

Eps51

Ben Wittner
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niggli

Bi-Script

Typography and
Graphic Design
with Multiple
Script Systems

ual العربية Arabic
Cyrillic Кириллица Greek
Ελληνικά Hangul 한글
Hanzi 汉字 Hebrew עברית
Devanagari देवनागरी
Kanji / Hiragana / Katakana
漢字 / ひらがな / カタカナ

Hanzi

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Essay by
Keith Tam

Type
Logographic script

Languages
Chinese, and variant forms
for Japanese, Korean and
Vietnamese

Actively used by
1,302 billion

Time period
c. 1600 BCE to the present

Direction
Traditionally top-to-bottom
running from right-to-left,
now commonly left-to-right,
less commonly right-to-left

譚智恒 Keith Tam

HISTORY AND BACKGROUND

[1]

The Chinese language is written in the Hanzi script, where *Han* refers to the dynasty (202 BCE – 220 CE) as well as the largest ethnic group in East Asia. Other languages also use subsets or variant forms of Hanzi, including *Kanji* for Japanese, *Hanja* for Korean, and *Chữ Nôm* for Vietnamese. The origins of the Hanzi script date back to the Shang Dynasty

(1600 – 1046 BCE), with inscriptions etched onto bones and animal shells used for divination. Hanzi is a logographic script, where each character represents a morpheme. The Hanzi script is made up of six kinds of characters known as *liushu*: pictographs, simple ideograms, compound ideographs, rebuses, phono-semantic compound characters, and derivative cognates. Each character represents one syllable, but pronunciation bears little relationship to the form of the character, except in phono-semantic compounds where pronunciation is imprecisely denoted. The Chinese language also consists of large numbers

of homonyms – characters that share one pronunciation. The total number of Chinese characters currently documented in the GB18030–2005 encoding standard is 70,244, 4,808 of which are frequently used.

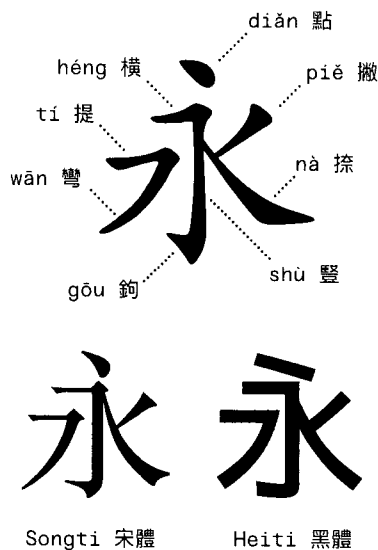
Strokes are the most elemental building block of Chinese characters. The character *yong* (永) is used to illustrate the eight types of basic strokes in Chinese calligraphy. (Figure 1) Strokes are used to construct a total of 213 radicals (部首). These are root characters that can either exist as individual characters or be combined to form composite characters. A word in Chinese can be made up of one to three characters, with an average word length of 1.5 characters. 55 percent of words are comprised of one character, 40 percent of two characters, and five percent of three characters. There is no spatial separation between words; they can only be differentiated in context.

There are eight main varieties of speech in China, often referred to as dialects rather than languages. Mandarin and Cantonese are the two that are most widely spoken. Mandarin was designated as the official form of Chinese in 1932 during the Republic of China era. Mandarin – called *Putonghua* (普通话) in Mainland China – is the official language on the mainland, Taiwan and Singapore. While the majority of the population in Hong Kong and Macau

speak Cantonese, they have been taught to write in a way that closely resembles Putonghua.

Hanyu Pinyin (汉语拼音 or simply *Pinyin*) is a standard romanisation system for Putonghua. It was introduced after the establishment of the People's Republic during the 1950s by Zhou Youguang (周有光). This system uses the Latin alphabet with four diacritical marks that denote the flat (macron *ˉ*), rising (acute *ˊ*), falling (grave *ˋ*) and falling-rising (caron *ˇ*) tones. Wade–Giles, Sin Wenz and Yale are other romanisation systems, but they have now been largely superseded by *Pinyin*. *Zhuyin* (注音, also known as *Bopomofo* ㄅㄆㄇㄏ) is a phonetic notation system that uses 37 phonetic characters and four tone marks. This system is commonly used for teaching reading and writing in school books in Taiwan, but is not used on the mainland.

