L2/20-256

Preliminary Proposal to encode Kawi in the UCS

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1. Introduction

The Kawi script is a historical Brahmi-based script found in various inscriptions and artefacts produced between the 8th and the 16th century in insular Southeast Asia. A large portion of its corpus is found in Java, but Kawi materials have also been found in Sumatra, Malay Peninsula, Bali, and the Philippines. The script is frequently associated with the Old Javanese language, but materials written in Sanskrit, Old Malay, Old Balinese, and Old Sundanese language has also been found in the Kawi script. From the mid-8th century, simple, functional Kawi was widely used to record land grants, royal edicts, and similar chancery documents. Towards the end of the first millennium, the script became increasingly decorative and calligraphic due to its use as the main vehicle of Old Javanese literary language, with long-lasting legacy in the literary tradition of the modern Javanese and Balinese languages. Later Kawi shows many variations over a wide geographic distribution. Over time, these variants have evolve (directly or indirectly) into the many modern Brahmic scripts of insular SE Asia, such as Balinese, Batak, Javanese, Lontara, etc.

While the active use of Kawi script has been replaced by other scripts since the 16th century, there are a number of modern-day enthusiasts and communities who use the script today for other purposes than ancient reproduction, for example to chat in social application and create image posts. In this revival type of use, the Kawi script may be used to write languages that are not found in 'authentic' Kawi corpus, such as the modern Javanese language or the Indonesian language. As Kawi has not been encoded in the Unicode yet, the community usually resorts to appropriating and hacking other Unicode blocks to create usable fonts.

2. Styles

The Kawi script was used over a span of 800 years, and within that period a wide range of styles is attested. The Kawi script evolved gradually from the earlier Pallava script with some overlap between late Pallava and early Kawi. Compared to the preceding script, which is lithic and monumental in style, the Kawi script shows evidence of palm-leaf writing techniques and is more cursive in nature. The oldest record in the early form of Kawi is the stele of Plumpungan located near Salatiga, Central Java, dated to c. 750 CE. The 'standard' form of early Kawi is exemplified in the stone and copper plate inscriptions of the rulers Kayuwangi (856–882) and Balitung (899–910) (de Casparis 1975: 33). Later forms of Kawi first emerged in East Java which Casparis (1975: 38) categorized into four styles: Kawi from the reign Daksa (c. 910–950), Airlangga (c. 1019–1042), and finally the 'normal' and decorative 'Quadrate script' from the Kadiri period (c.1100–1220). Other variations of later Kawi can also be found in locations such as Sumatra, the Malay Peninsula, Bali, and the Philippines.

Naming conventions and definitions for the styles of Kawi are a subject of continual refinement from scholars of the field until this day. For example, Titi (2017) noted that while authors often associate the Quadrate style with the 12th century Kadiri period, there are numerous Quadrate samples preceding this period, and its sole association with Kadiri is somewhat erroneous.[1] Another example is a particular style of Kawi common in *gebang*[2] manuscripts from 14th to 16th century West Java, which is referred, confusingly, as "Quadrate Old Javanese" (Holle 1877: 14-16), "Bold Semi-cursive Script of West Java" (Pigeaud 1968:94, 1980:247), "Old (West) Javanese Quadratic" (Acri 2011:120), and "Buda" (Molen 1983:115-116).

[1] Griffiths (2012:203-204) suggested that the term 'Quadrate' should only be used for highly ornate Kawi, but also noted that writers on the subject tend to use the term loosely and de Casparis himself only *implied* that it should be used for highly ornamental samples.
[2] 'Gebang' is a writing medium made from the leaves of *Corypha gebanga* or similar palm species. Unlike *lontar* manuscripts, which are written with knife incisions and blackened with soot, *gebang* manuscripts from West Java are written with pen and ink. This material is often referred to as 'nipah' in many works, but recent scholarship considers 'nipah' as a misnomer (see Gunawan, 2015)

Even though the Kawi script has a wide range of disparate styles, the underlying structure is coherent enough to be represented as a single script. Encoding 'Early Kawi', 'Late Kawi', etc would be redundant, and a change of font is sufficient to render the many styles of Kawi. There are however some variant aspects that need to be encoded separately, as will be explained in the following sections.

3. Font

The font used in this proposal is based on the Mpu Mada Inscription (figure 29), dated 1214 Śaka Era (ŚE)/1351 CE, made by Arif Budiarto with edits by Aditya Bayu Perdana. The style of this inscription can be described as midway between early and late Kawi; the overall shape retains the simple outline of early Kawi, but with restrained hook strokes and other glyph tendencies that would herald later Kawi development. The Mpu Mada inscription does not contain all characters necessary to write Kawi, and so several characters are reconstructed from other attestations to resemble the Mpu Mada inscription style. The glyphs of this font are meant to be illustrative but not the sole representation of the wide variety of attested Kawi styles.

4. Character names

Many Kawi characters have direct cognates in modern Javanese and Balinese. Currently, Kawi characters are often referred to by scholars with the name of their modern cognates in their native languages or associated fields of study. For example, the Kawi sign ANUSVARA may be identified as *cecak* based on the name of its modern-day Javanese/Balinese/Sundanese cognate. However not all names are shared across studies, the sign VISARGA for example is known as *wignyan* in Javanese, *bisah* in Balinese, and *pangwisad* in Sundanese. Because of this, the characters in Kawi script do not have a single, standardized naming scheme and so far no historic native naming scheme has been extensively studied. For now, the proposed characters have Indic based names that are meant to be generic and descriptive.

5. Structure

5.1. Independent Vowel Letters

The following independent vowel letters are used in the available materials:

Glyph	Character names	Glyph	Character names
𑼃	KAWI LETTER A	𑼄	KAWI LETTER AA
𑼅	KAWI LETTER I	𑼆	KAWI LETTER II
𑼇	KAWI LETTER U	𑼈	KAWI LETTER UU
𑼉	KAWI LETTER VOCALIC R	𑼊	KAWI LETTER VOCALIC RR
𑼋	KAWI LETTER VOCALIC L	𑼌	KAWI LETTER VOCALIC LL
𑼍	KAWI LETTER E	𑼎	KAWI LETTER AI
𑼏	KAWI LETTER O	𑼐	KAWI LETTER AU
𑼑	KAWI LETTER EU	𑼒	KAWI LETTER EUU

Dependent vowel signs and other signs such as VISARGA and ANUSVARA can be attached to independent vowel letters.

Glyphs for independent vowel LETTER AA, II, and UU vary throughout the history of Kawi. Some attestations are visually distinct, while some use composite shapes consisting of LETTER A, I, and U + VOWEL SIGN AA respectively (figure 11 for example of LETTER II). The LETTER AU, EU, and EUU are only attested in composite forms and are not given an atomic codepoint.

	Visually distinct	Composite		Sequence
AA	𑼄	𑼄	=	𑼄+𑼵
II		𑼅	=	𑼅+𑼵
UU	𑼆	𑼆	=	𑼆+𑼵
AU	(unattested)	𑼇	=	𑼇+𑼵
EU	(unattested)	𑼈	=	𑼈+◌ᳮ
EUU	(unattested)	𑼈	=	𑼈+◌ᳮ+𑼵

5.1.1. Vowel Letter Conjuncts

KAWI LETTER VOCALIC R has two distinct dependent forms: a conjunct and a vowel sign. Both of these forms are attested to co-occur in later Kawi texts (figure 12, 13).[3] The vowel sign of this letter is encoded atomically while its conjunct counterpart can be encoded indirectly by the sequence of SUBJOINER + LETTER VOCALIC R.

KAWI LETTER VOCALIC L has been observed to have a single dependent form (figure 13). However, it is unclear whether this dependent form should be treated as an atomic vowel sign or a conjunct (encodable using SUBJOINER + LETTER VOCALIC L sequence). We propose to treat this dependent form as an atomic vowel sign.

	Base gyph	*Vowel sign*	*Conjunct*
VOCALIC R	𑼉	◌𑼶	◌𑼷
VOCALIC L	𑼊	◌𑼸	-

5.2. Consonant Letters

Consonant letters represent a syllable with inherent vowel /a/, attested letters are as follow:

[3] We assume that this distinction is similar in function to its modern Javanese/Balinese counterparts; the vowel sign is used word-internally, while the conjunct form is used immediately following a morpheme boundary or a phonetic syllable boundary (see Properties of U+A9BD JAVANESE CONSONANT SIGN KERET L2/19-004 for similar treatment in modern Javanese).

base	conj	character names
𑰀	◌𑰀	KAWI LETTER KA
𑰁	◌𑰁	KAWI LETTER KHA
𑰂	◌𑰂	KAWI LETTER GA
𑰃	◌𑰃	KAWI LETTER GHA
𑰄	◌𑰄	KAWI LETTER NGA
𑰅	◌𑰅	KAWI LETTER CA
𑰆	◌𑰆	KAWI LETTER CHA
𑰇	◌𑰇	KAWI LETTER JA
𑰈	◌𑰈	KAWI LETTER JHA
𑰉	◌𑰉	KAWI LETTER NYA
𑰊	◌𑰊	KAWI LETTER TTA
𑰋	◌𑰋	KAWI LETTER TTHA

base	conj	character names
𑰌	◌𑰌	KAWI LETTER DDA
𑰍	◌𑰍	KAWI LETTER DDHA
𑰎	◌𑰎	KAWI LETTER NNA
𑰏	◌𑰏	KAWI LETTER TA
𑰐	◌𑰐	KAWI LETTER THA
𑰑	◌𑰑	KAWI LETTER DA
𑰒	◌𑰒	KAWI LETTER DHA
𑰓	◌𑰓	KAWI LETTER NA
𑰔	◌𑰔	KAWI LETTER PA
𑰕	◌𑰕	KAWI LETTER PHA
𑰖	◌𑰖	KAWI LETTER BA
𑰗	◌𑰗	KAWI LETTER BHA

base	conj	character names
𑰘	◌𑰘	KAWI LETTER MA
𑰙	◌𑰙	KAWI LETTER YA
𑰚	◌𑰚	KAWI LETTER RA
𑰛	◌𑰛	KAWI LETTER LA
𑰜	◌𑰜	KAWI LETTER WA
𑰝	◌𑰝	KAWI LETTER SHA
𑰞	◌𑰞	KAWI LETTER SSA
𑰟	◌𑰟	KAWI LETTER SA
𑰠	◌𑰠	KAWI LETTER HA

5.2.1. Killer and Subjoiner

Glyph	Character names
◌𑰡	KAWI SIGN KILLER
◌𑰢	KAWI SUBJOINER

The inherent vowel of a consonant letter is "killed" by a KILLER sign. A consonant letter preceded by the SUBJOINER becomes a conjunct which is joined below or after the preceding base letter.

