol 𐌹 for the English word “The” or *keio*: 京大 for the name of the Kei-O: University in Japan (慶應義塾大学).

2. Typographic ligatures - characters which are clearly distinguishable, but combined with single pieces of type, or with one code (in the case of digital media) in response to the demands of composition (ff, ffl etc.) or space (ドル、平成、株式会社).

2. Orthographic ligatures in Japan and Europe

In this section we will discuss orthographic ligatures in detail, and show through particular examples how parallels in their creation and use can be found in both traditions of writing.

As mentioned in the introduction, processes of script adaptation in East Asia and medieval Europe have been noticed to have some common mechanisms. Ligatures can also be seen as one of such mechanisms of script adaptation. One of the most used orthographic ligatures in Japan is *maro* 磨, the character is widely used in personal names such as *Hitomaro* 人磨 or *Kiyomaro* 清磨. It was formed by combination of the Chinese characters *ma* 麻 (hemp) and *ro* 呂 (backbone), which are used phonetically without any regards to their meaning (so called *ateji* 当て字). In *mokkan* (wooden tablets from Nara period (710-784)) we can trace the changes in the letter shape and evolution to the ligature form⁸ (fig. 1). From the early Edo period the character for *maro* 磨 can be found in dictionaries as an independent character for proper names.



Fig. 1 Formation of the ligature *maro* 磨 in wooden tablets from Nara period.

Source: Nara National Research Institute for Cultural Properties, Wooden Tablet Image Database.

One can find a similar process in the invention of the german character *eszett* ß, which was obtained by combining a long “s” (ſ)⁹ with a “z” (at that time having a form closer to ʒ)¹⁰. In the

⁸ Sasahara (2012) also argues that the previous existence of a character *migaku* 磨 with similar structure could have influenced the creation of *maro* 磨. Also, there was a word of the same origin *maru* (丸) which already consisted of a single character, thus motivating the representation of *maro* with a single character as well.

⁹ The long s (ſ) is a form of lowercase s, which was formerly used in the beginning and in the middle of word, while the short or round s was used in the end of word.

“Sibyllenbuch fragment” (fig. 2) we can see ʃ and ʒ written close to each other but still not fused into one character, while in later books they occur in ligated form (fig. 3 and 4).

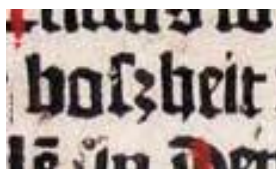


Fig.2. 1452-53



Fig.3. 1618

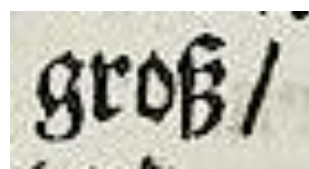


Fig. 4. 1663

Finally we can find “ß” included in the alphabet and recognized as an independent letter, for example in a german textbook from the 18th century (fig. 5).

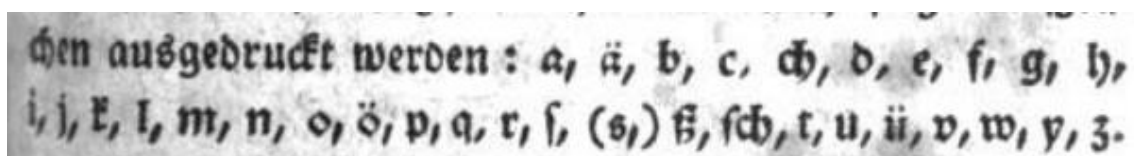


Fig. 5. “Deutsche Sprachlehre für Schulen”, 1781, p.40.

Nowadays, in Japan, *maro* 磨 is included in the list of Characters in use for personal names (人名用漢字), which demonstrates its need and frequency of use. The Eszett had a more difficult story, including debates around scraping the letter from the Alphabet entirely (which Switzerland did). However, despite the limitation of its use after the orthographic reform of 1996, in 2008 the letter “has been officially accepted as a lower and upper case alphabet figure by the International Organization of Standardization (ISO) which has granted it status in its club of “special consonants found in western European languages”” (The Guardian, 27 June 2008).

Ligature status

The status of a ligature may change depending on language. As Herrick (1974) mentions, the ligature “æ”, for example, is seen as a single letter in Danish, but in the modern English language it is a ligature embodying the letters “a” and “e”.

The status of a ligature may change even within one language. For example, *kana-ligatures* such as *toki* 𛄂 (トキ), *koto* 𛄃 (コト) etc. were actively used in Japan in the Edo and Meiji periods. They were even placed together with *hiragana* and *katakana* syllabaries in the school textbooks (fig. 6).