There are two forms of Chinese orthography, Traditional Chinese (繁體中文) and Simplified Chinese (简体中文). Simplified Chinese characters were derived from the traditional forms by reducing the number of strokes, and were first proposed during the Republic of China era in 1935. The official set of Simplified Chinese characters was later expanded and imposed by the government of the People's Republic of China during the 1960s. It went through several iterations and the current national standard consists of 8,150 characters. Simplified Chinese is the official script in Mainland China, and it is also used by Chinese diasporas in Malaysia, Singapore and other parts of the world. Traditional Chinese is used in Hong Kong, Macau and Taiwan, and in some overseas Chinese communities. A reader's preference of one form over the other can be due to his reading proficiency, habit, cultural propensity or regional sentiment. In addition to Traditional and Simplified Chinese, further regional orthographic variations exist between Mainland China, Taiwan and Hong Kong. Kanji (Japanese) and Hanja (Korean) also have their own regional orthographic variations. (Figure 2)



↑ Figure 1: The eight types of strokes illustrated by the character *yong* in Kaiti, Songti and Heiti

→ Figure 2: Simplified Chinese (SC), Traditional Chinese (TC), Japanese (J) and Korean (K) regional variations of a selection of characters in Noto Serif.

SC	TC	J	K	SC	TC	J	K
草	草	草	草	巨	巨	巨	巨
她	她	她	她	空	空	空	空
能	能	能	能	松	松	松	松
骨	骨	骨	骨	直	直	直	直
迷	迷	迷	迷	港	港	港	港

→ Figure 3



Chinese text is traditionally written vertically from top to bottom, with lines running from right-to-left. Books and publications were almost exclusively set vertically until the Republic of China era (1912–1949), when foreign influences and bilingual publications encouraged the adoption of Western style horizontal typesetting. Since 1955, the government of the People's Republic of China has enforced horizontal setting for all printed

matter. Both vertical and horizontal settings can be found in Taiwan, Hong Kong and Macau, however.

The use of a soft, pointed brush for writing Hanzi characters dates back some 5,000 years. By varying the pressure applied, different thick–thin stroke transitions are achieved. Calligraphic scripts such as Bronze Script (金文) or *Zhuanshu* (篆书, seal script) show less brush manipulation, with almost monolinear characteristics. *Lishu* (隶书, clerical script) shows more variation in pressure and finial treatments. *Kaishu* (楷书, standard script), *Xingshu* (行书, running script) and *Caoshu* (or grass script) display appreciably more sophisticated variations in stroke contrast and

finial manipulations. (Figure 3)

The development of *Kaishu* in 219–265 (Figure 4) paved the way for the subsequent development of standardised lettering styles used first in woodblock printing and subsequently in typesets used in moveable type printing. *Kaishu* reached its height during the Tang Dynasty (618–906). The works of four master calligraphers from the Tang Dynasty – Ou-yang Hsun (欧阳询), Yen Chen-ching (颜真卿), Liu Gong-chuen (柳公权) and Zhao Meng-fu (赵孟頫) – became archetypes, widely imitated as the major lettering styles for xylographic printing. *Kaishu* was the last development in the evolution of the Chinese script, and it has remained largely unchanged to this day.

Xylographic (woodblock) printing was first developed during the Sui Dynasty around 1,400

years ago. At first, *Kaishu* was the style used for book production. The intricate curves of *Kaishu* soon proved to be inefficient for carving onto wood. A new style called *Songti* (宋体) evolved from *Kaishu* in order to speed up production. This style took the essence of *Kaishu* and regularised and standardised its features. The development of *Songti* reached maturation during the Ming Dynasty, hence the style is sometimes referred to as *Mingti* (明体), or *Minchōtai* (明朝体) in Japan. *Songti* was a development that signalled a typographic rather than calligraphic aesthetic to printing, later fuelled by the work of missionaries such as William Gamble, who brought the industrialised process of moveable type printing from the West in the late 19th century.