𑰏+𑰏+◌𑰡 = 𑰏𑰡 *tat*

𑰏+𑰏+◌𑰢+𑰏 = 𑰏𑰣 *tatta*

Some conjuncts can either have below or after base forms depending on the style of the inscription, most notably the conjunct of KAWI LETTER SSA and HA. While most inscriptions only use one form, some inscriptions may have both (figure 14). These alternate forms do not seem to have contextual significance and are merely scribal variants. Below

base forms may be occasionally used to save space in a text that otherwise uses after base forms, after base forms may be occasionally used akin to scribal flourish in a text that otherwise uses below base forms. Font designers may wish to make provision for these alternate glyphs if they wish to support facsimile reproduction of texts that require them.

below base	after base	below base	after base
			
	‘standard’		‘standard’
	-ṣa		*-ha*

5.2.2. Conjunct Ra and Repha

KAWI LETTER RA has two distinct conjunct forms. When used as an initial r- in a consonant stack, the letter usually takes the form of a sign above the following letter, commonly known as *repha*. When used elsewhere in a consonant stack, the letter takes the form of a semi-circular swash that partially wraps the bottom to left part of the previous letter, which is called *cakra* or *guwung* in modern Javanese/Balinese (figure 15).

	=		*rka*
	=		*kra*

The shape of *repha* and *cakra/guwung* may slightly change to accommodate glyph stacks and constrained spaces. Compare the overall stroke length of the previous example with the following:

	=		*rki*
	=		*kkra*

There are exceptional cases in which initial r- sound uses RA +conjunct combination instead of the expected *repha*. A common example is the Kawi word *rwa* (figure 26)

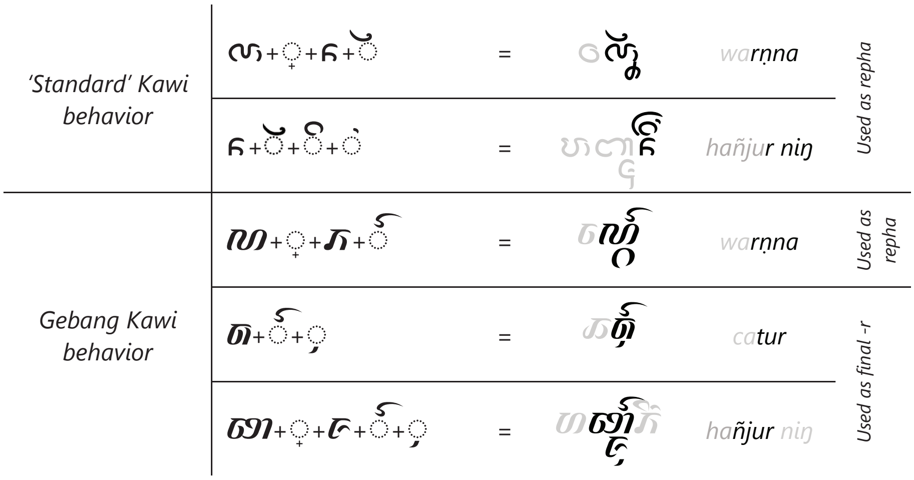
	=		*rwa*
	=		*sarwa*

While the *repha* glyph originally represented initial r-, modern descendants of the Kawi script have reanalyzed it as a final -r sign. The original initial r- *repha* function is used in most Kawi texts, but the final -r function started appearing in some late varieties of Kawi, for example in *gebang* manuscripts from West Java and *lontar* manuscripts from the Merapi-Merbabu region of Central Java. Simultaneous use of identical *repha* glyph for initial r- and final -r is also attested (figure 25).[4]

[4] A cursory survey of *gebang* manuscripts from West Java indicate that the language of a text might correlate to how the *repha* glyph is used: Old Sundanese texts tend to use the *repha* glyph as final -r consistently, while Old Javanese texts tend to use *repha* as both initial -r and final -r in a rather arbitrary manner. However, Central Javanese Merapi-Merbabu manuscripts with Old Javanese language exclusively used the *repha* glyph as final -r.

Glyph	Character names
	KAWI SIGN REPHA

Due to its varying use over time, we propose to encode KAWI REPHA as a single code point similar to how its modern cognates[5] of this character is encoded in the Balinese, Javanese, and Sundanese scripts.[6] Deriving *repha* from an initial consonant-subjoiner combination is unsuitable because of exceptional cases such as *rwa,* while encoding *repha* and final -r separately would likely cause confusion as there's no visual difference between them.



We propose that the Kawi repha uses Indic Syllabic Category Consonant_Succeeding_Repha. This the category that BALINESE SURANG, JAVANESE LAYAR, and SUNDANESE PANGLAYAR had before their recategorization proposed in L2/20-150, and that are still used by U+17CC KHMER SIGN ROBAT. The reason for this is that KAWI REPHA, unlike its modern counterparts, is used as a REPHA most of the time; the use as a final consonant is only attested in specific (but notable) late Kawi varieties. A Consonant_Succeeding_Repha should come right after the consonants, before any vowels (the OpenType Universal Shaping Engine currently misplaces it at the end of the syllable and needs to be updated). This makes it easier to handle it in string comparison – where it normally has to be moved to before the other consonant(s) in the syllable for comparison, or to after any vowels if it's used as a final consonant. Moving it across both vowels and consonants (but not across vowels of a preceding syllable) is slightly more difficult.

5.2.3. Depth of Conjuncts

Kawi conjunct stacks may contain up to three or four consonants cluster (the former being more common), especially in words containing liquid consonants (figure 16). Some examples include:

sukṣma *rakryan* *indrapura* *mpwaŋgarjja* *tamblin̈an* *mantrya*

Note that conjunct clusters may be attached with below-base vowel signs which further deepens the depth of the glyph stack. The deepest stack attested so far is the word *hantlū* (figure 17):

hantlū

5.2.4. Exceptional Consonant Letters

[5] U+1B03 BALINESE SIGN SURANG, U+A982, JAVANESE SIGN LAYAR, and U+1B81 SUNDANESE SIGN PANGLAYAR

[6] See Unicode proposal of Syllabic category of Balinese Surang, Javanese Layar, and Sundanese Panglayar L2/20-150.

Glyph	Character names
𑼏	KAWI LETTER JNYA

KAWI LETTER JNYA is a graphic simplification of the consonant cluster jña (LETTER JA + SUBJOINER + NYA), in which the conjunct form NYA is reduced in form. It is attested in some texts (figure 18) and has direct cognate in modern Javanese and Balinese scripts: the JAVANESE LETTER NYA MURDA U+A998, which has been encoded in the UCS, and BALINESE LETTER ARCHAIC JNYA U+1B4C, which has been accepted for a future version of the standard.[7]

Another exceptional letter is the Kawi letter *ro,* which replaces LETTER RA + VOWEL SIGN O combination with the glyph of KAWI DIGIT TWO, so far exclusively found in West Javanese *gebang* manuscripts. See § 5.5. Numerals.

5.3. Vowel Signs

The following dependent vowel signs are used in the available materials:

Glyph	Character names	Glyph	Character names
◌𑼰	KAWI VOWEL SIGN AA	◌𑼱	KAWI VOWEL SIGN ALTERNATE AA
◌𑼲	KAWI VOWEL SIGN I	◌𑼳	KAWI VOWEL SIGN II
◌𑼴	KAWI VOWEL SIGN U	◌𑼵	KAWI VOWEL SIGN UU
◌𑼶	KAWI VOWEL SIGN VOCALIC R		-
◌𑼷	KAWI VOWEL SIGN VOCALIC L		-
◌𑼸	KAWI VOWEL SIGN E	◌𑼹	KAWI VOWEL SIGN AI
◌𑼸𑼰	KAWI VOWEL SIGN O	◌𑼹𑼰	KAWI VOWEL SIGN AU
◌𑼺	KAWI VOWEL SIGN EU	◌𑼺𑼰	KAWI VOWEL SIGN EUU

VOWEL SIGN O, AU, and EUU are diacritics that can be decomposed into a sequence of dependent signs, and we propose that they will be encoded as such sequences, similar to the encoding model for the Javanese script. This differs from the encoding model for the Balinese script, which encodes such characters atomically (with decompositions) to align with the traditional Sanskrit phonetic analysis.

Dependent vowel sign counterparts for independent LETTER VOCALIC RR and VOCALIC LL are presumed to exist, but this is still being investigated. Code points for them are reserved for the time being.

VOWEL SIGN EU is not derived from a Brahmi or Pallavan precursor, but an innovative sign used to represent the mid central vowel /ə/, commonly transcribed as [ĕ] in Kawi scholarship. The long counterpart of this sign (often used

[7] Direct cognate grapheme of KAWI LETTER JNYA is still taught in contemporary Javanese practice, but often omitted in contemporary Balinese, even though the letter can be found in old and near contemporary Balinese palm leaf manuscripts (see Unicode proposal to encode Balinese Archaic Jnya L2/19-259).

for metrical purposes in verses but with uncertain pronunciation) is formed by adding VOWEL SIGN AA, and the resulting sign VOWEL SIGN EUU is commonly transcribed as [ö].

5.3.1. Alternate Vowel Sign -aa

VOWEL SIGN AA may be replaced with ALTERNATE AA to disambiguate confusable glyph combinations, whether alone or as multiple-part vowel sign. However, what constitutes as "confusable glyph" varies considerably in different styles of Kawi and may not be applied consistently in a single text. The use of alternate shape may also be influenced by aesthetic considerations and its exact shape depends on the base letter and the style of Kawi in question. For example, LETTER PA and NGA combinations almost always used VOWEL SIGN ALTERNATE AA to disambiguate them from LETTER HA and NYA. However, LETTER TTA combination (which is confusable with NGA) is observed to use both 'standard' and alternate form of VOWEL SIGN AA in a single text (figure 22). We propose to encode a single VOWEL SIGN ALTERNATE AA in addition to the standard VOWEL SIGN AA, so that users can choose between the standard form and one alternate form due to its orthographical disambiguating properties. This function is similar to U+102B MYANMAR VOWEL SIGN TALL AA. Additional shapes of alternate -aa can be supported as font-dependent stylistic variants.

pā	ᨷ+ᩣ	→	ᨷᩣ	(confusable with *ha* ᨹ)	→	ᨷᩤ
ṅā	ᨿ+ᩣ	→	ᨿᩣ	(confusable with *ña* ᨾᩣ)	→	ᨿᩤ or ᨿᩣ
ṭā	ᨧ+ᩣ	→	ᨧᩣ	(confusable with *ṅa* ᨿ)	→	ᨧᩤ or ᨧᩣ however, ᨧᩣ is also attested

If ALTERNATE AA were not encoded, vowel sign alternates would have to be handled at the font level, with contextual rules to select the appropriate glyph. ZERO WIDTH NON JOINER could then be used between the consonant and VOWEL SIGN AA to "force" standard shape vowel sign if encountered.