¹⁰ A shift in the pronunciation of modern High German had led by the 18th century to the same pronunciation of ss and sz, and also to the interchangeable use of “ß” in both cases.

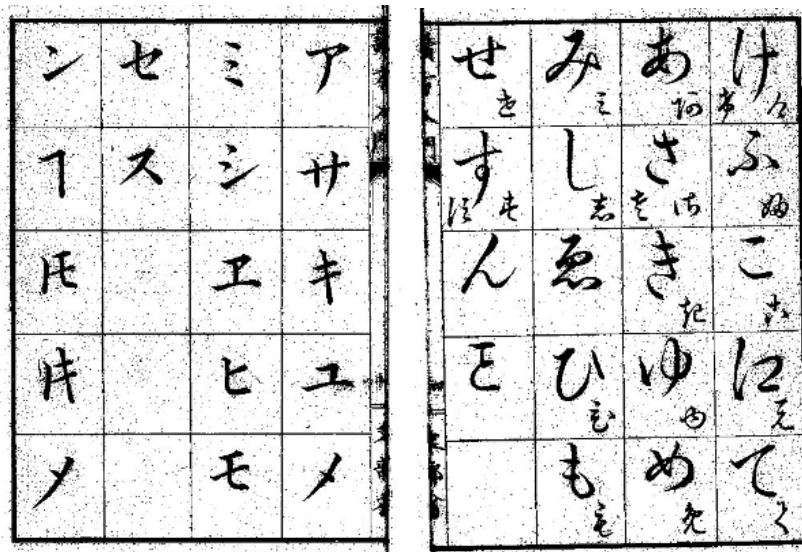


Fig. 6. 『読方入門』、文部省編 (1884)

However, after the acceptance of Regulations for Elementary School Education (1900、「小学校令施行規則」) the number of kana-characters and range of their use was limited and most ligatures went out of use. Some of them were nevertheless registered in Unicode and at the present time they can be found in the list of special symbols (特殊文字) of Microsoft Word, for example.

A similar story, but which ran in the opposite direction, happened to the ampersand (&), which at some point was treated as a letter of the English alphabet and came after z (fig. 7).



Fig. 7. Aickin Joseph "The English Grammar" (1693)

Its active use by writing systems of other languages brought it eventually to keyboards of typing

machines and computers. And in modern time it has a status of international symbol (even being called ideogram) rather than belonging to any particular language.

Subculture ligatures

We will call “Subculture ligatures” to ligatures which are widely used by certain groups of people, but are not part of the standard orthography of a language. One of the examples that can be given is the character for *toshokan* 圖 (library), formed by fusing the characters *to* 囧 and *sho* 書 from the word *toshokan* 圖書館 (library)¹¹. The character was invented and introduced in Japan at around 1926 by the Chinese librarian Du Dingyou (杜定友, one of the founders of Modern Library science). This invention was very warmly welcomed by the Japanese library world, especially because the old form of the character *to* 囧 being used at that time was 圖, and everyday writing of the word *toshokan* 圖書館 (library) was tiring. The character was even used in the title of a magazine published in Japan “Library research” 「圖研究」 (fig. 8)¹².



Fig.8 The ligature 圖 (library) in the title and text of the magazine “Library research”.

An example of a similar pattern can be found in the western tradition of writing nowadays. The Australian restaurateur Paul Mathis invented a new letter “Th” to replace the english word “The”. The inventor argued that even though the word “and” is only the fifth most frequently used word in english, it has its own symbol and place on the keyboard, while “The” - the most used word in english - does not have such privileges. The symbol, he believes, would also help saving time and space when messaging on mobile phones, since only 1 key press is necessary instead of 3¹³. The new symbol was released in 2013 as an application for Android, which adds the new symbol to the phones virtual keyboards (fig. 9).

¹¹ There are several different opinions about the origin of the character 圖: in 「現代日本の異体字」 (2003, p. 40) the character is introduced as a ligature, while in 阿辻 (2008, p. 184) it is seen as a symbol. Also, in 「新漢和大字典」 (2006, p. 351) it was ascribed to the class of compound ideographs (会意) where 囧 represents a building and 書 represents the books inside.

¹² For further information about the history of the invention of the character 圖 see 笹原 (1993) and 阿辻 (2008, pp. 181-184).