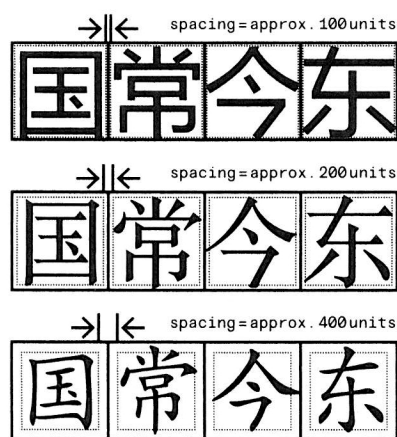
Punctuation has a long history in Chinese books, dating back to the Qin Dynasty (219–207 BCE). These marks were originally added to text as a form of annotation to aid reading, between columns of vertical text. These were once added by the reader by hand, and later printed with xylography, usually in a second colour such as red. Punctuation was not standardised until the end of the Qing Dynasty towards the end of the 1920s, when Western punctuation marks were introduced. Until the end of the Republican era, punctuation was always interlinear rather than within the text flow (with the exception of quotation marks and brackets).

FUNCTION-ALITY

[2] Hanzi characters are customarily monowidth; they sit within a notional square. This is defined as the em square in typesetting, referred to as the 'body frame'. Spacing between Chinese characters is defined internally within each glyph, with a margin within the body frame called the 'surface frame'. The surface frame is often defined as a percentage of the body frame. The larger this percentage, the more tightly-spaced and the larger the typeface appears. If a typeface's surface frame is 90 percent, given that the em square consists of 1,000 units, the space between two



↑ Figure 4



↑ Figure 5: The (average) surface frames and internal character spacing of Microsoft Ya Hei (top), ST Songti (middle) and ST Kaiti (bottom)

characters will be 200 units. (Figure 5) This data is usually not known to the user of typefaces and can only be judged by eye. Condensed typefaces such as most *Fangsongti* (仿宋体) appear very widely spaced on the body frame, whereas typefaces with small surface frames such as *Kaiti* often appear small compared with other typefaces of the same point size. (Figure 6) In the Hanzi script, all strokes and characters are centred optically within the body frame, and sized and aligned

optically between each character. This makes it possible for most Chinese fonts to be set horizontally as well as vertically.

TYPE CLASSIFICATION Chinese typefaces can be broadly classified into four major categories: *Songti*, *Fangsongti*, *Kaiti* (*Kaishu*), and *Heiti*. (Figure 7) These categories of typefaces are considered general purpose and conventional and are most suitable for continuous text as well as display use. Typefaces that are outside of these four categories can generally be considered novelty display typefaces.

Kaiti (楷体) is a calligraphic typestyle that closely follows the style of *Kaishu* (楷书). All strokes are made up of curves, with no orthogonal lines.

慶歷中，有布衣畢昇，又為活版。其法用膠泥刻字，薄如錢唇，每字為一印，火燒令堅。先設一鐵版，其上以松脂臘和紙灰之類冒之。欲印則以一鐵范置鐵板上，乃密布字印。滿鐵范為一板，持就火燭之，藥稍熔，則以一平板按

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↑ Figure 6:
Top left: *Songti*
Top right: *Heiti*
Bottom left: *Kaiti*
Bottom right: *Fangsongti*

Conveying traditionalism, this style is conventionally used for correspondence, business cards or invitations, suggesting formality. It is also often used for children's readers or textbooks, because it most closely resembles handwritten forms. *Kaiti* may be preferred by elderly readers, but can sometimes appear too traditional, and may slow down reading if used in long texts.

Songti (宋体) is the most ubiquitous category of typefaces for continuous reading. Its modulated stroke contrast and emphasised stroke terminals can make it comparable to Latin serifed typefaces. It is also sometimes called *Mingti* (明体) in Chinese, especially in Taiwan and Hong Kong. *Songti* has a literary quality that works well for both text and display use.

Fangsongti (仿宋体) is a style originally developed for interlinear notes in small sizes in

xylographic printing during the Song Dynasty. The stroke contrast is low, with condensed proportions and often very light stroke weights. *Fansong* typefaces are usually very light in weight, and are therefore unsuitable for lengthy continuous reading, especially in small sizes. Its condensed proportions make it suitable for vertical setting.