5.3.2. Vowel Sign -aa as Consonant Reduplicator

VOWEL SIGN AA is known to be repurposed as consonant reduplicator in West Javanese *gebang* manuscripts. The base glyph that uses VOWEL SIGN AA as a reduplicator may further hold other vowel signs (figure 24).

ꦲ+ꦺꦴ = ꦭꦸꦤꦤꦒꦺꦴꦁ *alunnnagöng*

ꦈ+ꦶ+ꦺꦴ = ꦑꦼꦤꦼꦥꦥꦶꦥꦸ *gĕnĕppipitu*

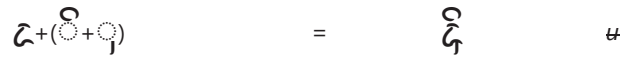
5.3.3. Vowel Sign -i and -u Combination as Cancellation Mark

VOWEL SIGN I and U are known to be used together in a single cluster to mark that the cluster in question is cancelled and not meant to be read. This cancellation strategy is also known from later Javanese and Balinese manuscripts (figure 24).

ꦭ+(ꦶ+ꦸ) = ꦏꦭ꧀ꦭꦏ *kalla*

In later Balinese practice, the cancelation mark may occur over a consonant letter that *already* has other diacritics attached, or even over independent vowel letters. Whether or not this occurs in the Kawi script corpus is still being investigated.

ᨷ+ᨩ◌+(ᩥ+ᩩ)+ᩣ = ᨩᩱᩣ *po*



5.3.4. Alternate Vowel Sign -ai and -au

Distinct alternate forms of VOWEL SIGN AI and AU are attested in some inscriptions.[8] These forms can be supported as font-dependent stylistic variants.

'standard'	alternate	'standard'	alternate
			
dai		*dau*	

5.4. Various Signs

Glyph	Character names
	KAWI SIGN CANDRABINDU
	KAWI SIGN ANUSVARA
	KAWI SIGN VISARGA

The CANDRABINDU is used for indicating nasalization in specific words such as 'Om'. ANUSVARA is used to represent final -ŋ, while VISARGA represent final -h.

5.5. Numerals

Numerals are attested in many materials. Kawi uses a decimal system with 10 digits:

Glyph	Character names	Glyph	Character names
	KAWI DIGIT ZERO		KAWI DIGIT FIVE
	KAWI DIGIT ONE		KAWI DIGIT SIX
	KAWI DIGIT TWO		KAWI DIGIT SEVEN
	KAWI DIGIT THREE		KAWI DIGIT EIGHT
	KAWI DIGIT FOUR		KAWI DIGIT NINE

[8] This alternate form is most often encountered in Sumatran inscriptions (see Amogaphasa Statue Inscription) but Javanese examples are also attested (see Ra Mwi/Ngabean VI inscription).

KAWI DIGIT TWO has a special property in West Javanese *gebang* manuscripts where it may also be used as a letter for the syllable *ro*, replacing the combination LETTER RA + VOWEL SIGN O combination (figure 19).[9] When used as the syllable *ro*, dependent signs such as ANUSVARA may be attached to this letter/numeral (figure 20).

5.6. Punctuation

Kawi materials use several punctuations characters and symbols to divide text into sections. Unfortunately, these characters are often neglected in paleographic studies and glyph tables, making it harder to categorize and document them conclusively. Attested punctuation marks are as follows:

Glyph	Character names	Glyph	Character names
꥟	KAWI DANDA	꥽	KAWI PUNCTUATION DOUBLE DOT
ꥠ	KAWI DOUBLE DANDA	꥾	KAWI PUNCTUATION TRIPLE DOT
ꥡ	KAWI PUNCTUATION SECTION MARKER	꥿	KAWI PUNCTUATION CIRCLE
ꥢ	KAWI PUNCTUATION ALTERNATE SECTION MARKER	ꦀ	KAWI PUNCTUATION FILLED CIRCLE
ꥣ	KAWI PUNCTUATION FLOWER	ꦁ	KAWI PUNCTUATION SPIRAL
ꥤ	KAWI PUNCTUATION SPACE FILLER	ꦂ	KAWI PUNCTUATION CLOSING SPIRAL
ꥥ	KAWI PUNCTUATION DOT		

Opening, closing, and major breaks in a text are often indicated using multiple punctuation marks, which can be arranged in several ways and are partly decorative. There are no standard combinations, and a text may use several distinct arrangements to indicate hierarchy.

KAWI PUNCTUATION SPACE FILLER is used to justify texts or to fill gaps that are too small to fit another letter at the middle or end of a line.

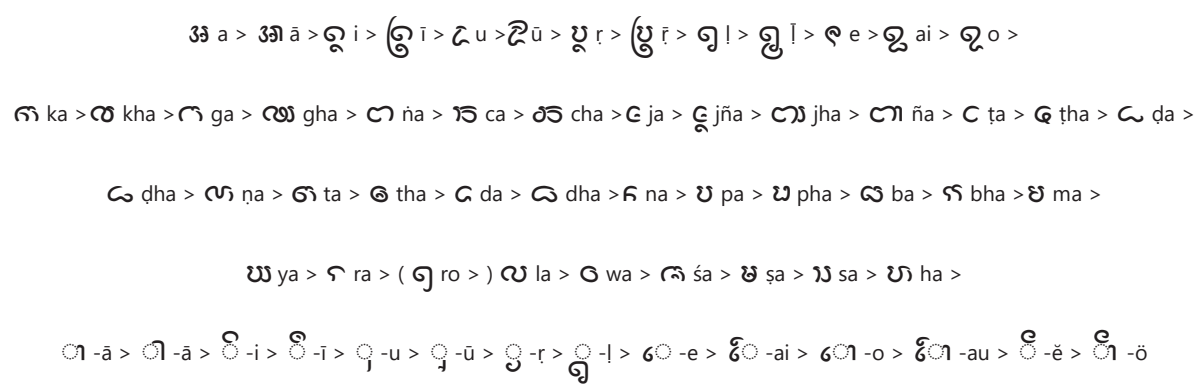
6. Text Layout

Kawi script is written with no spaces between words, and line breaks may occur after every orthographic syllable. While most Kawi materials are written horizontally left-to-right, several decorative objects and inscriptions are written in an unusual direction: vertically bottom-to-top, where each letterform with corresponding diacritics are rotated into diagonal position (figure 32). Objects with vertical writing direction usually only contain short texts and are often rendered in decorative quadrate form.

7. Ordering

This proposal arranges Kawi in the standard Brahmic ordering, based on the native abecedarium of the Kawi script, which is attested in several texts (figure 35, 36). Note that exceptional consonant letters are sorted along with their non-exceptional counterparts – JNYA as JA-NYA. *Repha* needs to be reordered according to its use: to the beginning of the cluster when used as *repha*; to the end of the cluster when used as final -r. When KAWI DIGIT TWO is used as the syllable *ro*, the numeral/letter should be sorted as r-o.

[9] So far, this property has only been attested in manuscripts using the Old Sundanese language. Dániel Balogh and Arlo Griffiths' Transliteration Guide for Members of the DHARMA Project gave the following treatment for transliterating this letter/numeral: "when the numeral 2 is used in Old Sundanese to represent the phonemes /ro/, transliterate it strictly as 2 (without adding numeral markup), but use *ro* in loose transliteration."



8. Unicode Character Data

This proposal uses a six-column block starting at 11F00. We're currently reserving code points for KAWI VOWEL SIGN VOCALIC RR and KAWI VOWEL SIGN VOCALIC LL in case attestations for them can be found. Canonical combining classes are intentionally set to 0 for all characters except for virama-like characters, where 9 is used for compatibility with software and Unicode documentation that assumes a correspondence of that value with virama-likeness. The order of marks within a cluster shall be derived according to the rules of the Universal Shaping Engine.