¹³ The official web-site of the character Th: <http://thethesymbol.com/>

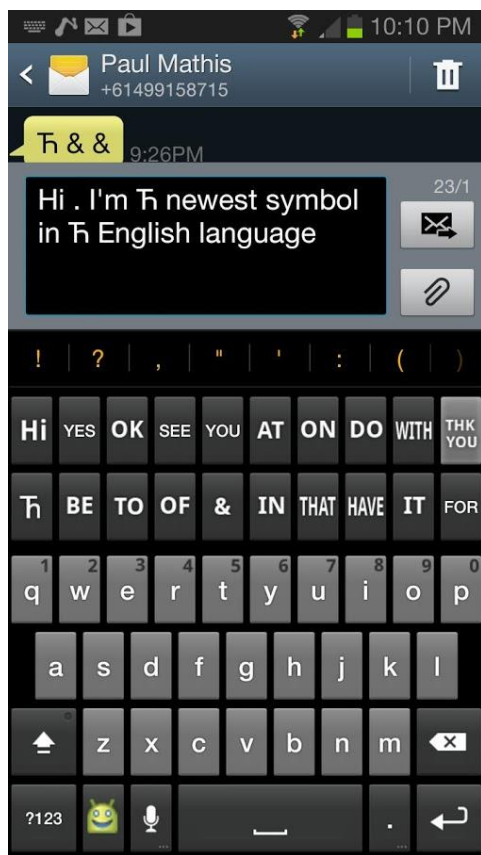


Fig.9 Application for android with virtual keyboard including the symbol 𐤀.

This example shows striking parallels with the “library” example. Both were invented by a single person for the purpose of saving energy or time (in the case of *toshokan* 圖 while writing and in case of *The 𐤀* while typing). The way the characters were combined is also similar for both examples - fusing the first two characters while dropping the last one. The $\rightarrow T+h \rightarrow 𐤀$; and 圖書館 $\rightarrow 圖 + 書 \rightarrow 圖$.

Another example of modern subculture ligatures is the character 𐤀, which stands for Kei-o: (慶應) used by Keio: University in Japan (慶應義塾大学). This character consists of two characters *kei* 𐤀 and *o*: 𐤀 ligated into one. 𐤀 is a simplification for 慶 which is read *kei*, and 𐤀 for 應 which is read *o*.

As a final example, in Portugal the @ mark is sometimes used as a ligature of “o” and “a”. This comes from the fact that in the Portuguese language words are distinguished by gender into masculine and feminine: masculine nouns require an article

“o” and usually finish with “o” (e.g. “o gato”, the (male) cat), while feminine nouns require an article “a” and also finish with “a” (e.g. “a gata”, the (female) cat). To express that an object could be both male or female, the notation “o(a)” can be used (e.g. “o gato ou a gata”, meaning the male or female cat, becomes “o(a) gato(a)”). The frequent use of this “o(a)” notation lead to its replacement by “@” to save effort and because of visual resemblance with “o” and “a” (e.g. “@ gat@”). Even if the @-mark is not originally a ligature of “a” and “o”, we can say that it at least functions as a ligature in this case.

Conclusion

In this paper we demonstrated the existence of common mechanisms in the adaptation and use of script in Europe and the Sinosphere trough the example of ligatures.

We discussed the need for a new definition of ligature and suggested our own. This new definition is applicable to both Chinese characters- and roman letters-based traditions of writing. We specially mentioned the frequency of use and arrangement of characters next to each other as important conditions for ligature appearance, and defined ligature as a combination of two or more characters

which are frequently placed next to each other into a single character, for orthographic, stylistic, or other reasons.

We classified ligatures into 2 groups, orthographic and typographic, and discussed the first in detail. Through examples of orthographic ligatures such as the German *eszett* ß and Japanese *maro* 𑜀𑜂𑜆𑜐, we showed similarities in the process of ligature creation in Japan and Europe. We also mentioned a tendency for orthographic ligatures to represent one language unit with one character.

Furthermore we introduced the term “Subculture ligatures” for ligatures which are frequently used by certain groups of people, but are not part of the standard orthography of a language.

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Ligature as a common pattern of written character creation in Japan and Europe

在漢字圈和羅馬字圈造字的共通模式 -以合字為例-

Anna Sharko

Abstract

This paper demonstrates common patterns in the creation and use of written characters in Japan and Europe through the example of *ligatures* (合字). These involve combining two or more different characters into a single one. For example, the Japanese character for *maro* (麿) was formed by combining *ma* (麻) and *ro* (呂), while in Germany the same principle was used to create *the eszett* (ß) from “f” and “z”.

In the theoretical part of the paper we discuss problems related to the definition of ligature and propose a definition and a classification which can be applied to both Chinese characters- and roman letters-based traditions of writing. In the second part we focus on orthographic ligatures and provide similar examples in the creation and use of ligatures in Japan and Europe. Examples of subculture ligatures such as 囧 (library) in Japan and the letter “H” (The) in English will also be shown.

Keywords: ligatures, character creation, Chinese characters, Latin alphabet, kanji.