Heiti (黑体) appears to be the most contemporary style amongst the four major categories. It is most similar to monolinear sans serif Latin typefaces. During the letterpress era, *Heiti* was used for display purposes or for emphasis within continuous text, and was only available in medium or bold weights. A much wider range of weights is now available, and they are popular for continuous reading as well as display use in contemporary graphic design.

READING DIRECTION Vertical setting is suitable for continuous, immersive reading, often associated with literary works. When vertical setting is used in a publication, binding is always on the right with the fore edge on the left. Horizontal setting is often more suitable for complex content structures and publications that are designed to be read selectively or consulted. For parallel bilingual texts, horizontal setting is often more convenient for both the designer and the reader.

ALIGNMENT AND JUSTIFICATION Continuous prose in Chinese is customarily set justified. The fact that Chinese characters are monowidth makes flush left, ragged right alignment impractical. Flush left alignment can only be achieved satisfactorily when line breaks are manually forced. Column widths should be defined as multiples of the point size of the text in order for the spacing to be optimal as defined by the type designer. Chinese justification and spacing rules should be used to ensure good spacing.

PUNCTUATION Chinese punctuation marks usually occupy the space of a full em square. However, the space around punctuation can be flexibly reduced to improve spacing. Larger display or short texts usually benefit from reducing the spacing around punctuation to half-width. (Figure 8) There are two types of Chinese punctuation marks. (Figure 9) In simplified Chinese

→ Figure 7: Four major categories of Hanzi typefaces: *Songti*, *Fangsong*, *Kaiti* and *Heiti* (top to bottom)

中文字體 宋體
中文字體 仿宋
中文字體 楷書
中文字體 黑體

→ Figure 8: By using half-width quotation marks and angled brackets (work title marks) in the bottom line, five full character spaces have been saved, and the text appears more coherent and aesthetically pleasing.

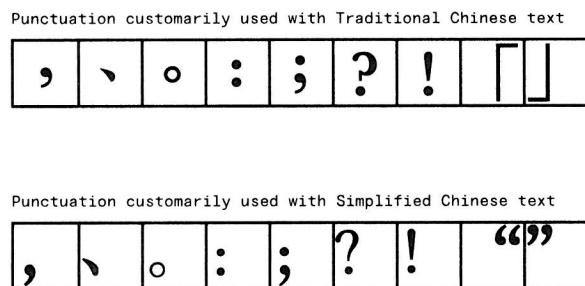
“泉镜花”、“山本郎”。《厨房》、《甘露》、《哀愁的预感》。

“泉镜花”、“山本郎”。《厨房》、《甘露》、《哀愁的预感》。

fonts, punctuation normally sits near the bottom of the em square, aligned to the left (except the dash, ellipses and brackets). Punctuation in Traditional Chinese fonts is centred within the em square, making it functional for both horizontal and vertical setting. Note that the single and double quotation marks are different in these two kinds of punctuation. Line-beginning and line-ending rules for punctuation should always be observed. (Figure 10) Mainland China and Taiwan have separate guidelines for punctuation usage. These should be consulted when designing for different locales.

LINE SPACING (LEADING) The presence of ascenders and descenders in Latin text means it requires relatively less line spacing compared to Chinese. For Chinese typesetting, a line space of at least half an em (half the point size of the text) is recommended, so that lines of text can be clearly differentiated. For example, for a type size of 10 point, the line spacing (leading) should be at least 15 point. The gap between two lines of type is hence half an em, or 5 point.

→ Figure 9: Traditional and Simplified Chinese fonts come with different sets of punctuation which are positioned differently within the body frame. Note that Simplified Chinese uses English style quotation marks.



SIGNALLING NEW PARAGRAPHS In Chinese text, new paragraphs are usually signalled by using a first-line indent. Traditionally, this indent is two-em wide. A blank line may also be used between paragraphs when a larger break is required. When the column width is narrow, a one-em first-line indent may be used instead.

[3] COMPARISON WITH LATIN SCRIPT

From both the linguistic and visual points of view, Hanzi and Latin are at the polar opposites of the spectrum. While the Latin alphabet is made up of 26 letters in lower- and upper-case with simple, somewhat modular strokes and shapes, Hanzi is an open system consisting of tens of thousands of characters that are much more complex in form and construction. Hanzi

characters do not have obvious alignment references such as baseline, x-height or cap height as in the Latin script. This makes alignment with Latin or other scripts slightly inconvenient. (Figure 11 – next page)

Hanzi characters occupy the em square quite fully and, without such components as ascenders and descenders, appear to be much larger than Latin letters of the same point size. Judicious adjustments should be made in order to make both scripts work well together without compromising legibility.