UnicodeData.txt:

```
11F00;KAWI SIGN CANDRABINDU;Mn;0;NSM;;;;;N;;;;;
11F01;KAWI SIGN ANUSVARA;Mn;0;NSM;;;;;N;;;;;
11F02;KAWI SIGN REPHA;Mn;0;NSM;;;;;N;;;;;
11F03;KAWI SIGN VISARGA;Mc;0;L;;;;;N;;;;;

11F04;KAWI LETTER A;Lo;0;L;;;;;N;;;;;
11F05;KAWI LETTER AA;Lo;0;L;;;;;N;;;;;
11F06;KAWI LETTER I;Lo;0;L;;;;;N;;;;;
11F07;KAWI LETTER II;Lo;0;L;;;;;N;;;;;
11F08;KAWI LETTER U;Lo;0;L;;;;;N;;;;;
11F09;KAWI LETTER UU;Lo;0;L;;;;;N;;;;;
11F0A;KAWI LETTER VOCALIC R;Lo;0;L;;;;;N;;;;;
11F0B;KAWI LETTER VOCALIC RR;Lo;0;L;;;;;N;;;;;
11F0C;KAWI LETTER VOCALIC L;Lo;0;L;;;;;N;;;;;
11F0D;KAWI LETTER VOCALIC LL;Lo;0;L;;;;;N;;;;;
11F0E;KAWI LETTER E;Lo;0;L;;;;;N;;;;;
11F0F;KAWI LETTER AI;Lo;0;L;;;;;N;;;;;
11F10;KAWI LETTER O;Lo;0;L;;;;;N;;;;;

11F11;KAWI LETTER KA;Lo;0;L;;;;;N;;;;;
11F12;KAWI LETTER KHA;Lo;0;L;;;;;N;;;;;
11F13;KAWI LETTER GA;Lo;0;L;;;;;N;;;;;
11F14;KAWI LETTER GHA;Lo;0;L;;;;;N;;;;;
11F15;KAWI LETTER NGA;Lo;0;L;;;;;N;;;;;
11F16;KAWI LETTER CA;Lo;0;L;;;;;N;;;;;
11F17;KAWI LETTER CHA;Lo;0;L;;;;;N;;;;;
11F18;KAWI LETTER JA;Lo;0;L;;;;;N;;;;;
11F19;KAWI LETTER JHA;Lo;0;L;;;;;N;;;;;
11F1A;KAWI LETTER NYA;Lo;0;L;;;;;N;;;;;
11F1B;KAWI LETTER TTA;Lo;0;L;;;;;N;;;;;
11F1C;KAWI LETTER TTHA;Lo;0;L;;;;;N;;;;;
11F1D;KAWI LETTER DDA;Lo;0;L;;;;;N;;;;;
11F1E;KAWI LETTER DDHA;Lo;0;L;;;;;N;;;;;
11F1F;KAWI LETTER NNA;Lo;0;L;;;;;N;;;;;
11F20;KAWI LETTER TA;Lo;0;L;;;;;N;;;;;
11F21;KAWI LETTER THA;Lo;0;L;;;;;N;;;;;
11F22;KAWI LETTER DA;Lo;0;L;;;;;N;;;;;
11F23;KAWI LETTER DHA;Lo;0;L;;;;;N;;;;;
11F24;KAWI LETTER NA;Lo;0;L;;;;;N;;;;;
11F25;KAWI LETTER PA;Lo;0;L;;;;;N;;;;;
11F26;KAWI LETTER PHA;Lo;0;L;;;;;N;;;;;
11F27;KAWI LETTER BA;Lo;0;L;;;;;N;;;;;
11F28;KAWI LETTER BHA;Lo;0;L;;;;;N;;;;;
11F29;KAWI LETTER MA;Lo;0;L;;;;;N;;;;;
11F2A;KAWI LETTER YA;Lo;0;L;;;;;N;;;;;
11F2B;KAWI LETTER RA;Lo;0;L;;;;;N;;;;;
11F2C;KAWI LETTER LA;Lo;0;L;;;;;N;;;;;
11F2D;KAWI LETTER WA;Lo;0;L;;;;;N;;;;;
11F2E;KAWI LETTER SHA;Lo;0;L;;;;;N;;;;;
11F2F;KAWI LETTER SSA;Lo;0;L;;;;;N;;;;;
11F30;KAWI LETTER SA;Lo;0;L;;;;;N;;;;;
```

```
11F31;KAWI LETTER HA;Lo;0;L;;;;;N;;;;;
11F32;KAWI LETTER JNYA;Lo;0;L;;;;;N;;;;;

11F33;KAWI VOWEL SIGN AA;Mc;0;L;;;;;N;;;;;
11F34;KAWI VOWEL SIGN ALTERNATE AA;Mc;0;L;;;;;N;;;;;
11F35;KAWI VOWEL SIGN I;Mn;0;NSM;;;;;N;;;;;
11F36;KAWI VOWEL SIGN II;Mn;0;NSM;;;;;N;;;;;
11F37;KAWI VOWEL SIGN U;Mn;0;NSM;;;;;N;;;;;
11F38;KAWI VOWEL SIGN UU;Mn;0;NSM;;;;;N;;;;;
11F39;KAWI VOWEL SIGN VOCALIC R;Mn;0;NSM;;;;;N;;;;;
# 11F3A; reserved for KAWI VOWEL SIGN VOCALIC RR
11F3B;KAWI VOWEL SIGN VOCALIC L;Mn;0;NSM;;;;;N;;;;;
# 11F4C; reserved for KAWI VOWEL SIGN VOCALIC LL
11F3D;KAWI VOWEL SIGN E;Mc;0;L;;;;;N;;;;;
11F3E;KAWI VOWEL SIGN AI;Mc;0;L;;;;;N;;;;;
11F3F;KAWI VOWEL SIGN EU;Mn;0;NSM;;;;;N;;;;;

11F40;KAWI SIGN KILLER;Mc;9;L;;;;;N;;;;;
11F41;KAWI SUBJOINER;Mn;9;NSM;;;;;N;;;;;

11F42;KAWI DANDA;Po;0;L;;;;;N;;;;;
11F43;KAWI DOUBLE DANDA;Po;0;L;;;;;N;;;;;
11F44;KAWI PUNCTUATION SECTION MARKER;Po;0;L;;;;;N;;;;;
11F45;KAWI PUNCTUATION ALTERNATE SECTION MARKER;Po;0;L;;;;;N;;;;;
11F46;KAWI PUNCTUATION FLOWER;Po;0;L;;;;;N;;;;;
11F47;KAWI PUNCTUATION SPACE FILLER;Po;0;L;;;;;N;;;;;
11F48;KAWI PUNCTUATION DOT;Po;0;L;;;;;N;;;;;
11F49;KAWI PUNCTUATION DOUBLE DOT;Po;0;L;;;;;N;;;;;
11F4A;KAWI PUNCTUATION TRIPLE DOT;Po;0;L;;;;;N;;;;;
11F4B;KAWI PUNCTUATION CIRCLE;Po;0;L;;;;;N;;;;;
11F4C;KAWI PUNCTUATION FILLED CIRCLE;Po;0;L;;;;;N;;;;;
11F4D;KAWI PUNCTUATION SPIRAL;Po;0;L;;;;;N;;;;;
11F4E;KAWI PUNCTUATION CLOSING SPIRAL;Po;0;L;;;;;N;;;;;

11F50;KAWI DIGIT ZERO;Nd;0;L;;0;0;0;N;;;;;
11F51;KAWI DIGIT ONE;Nd;0;L;;1;1;1;N;;;;;
11F52;KAWI DIGIT TWO;Nd;0;L;;2;2;2;N;;;;;
11F53;KAWI DIGIT THREE;Nd;0;L;;3;3;3;N;;;;;
11F54;KAWI DIGIT FOUR;Nd;0;L;;4;4;4;N;;;;;
11F55;KAWI DIGIT FIVE;Nd;0;L;;5;5;5;N;;;;;
11F56;KAWI DIGIT SIX;Nd;0;L;;6;6;6;N;;;;;
11F57;KAWI DIGIT SEVEN;Nd;0;L;;7;7;7;N;;;;;
11F58;KAWI DIGIT EIGHT;Nd;0;L;;8;8;8;N;;;;;
11F59;KAWI DIGIT NINE;Nd;0;L;;9;9;9;N;;;;;
```

IndicSyllabicCategory.txt:

```
11F00..11F01  ; Bindu # Mn [2] KAWI SIGN CANDRABINDU..KAWI SIGN ANUSVARA
11F02         ; Consonant_Succeeding_Repha # Mn KAWI SIGN REPHA
11F03         ; Visarga # Mc KAWI SIGN VISARGA
11F04..11F10  ; Vowel_Independent # Lo [13] KAWI LETTER A..KAWI LETTER O
11F11..11F32  ; Consonant # Lo [35] KAWI LETTER KA..KAWI LETTER JNYA
11F33..11F34  ; Vowel_Dependent # Mc [2] KAWI VOWEL SIGN AA..KAWI VOWEL SIGN ALTERNATE AA
11F35..11F39  ; Vowel_Dependent # Mn [5] KAWI VOWEL SIGN I..KAWI VOWEL SIGN VOCALIC R
11F3B         ; Vowel_Dependent # Mn KAWI VOWEL SIGN VOCALIC L
11F3D..11F3E  ; Vowel_Dependent # Mc [2] KAWI VOWEL SIGN E..KAWI VOWEL SIGN AI
11F3F         ; Vowel_Dependent # Mn KAWI VOWEL SIGN EU
11F40         ; Pure_Killer # Mc KAWI SIGN KILLER
11F41         ; Invisible_Stacker # Mn KAWI SUBJOINER
11F50..11F59  ; Number # Nd [10] KAWI DIGIT ZERO..KAWI DIGIT NINE
```

IndicPositionalCategory.txt:

```
11F00..11F02  ; Top # Mn [3] KAWI SIGN CANDRABINDU..KAWI SIGN REPHA
11F03         ; Right # Mc KAWI SIGN VISARGA
11F33..11F34  ; Right # Mc [2] KAWI VOWEL SIGN AA..KAWI VOWEL SIGN ALTERNATE AA
11F35..11F36  ; Top # Mn [2] KAWI VOWEL SIGN I..KAWI VOWEL SIGN II
11F37..11F39  ; Bottom # Mn [3] KAWI VOWEL SIGN U..KAWI VOWEL SIGN VOCALIC R
11F3B         ; Bottom # Mn KAWI VOWEL SIGN VOCALIC L
11F3D..11F3E  ; Left # Mc [2] KAWI VOWEL SIGN E..KAWI VOWEL SIGN AI
11F3F         ; Top # Mn KAWI VOWEL SIGN EU
11F40         ; Right # Mn KAWI SIGN KILLER
```

Classes in the Universal Shaping Engine, in the order in which they should appear in a cluster. This assumes that the USE is corrected to place Consonant_Succeeding_Repha right after the consonants, not at the end of the cluster. BASE_IND characters don't take any marks.

```
BASE_IND: 11F42..11F4E
BASE: 11F11.. 11F32, 11F04..11F10, 11F50..11F59
HALANT: 11F41
CONSONANT_SUCCEEDING_REPHA: 11F02
VOWEL_PRE: 11F3D..11F3E
VOWEL_ABOVE: 11F35..11F36, 11F3F
```

```
VOWEL_BELOW: 11F37..11F39, 11F3B
VOWEL_POST: 11F40 , 11F33..11F34
VOWEL_MOD_ABOVE: 11F00..11F01
VOWEL_MOD_POST: 11F03
```


9. Acknowledgement

This project was made possible in part by the help provided by the Segajabung community in Yogyakarta and the PANDI domain registry in Tangerang. Kawi epigraphical notes and attestations were made with the help of Ida Bagus Komang Sudarma. Norbert Lindenberg provided advice on Unicode technical aspects.