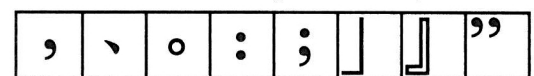
No two Hanzi characters are absolutely the same width, height and proportion in the same typeface, as the profiles and structures of individual characters vary greatly. But on average they are optically equal in height and in width. They are comparable to upper-case Latin letters, which are of equal height. As the Hanzi script has no casing, it is rather difficult to compare Latin lower-case letters with Hanzi. The x-height is a key reference for size matching and alignment.

The lack of any variant forms in Hanzi typefaces that are comparable to upper- and lower-case, small caps and italics makes text articulation different in the Hanzi script. Other variables such as colour, weight, size, change of typeface and use of graphic devices will have to be used instead to signal text structure or differentiation. The lack of word spaces makes Hanzi and Latin quite different in texture within a passage of text. Punctuation provides the only breaks when reading a passage of Hanzi text.

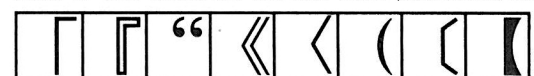
It is difficult to compare the styles of characters between Latin and Hanzi, as their historical developments took completely different courses. However, both Latin and Hanzi have typefaces with modulated and unmodulated stroke contrast. Songti and seriffed typefaces have modulated stroke contrast and are considered similar in form and construction, though the logic and features

→ Figure 10: Certain punctuation should not fall at the beginning or the end of a line of Chinese text.

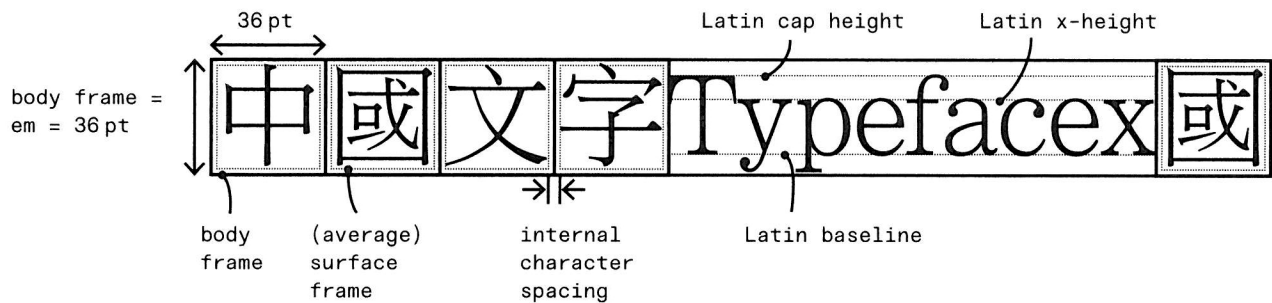
Lines of text should not begin with these punctuation marks



Lines of text should not end with these punctuation marks



→ Figure 11: A comparison of the anatomy of Chinese and Latin characters



are different, while Latin is based on calligraphy with broad-edged and flexible pointed writing tools, Hanzi is based on manipulations of the brush. Heiti and sans serif share obvious similarities with little stroke contrast. Obviously calligraphic typefaces such as *Lishu* and *English Roundhand*, for example, would share little similarity, if any.

[4] BILINGUAL APPROACH AND TYPE DESIGN

TEXT EXTENT A passage translated from English into Chinese is usually shorter. In a study conducted by George Sadek and Maxim Zhukov in 1997, the Chinese translation of a selected English text was found to require only 61 percent of the area occupied by its English counterpart. This rather large difference in text lengths can create a difference in visual effect on the page. If the two scripts are intended to be given equal status, careful layout and typographic considerations have to be made in order to create visual parity.