	11F0	11F1	11F2	11F3	11F4	11F5
0	11F00	11F10	11F20	11F30	11F40	11F50
1	11F01	11F11	11F21	11F31	11F41	11F51
2	11F02	11F12	11F22	11F32	11F42	11F52
3	11F03	11F13	11F23	11F33	11F43	11F53
4	11F04	11F14	11F24	11F34	11F44	11F54
5	11F05	11F15	11F25	11F35	11F45	11F55
6	11F06	11F16	11F26	11F36	11F46	11F56
7	11F07	11F17	11F27	11F37	11F47	11F57
8	11F08	11F18	11F28	11F38	11F48	11F58
9	11F09	11F19	11F29	11F39	11F49	11F59
A	11F0A	11F1A	11F2A		11F4A	
B	11F0B	11F1B	11F2B	11F3B	11F4B	
C	11F0C	11F1C	11F2C		11F4C	
D	11F0D	11F1D	11F2D	11F3D	11F4D	
E	11F0E	11F1E	11F2E	11F3E	11F4E	
F	11F0F	11F1F	11F2F	11F3F		

Various signs

11F00 𑿀 KAWI SIGN CANDRABINDU
11F01 𑿁 KAWI SIGN ANUSVARA
11F02 𑿂 KAWI SIGN REPHA
• also used as final r
11F03 𑿃 KAWI SIGN VISARGA

Independent vowels

11F04 𑿄 KAWI LETTER A
11F05 𑿅 KAWI LETTER AA
11F06 𑿆 KAWI LETTER I
11F07 𑿇 KAWI LETTER II
11F08 𑿈 KAWI LETTER U
11F09 𑿉 KAWI LETTER UU
11F0A 𑿊 KAWI LETTER VOCALIC R
11F0B 𑿋 KAWI LETTER VOCALIC RR
11F0C 𑿌 KAWI LETTER VOCALIC L
11F0D 𑿍 KAWI LETTER VOCALIC LL
11F0E 𑿎 KAWI LETTER E
11F0F 𑿏 KAWI LETTER AI
11F10 𑿐 KAWI LETTER O

Consonants

11F11 𑿑 KAWI LETTER KA
11F12 𑿒 KAWI LETTER KHA
11F13 𑿓 KAWI LETTER GA
11F14 𑿔 KAWI LETTER GHA
11F15 𑿕 KAWI LETTER NGA
11F16 𑿖 KAWI LETTER CA
11F17 𑿗 KAWI LETTER CHA
11F18 𑿘 KAWI LETTER JA
11F19 𑿙 KAWI LETTER JHA
11F1A 𑿚 KAWI LETTER NYA
11F1B 𑿛 KAWI LETTER TTA
11F1C 𑿜 KAWI LETTER TTHA
11F1D 𑿝 KAWI LETTER DDA
11F1E 𑿞 KAWI LETTER DDHA
11F1F 𑿟 KAWI LETTER NNA
11F20 𑿠 KAWI LETTER TA
11F21 𑿡 KAWI LETTER THA
11F22 𑿢 KAWI LETTER DA
11F23 𑿣 KAWI LETTER DHA
11F24 𑿤 KAWI LETTER NA
11F25 𑿥 KAWI LETTER PA
11F26 𑿦 KAWI LETTER PHA
11F27 𑿧 KAWI LETTER BA
11F28 𑿨 KAWI LETTER BHA
11F29 𑿩 KAWI LETTER MA
11F2A 𑿪 KAWI LETTER YA
11F2B 𑿫 KAWI LETTER RA
11F2C 𑿬 KAWI LETTER LA
11F2D 𑿭 KAWI LETTER WA
11F2E 𑿮 KAWI LETTER SHA
11F2F 𑿯 KAWI LETTER SSA
11F30 𑿰 KAWI LETTER SA
11F31 𑿱 KAWI LETTER HA
11F32 𑿲 KAWI LETTER JNYA

Dependent vowel signs

11F33 𑿳 KAWI VOWEL SIGN AA
11F34 𑿴 KAWI VOWEL SIGN ALTERNATE AA
11F35 𑿵 KAWI VOWEL SIGN I
11F36 𑿶 KAWI VOWEL SIGN II
11F37 𑿷 KAWI VOWEL SIGN U
11F38 𑿸 KAWI VOWEL SIGN UU
11F39 𑿹 KAWI VOWEL SIGN VOCALIC R
11F3A <reserved>
• for KAWI VOWEL SIGN VOCALIC RR if needed
11F3B 𑿺 KAWI VOWEL SIGN VOCALIC L
11F3C <reserved>
• for KAWI VOWEL SIGN VOCALIC LL if needed
11F3D 𑿽 KAWI VOWEL SIGN E
11F3E 𑿾 KAWI VOWEL SIGN AI
11F3F 𑿿 KAWI VOWEL SIGN EU
= ə

Virama

11F40 𑿀 KAWI SIGN KILLER
• vowel killer (always rendered visibly)
11F41 𑿁 KAWI SUBJOINER
• used for producing below-base and post-base conjunct forms

Punctuation

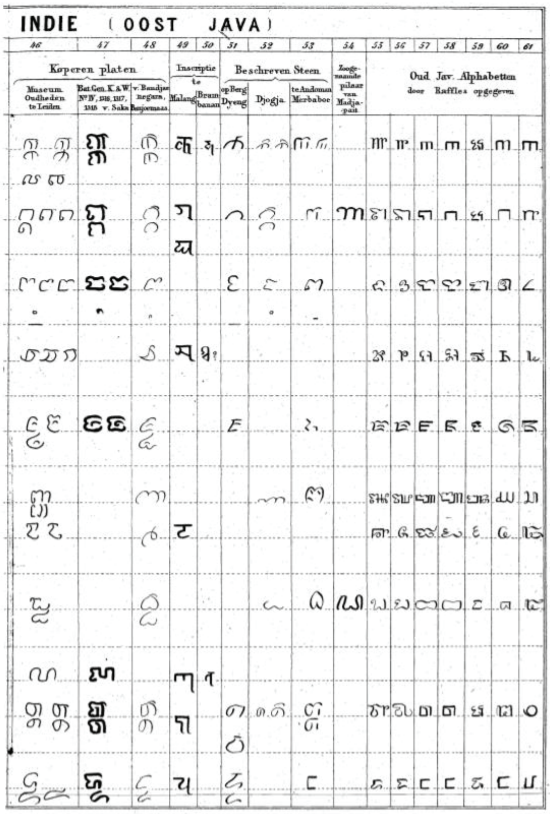
11F42 𑿂 KAWI DANDA
11F43 𑿃 KAWI DOUBLE DANDA
11F44 𑿄 KAWI PUNCTUATION SECTION MARKER
11F45 𑿅 KAWI PUNCTUATION ALTERNATE SECTION MARKER
11F46 𑿆 KAWI PUNCTUATION FLOWER
11F47 𑿇 KAWI PUNCTUATION SPACE FILLER
11F48 𑿈 KAWI PUNCTUATION DOT
11F49 𑿉 KAWI PUNCTUATION DOUBLE DOT
11F4A 𑿊 KAWI PUNCTUATION TRIPLE DOT
11F4B 𑿋 KAWI PUNCTUATION CIRCLE
11F4C 𑿌 KAWI PUNCTUATION FILLED CIRCLE
11F4D 𑿍 KAWI PUNCTUATION SPIRAL
11F4E 𑿎 KAWI PUNCTUATION CLOSING SPIRAL

Digits

11F50 𑿐 KAWI DIGIT ZERO
11F51 𑿑 KAWI DIGIT ONE
11F52 𑿒 KAWI DIGIT TWO
11F53 𑿓 KAWI DIGIT THREE
11F54 𑿔 KAWI DIGIT FOUR
11F55 𑿕 KAWI DIGIT FIVE
11F56 𑿖 KAWI DIGIT SIX
11F57 𑿗 KAWI DIGIT SEVEN
11F58 𑿘 KAWI DIGIT EIGHT
11F59 𑿙 KAWI DIGIT NINE

10. Figures


A. VASTE-LAND v. INDIE.
B. NEDERLANDSCH
Volgorde der Letters
Bengali
Telegoe Madras
Telinga
Tamil
Beschreven steen van Djogja.
784/5 v. Saka
828
Koperen platen Bat. Gen. K. & W.
N° II. 762 v. Saka
N° X. 847 v. Saka
N° X. 925 A.D.
N° IX. 808 v. Saka
N° V. 925 v. Saka
N° VIII.
K
KH
G
GH
NG
_NG
TJ
TJH
DJ
DJH
NJ
T
TH
D
DH
N
T
TH
D


INDIE (OOST JAVA)
Koperen platen
Museum Oudheden te Leiden
Bat. Gen. K. & W.
v. Bandjar negara Banjoemaas
Inscriptie te
Malang
Beschreven Steen
op Berg Dyeng
Djogja
te Andanan Merbaboe
Zoogenaamde pilaar van Madjapait
Oud. Jav. Alphabetten door Raffles opgegeven


B. NEDERLANDSCH
Volgorde der Letters
Beschreven steen van Djogja.
784/5 v. Saka
828
Koperen platen Bat. Gen. K. & W.
N° II. 762 v. Saka
N° X. 847 v. Saka
N° IX. 808 v. Saka
N° V. 925 v. Saka
N° VIII
Koperen plat
Museum Oudheden te Leiden
Bat. Gen. K. & W. 1318 v. Saka
DH
N
P
PH
B
BH
M
IJ
_J
R
_R
_R_
L
V
Ç
SJ
SH
H
_H


INDIE [OOST - JAVA]
v. Bandjar negara Banjoemaas
Inscriptie te
Malang
Beschreven Steen
op Berg Dyeng
Djogja
te Andanan Merbaboe
Zoogenaamde pilaar van Madjapait
Oud. Jav. Alphabetten door Raffles opgegeven.
Oud Jav. Alphabetten volgens opgave Cohen Stuart. Tijdschr. Inst. Taal-, Land- en Volkenkunde Deel IV 1863

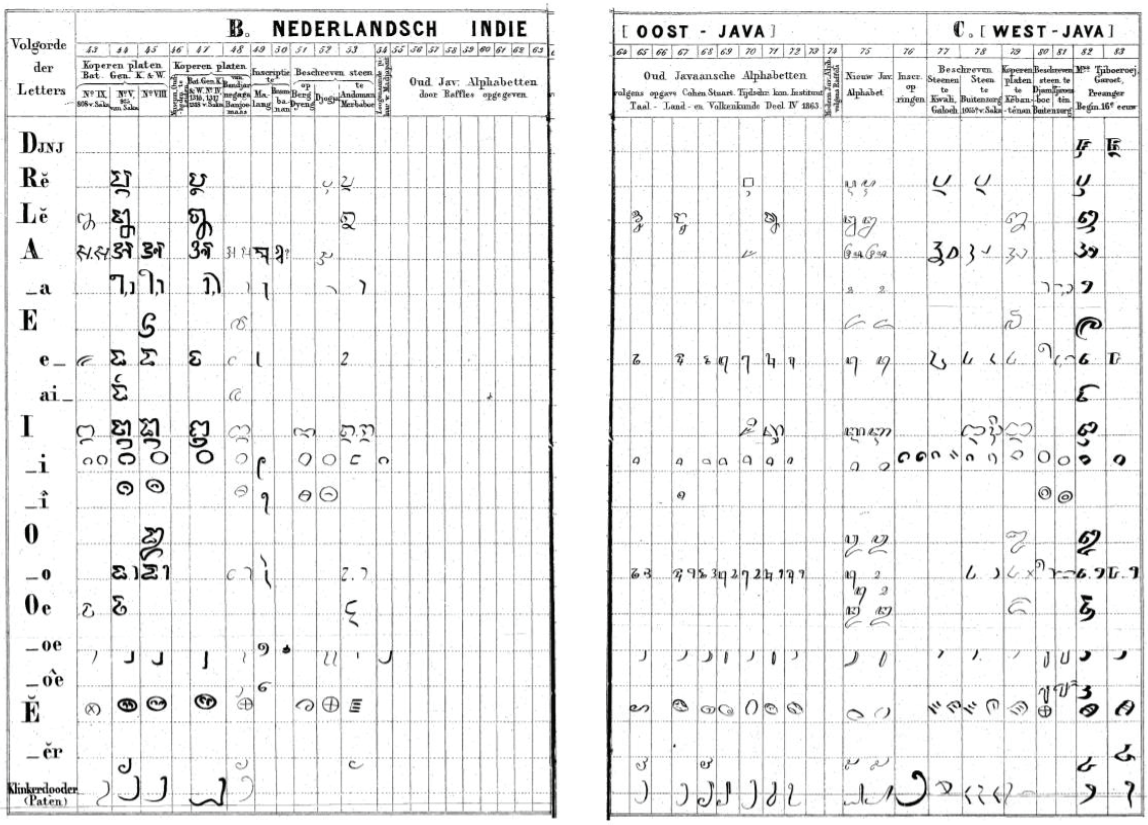


figure 1. Chart showing various glyph variations of the Kawi script, from Holle (1882)