TYPE SIZE The anatomical differences between Chinese and Latin characters make them appear different in size even when they are both set in the same point size. Chinese characters appear larger, as they occupy the em square more fully than Latin characters. Latin typefaces with large x-heights and relatively shorter ascenders and descenders tend to match better with Hanzi characters. The type size and baseline of Latin type may be adjusted in relation to the Chinese typeface used so that they are better harmonised visually. Common type sizes for body text in modern Chinese typesetting are between 9 and 12 points, which is similar to typesetting in Latin-based languages. The most common size for Chinese body text in lead type used to be 10.5 point. Xylographic books used much larger character sizes still, of around 1 cm square. Due to the sheer stroke densities of Chinese characters, it is important that the size of Chinese text is not so small that reading comfort and legibility is compromised.

→ Figure 12: Xin Gothic has rather condensed Latin glyphs and a moderately large x-height. A space of one-eighths of an em gives an appropriate distance between the Latin and Hanzi glyphs.

WEIGHT AND DENSITY Chinese characters can have anywhere between one and 64 strokes, making their densities vary quite considerably. A page of Chinese text can appear spotty compared with the even grey value in Latin script. This variation in density is natural and aids legibility, though poorer quality typefaces appear rather spottier. Many Chinese typefaces offer a range of weights. Differences in weight are achieved by varying the average stroke widths in relation to characters with varying stroke densities, so that a reasonably consistent overall visual weight is achieved. When matching weights between Latin and Chinese typefaces, look for an approximate equivalence of overall density rather than an absolute match of stroke widths. Very heavy weights of Chinese typefaces should be avoided for small sizes, as the small counters tend to be filled in, hindering legibility.

INSERTING LATIN CHARACTERS

WITHIN A HANZI TEXT When inserting Latin characters within a Hanzi text, it is helpful to use a more condensed Latin typeface, as words in Latin-based languages tend to have a wider span than several Hanzi characters combined. Latin characters that are too wide will disrupt the overall spacing. Spacing between Latin letters and Hanzi characters often needs to be adjusted in order to appear visually balanced. A word-width space will be too large; a space of the width of one-eighth of an em will usually suffice. (Figure 12)

中国文字 | Handgloves | 黑体

[5] SHORT NOTE ON TYPOGRAPHIC ADVICE

1 The alignment of Hanzi characters is based on the centre line, with no precise references such as the baseline in Latin letters. It is normal that very few parts of adjacent characters line up, if at all – this is how it should be. Do not try to force elements to align.

2 Optimal spacing in Hanzi text is achieved by having a column width that is precisely the width of the point size of the text multiplied by the number of characters desired in a line.

3 Hanzi text is customarily set justified. If flush left, ragged right is desired, manual line breaks will be necessary, and this should be done by someone who knows the language.

4 Hanzi requires more generous leading compared with Latin text. A leading of 1.5 times the text size is the minimum.

5 The grey values of Traditional and Simplified Chinese text can be quite different due to the difference in the complexity of the characters, and more different still when compared with Latin text. It is more useful to compare overall densities rather than exact stroke widths. Latin typefaces with larger x-heights tend to harmonise better with Hanzi text.

6 Since Hanzi characters can be very dense, a slightly larger body text size is usually advisable. 10 point is a good starting point. 8 point or below will be arduous to read.

7 Some Chinese and Latin punctuation marks are very similar, especially commas, colons, semicolons, dashes, ellipses and parentheses. Check that proportional-width punctuation is not used within a Chinese text.

8 Use lining figures where there are Arabic numerals within Chinese text.

GOOD TO KNOW

Unicode alias: Han

Unicode range: 4E00–9FFF

Official language in: The People's Republic of China (spoken: Putonghua, written: Simplified Chinese), Taiwan (spoken: Mandarin, written: Traditional Chinese), Hong Kong (spoken: Cantonese, written: Traditional Chinese), Macau (spoken: Cantonese, written: Traditional Chinese), Singapore: (spoken: Mandarin, written: Simplified Chinese)

BIOGRAPHY

Keith Tam

Keith is a typographer, information designer, teacher and researcher. Principal Lecturer in Communication Design at the Hong Kong Design Institute. Former Associate Professor and Programme Director, MA Information Design, University of Reading.

FURTHER READING

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TYPE FOUNDRIES

Adobe, Arphic, DynaComware, Founder Type, Hanyi Fonts, Monotype, Sinotype