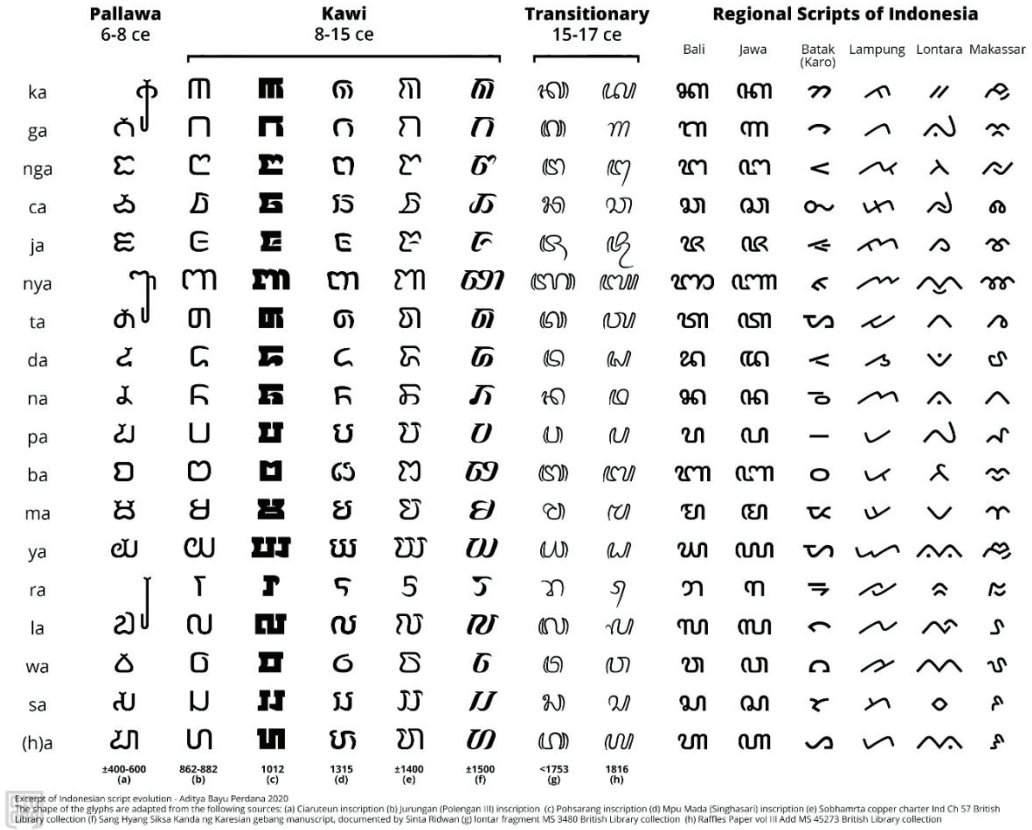


figure 2. Samples of selected consonant letters and its stylistic variations throughout the ages, compared to its modern Indonesian descendants.

COMPARISON *of* KAWI *with* MODERN JAVANESE & BALINESE

INDEPENDENT VOWEL LETTERS

	Kawi	Javanese	Balinese		Kawi	Javanese	Balinese
A				AA			
I				II			
U				UU			
VOC. R				VOC. RR			
VOC. L				VOC. LL			
E				AI			
O				AU			

CONSONANT LETTERS

	Kawi	Javanese	Balinese		Kawi	Javanese	Balinese
KA				DHA			
KHA				NA			
GA				PA			
GHA				PHA			
NGA				BA			
CA				BHA			
CHA				MA			
JA				YA			
JHA				RA			
NYA				LA			
TTA				WA			
TTHA				SHA			

DDA				SSA			
DDHA				SA			
NNA				HA			
TA							
THA				JNYA			
DA							

DEPENDENT VOWEL SIGNS

	Kawi	Javanese	Balinese		Kawi	Javanese	Balinese
-	-	-	-	AA			
I				II			
U				UU			
VOC. R				VOC. RR			
VOC. L				VOC. LL			
E				AI			
O				AU			
EU				EUU			

OTHER SIGNS

	CANDRABINDU	ANUSVARA	VISARGA	REPHA*	KILLER
Kawi					
Javanese					
Balinese					

* Modern Javanese and Balinese script reanalyzed this character as final -r and no longer use it as a *repha*

NUMERAL

	0	1	2	3	4	5	6	7	8	9
Kawi	᱐	᱑	᱒	᱓	᱔	᱕	᱖	᱗	᱘	᱙
Javanese	꧐	꧑	꧒	꧓	꧔	꧕	꧖	꧗	꧘	꧙
Balinese	᭐	᭑	᭒	᭓	᭔	᭕	᭖	᭗	᭘	᭙

figure 3. Glyph comparison of Kawi, Javanese, and Balinese. Characters in light grey cells are not encoded atomically in the corresponding Unicode blocsk. Characters in dark grey cells are not attested.

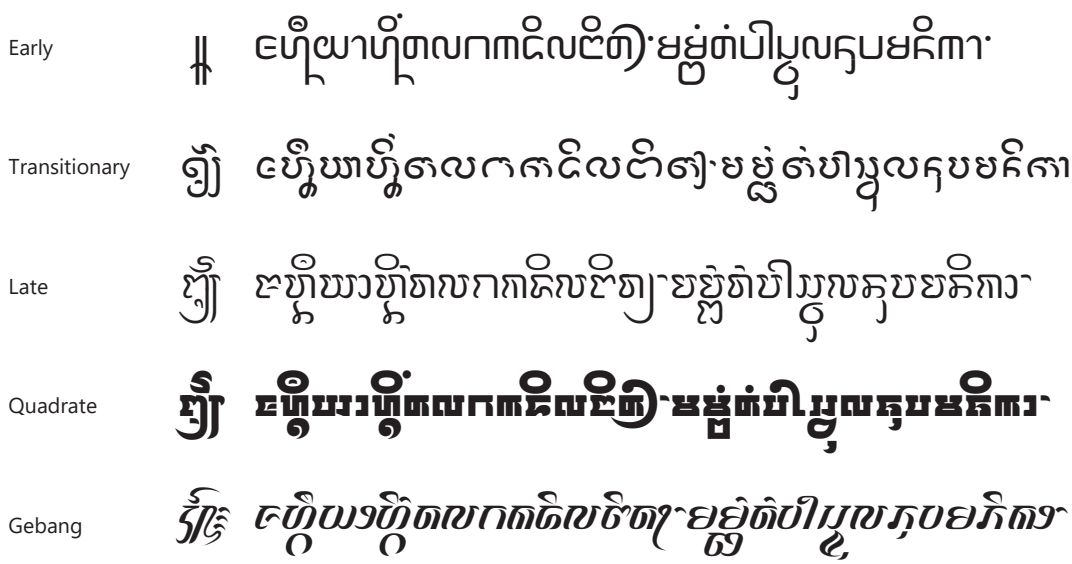


figure 4. Several styles of Kawi rendered in digital fonts

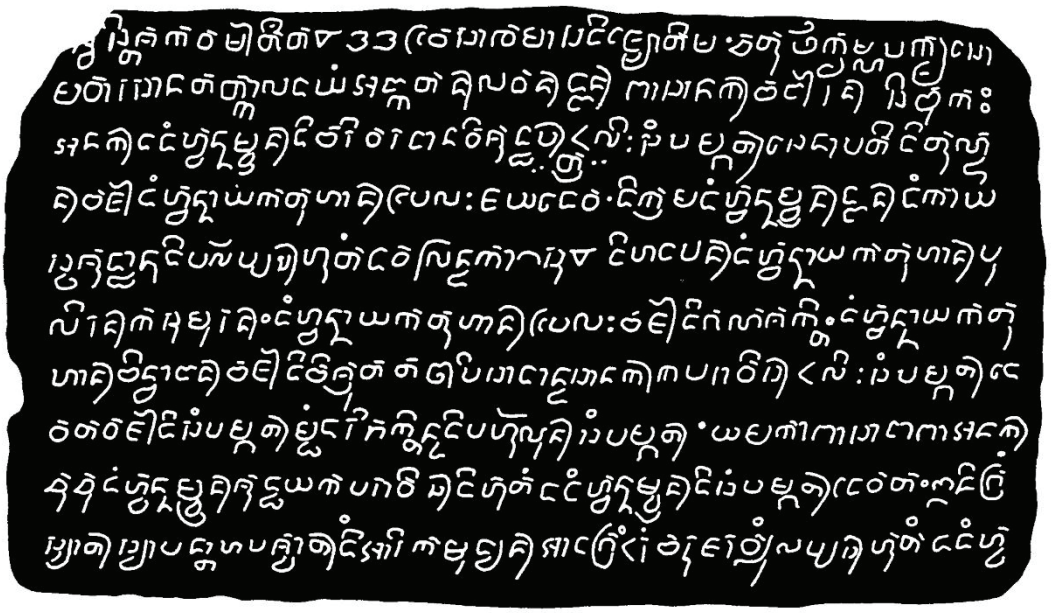


figure 5. Laguna Copper Plate Inscription (822 ŚE/900 CE), discovered in Lumbang River near Laguna de Bay, Philippines in 1989, now in the National Museum of Philippines. The inscription uses a mixture of languages including Sanskrit, Old Javanese, and Old Malay.

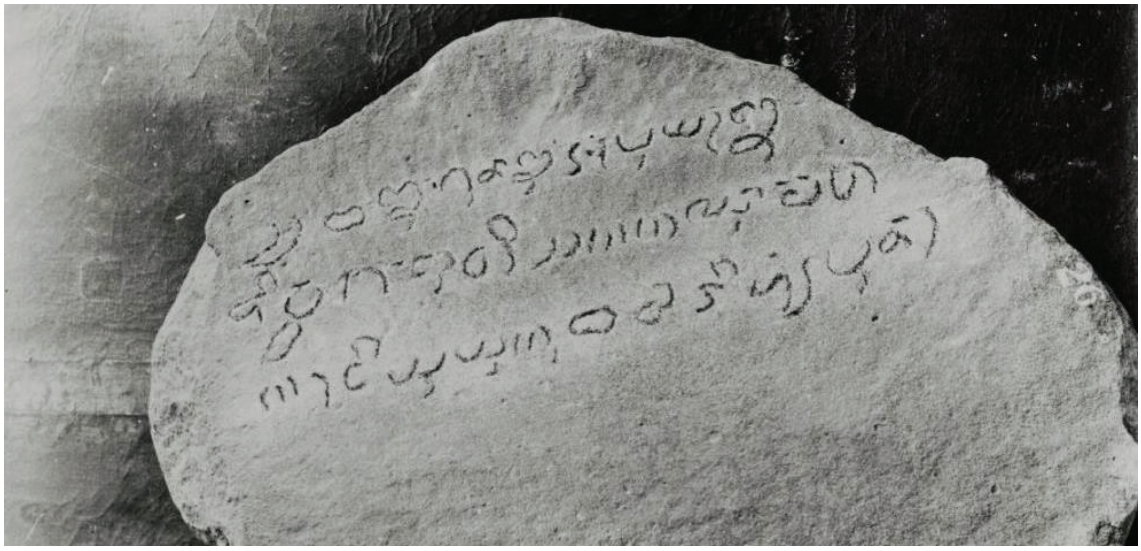


figure 6. Geger Hanjuang Inscription (1033 ŚE/1111 CE or 1333 ŚE/1411 CE), discovered in Tasikmalaya, West Java, now in the National Museum of Indonesia. The inscription uses Old Sundanese language.

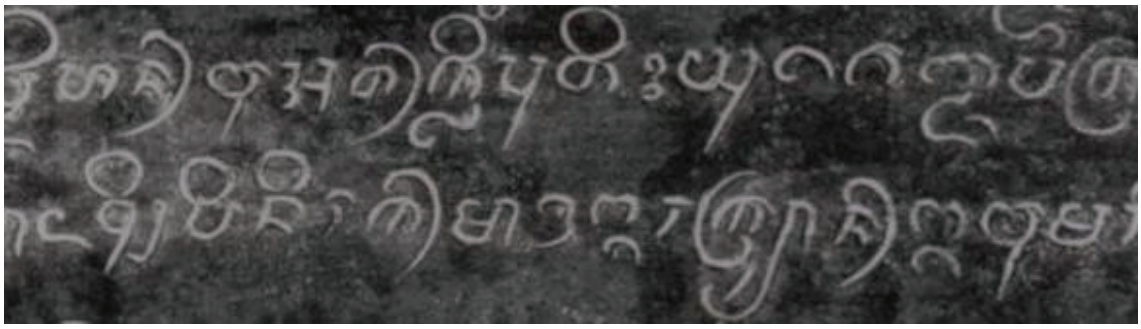


figure 7. Example of early Kawi, Jurungan Inscription (798 ŚE/876 CE).

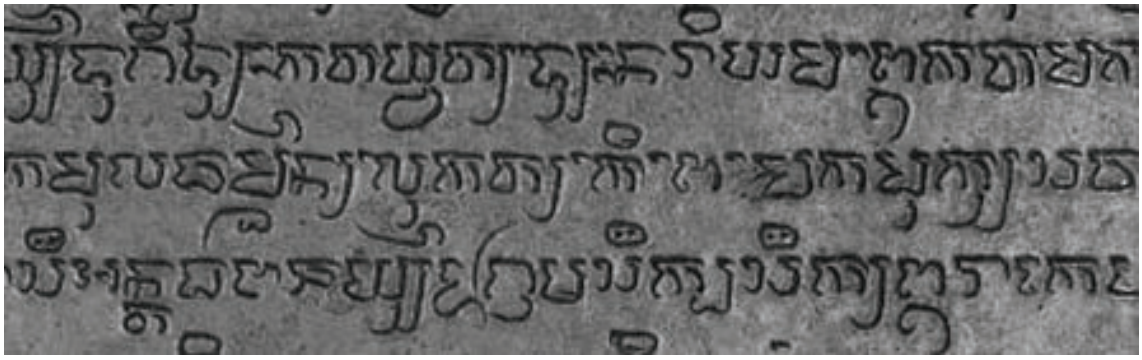


figure 8. Example of late Kawi, Paburuhan Inscription (14-15th century CE).

figure 9. Example of quadrate Kawi, Pohsarang Inscription (934 ŚE/1012 CE). Note PUNCTUATION SPIRAL at the beginning and end of text.

figure 10. Example of 'Buda' Kawi in gebang manuscript, Sang Hyang Raga Dewata MS (Sri Baduga Museum collection no. 07.106). Documentation by Ilham Nurwansah.

figure 11. Example of non-decomposable and decomposable form of KAWI LETTER II in different text, compared to LETTER I. Left: Gilikan Inscription (845 ŚE/923 CE). Right: Dharma Pātañjala gebang MS (Staatsbibliothek Berlin, MS Schoemann I-21).

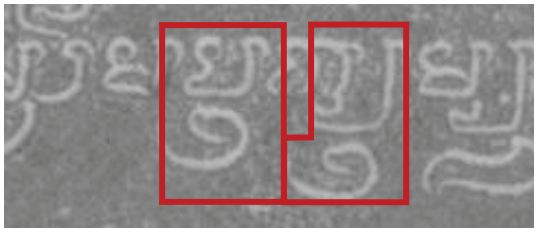


figure 12. KAWI LETTER VOCALIC R (left) compared with its conjunct form (right) in Tuhanyaru Inscription (1245 ŚE/1323 CE).

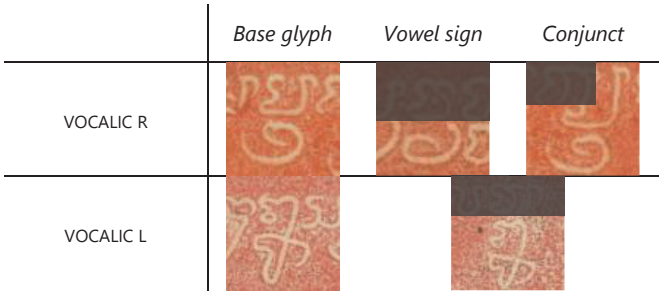


figure 13. Co-occurrence of dependent vowel sign and conjunct form of KAWI LETTER VOCALIC R in Tuhanyaru inscription. Dependent form of LETTER VOCALIC L is also found in this inscription; however, it is not entirely clear whether this form should be treated as vowel sign or as a conjunct. No other dependent form of VOCALIC L has been attested so far.

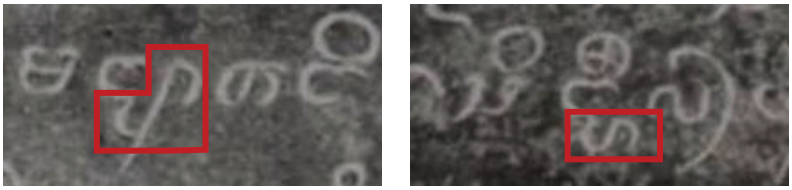


figure 14. Different form of KAWI LETTER HA conjunct in Jurungan Inscription.

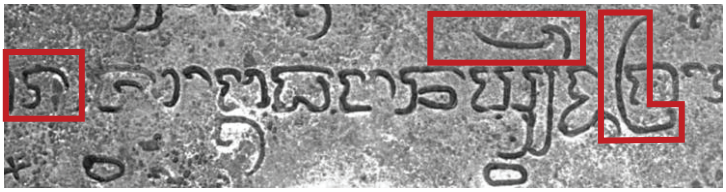


figure 15. Three forms of LETTER RA (base glyph in 'rajā', repha in 'caryya', and conjunct in 'ugra') in Pabuharan inscription.

figure 16. Examples of glyph stacks in various inscriptions. From left to right: 'rakryan' in Jurungan Inscription, 'Indrapura' in Air Tabar B Inscription, 'mpwaŋgarjja' in Patapan II Inscription, and 'tambli(ṅan)' in Tamblingan II Inscription.

figure 17. The deepest glyph stack attested so far: 'hantlū' in Gilikan Inscription.

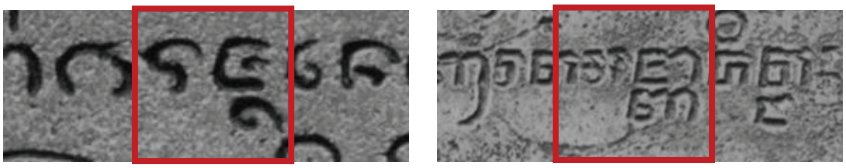


figure 18. The word 'rajña' with LETTER JNYA in Mpu Mada inscription (1214 ŚE/1351 CE). Compare with the word 'ajñā' in Air Tabar inscription (905 ŚE/983 CE) which uses conjunct NYA instead.

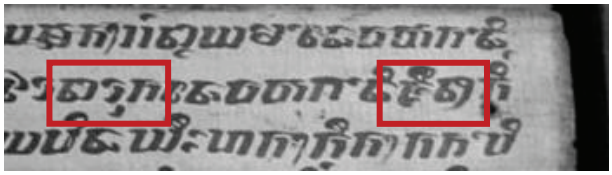


figure 19. The word 'baruna' and 'jĕro' in Sang Hyang Raga Dewata gebang MS. The later word uses a distinct glyph for the syllable [ro], compared to the syllable [ru] which uses standard LETTER RA + VOWEL SIGN U sequence.

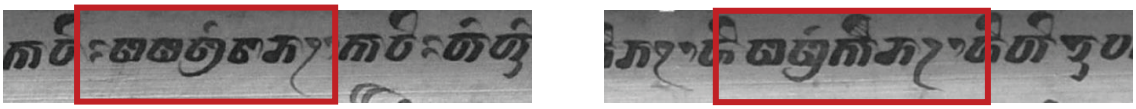


figure 20. The word 'babaroŋhan' and 'baroŋkĕn' with LETTER RO + ANUSVARA in Siksa Kandang Karĕsian MS (National Library of Indonesia collection no. L 630). Documentation by Aditia Gunawan.

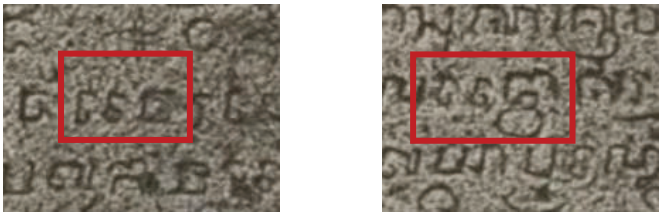


figure 21. Alternate form of VOWEL SIGN AI and AU sign in Amoghapasa statue inscription (1208 ŚE/1286 CE).

	Base gyph	+VOWEL SIGN AA	+VOWEL SIGN ALTERNATE AA	font dependent alternate
NGA		x		
TTA				
PA		x		
HA			x	

figure 22. Contrasting use of VOWEL SIGN AA and ALTERNATE AA in Air Tabar B inscription to disambiguate certain letter combinations. The letter NGA has an additional form that is more decorative in nature, which can be supported as font-dependent stylistic variants.

figure 23. VOWEL SIGN AA and ALTERNATE AA in the same word 'boddhi' on two inscriptions with different style and medium. Left: Paburuhan inscription. Right: Pohsarang inscription.

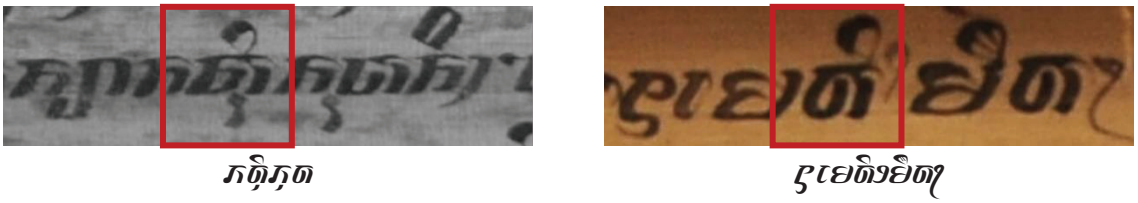


figure 24. Left: VOWEL SIGN I and U used together to mark a canceled letter in Nipah Kropak Ciburuy I (BL, EAP280/1/2/1). Right: VOWEL SIGN AA repurposed as consonant reduplicator with attaching VOWEL SIGN I in the word "emettimĕt" in Siksa Kandang Karĕsian MS.

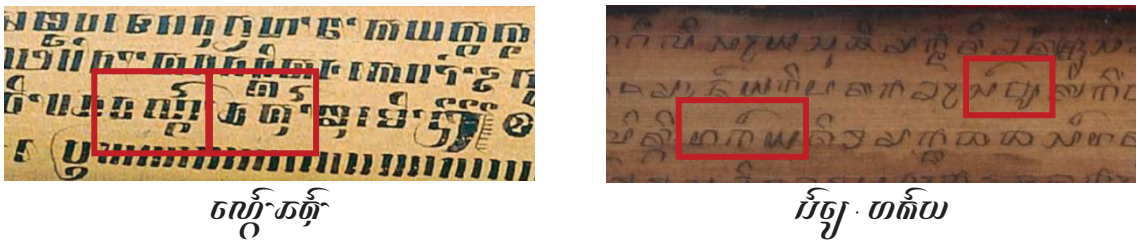


figure 25. Left: Simultaneous use of repha glyph as initial r- and final -r in a single text: 'warṇna' and 'catur' in Serat Catur Bumi gebang MS (1445 ŚE/1523 CE). Documentation by the Lontar Foundation. Right: The repha glyph completely repurposed as final -r throughout a text: 'sarwya' and 'hakarya' (among others) in Gita Sinangsaya lontar MS. Documentation by Abimardha Kurniawan.

figure 26. The word 'rwa' written with ra+conjunct wa, as opposed to expected repha, in Pura Gunung Kawi, Bali

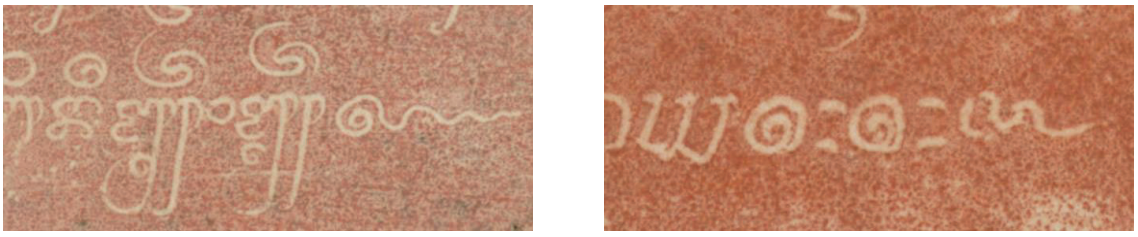
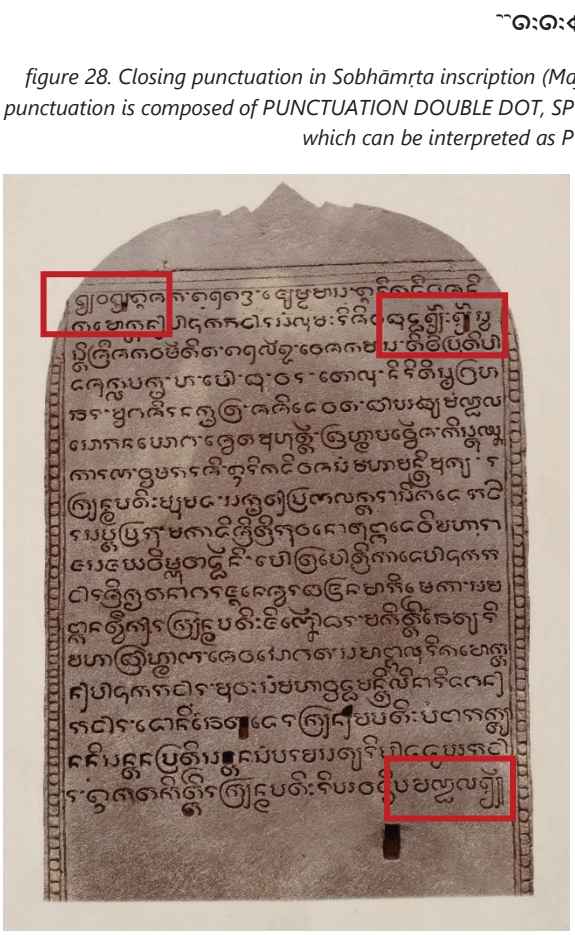
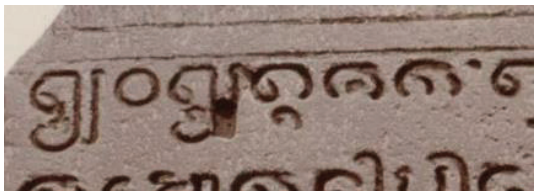
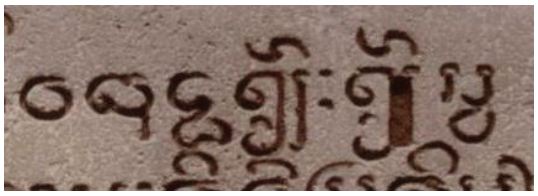


figure 27. PUNCTUATION CLOSING SPIRAL used at the end of text of two inscriptions, but with different set of preceding punctuations. Left: Patapan II inscription (1340 ŚE/1418 AD). Right: Gandhakuti inscription (964 ŚE/1042 AD).







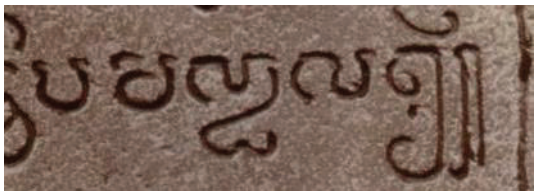
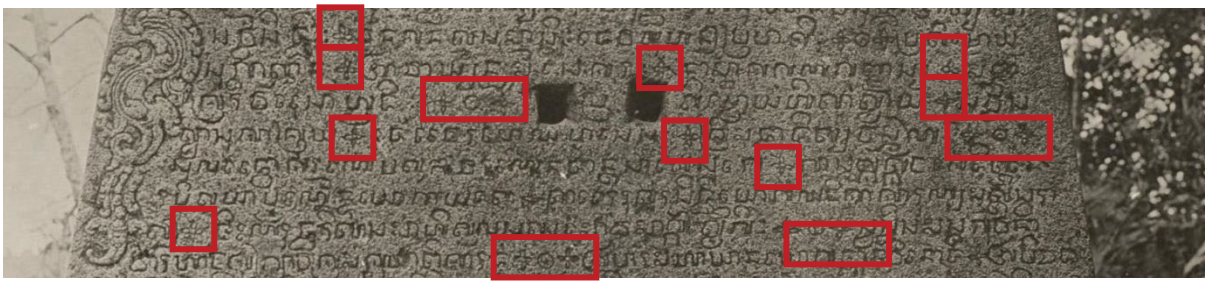


figure 28. Closing punctuation in Sobhāmṛta inscription (Majapahit era copy of a charter from 861 ŚE/939 CE). This closing punctuation is composed of PUNCTUATION DOUBLE DOT, SPIRAL, and FLOWER with space-filling decorative waves at the end which can be interpreted as PUNCTUATION CLOSING SPIRAL.

figure 29. The Mpu Mada inscription shows how a set of Kawi punctuations can be arranged in several ways in different sections of the same text, indicating hierarchal use.



...

figure 30. Punctuation in Amoghapasa statue inscription. Break in text are indicated with PUNCTUATION FLOWER or the sequence FLOWER – SPIRAL – FLOWER. The very end of the text closes with a pair of FLOWER – SPIRAL – FLOWER – CLOSING SPIRAL sequence enclosing the word '(su)kṣma'.

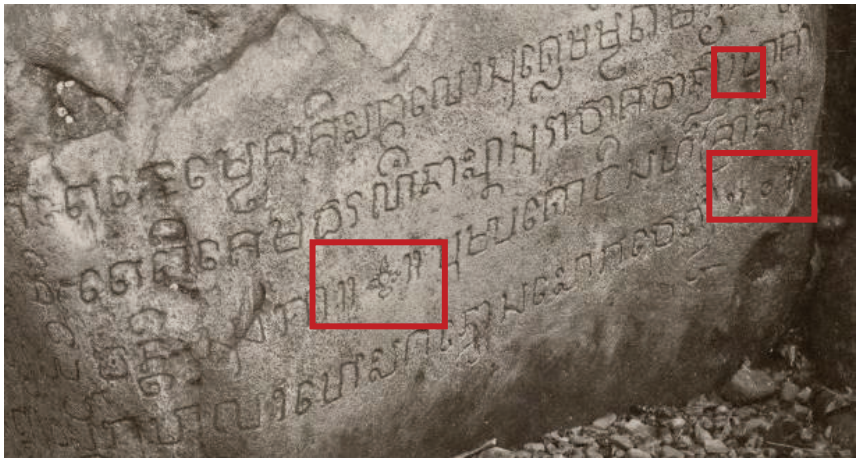


figure 31. Surawasa I inscription (1296 ŚE/1374 CE). Text breaks are indicated with PUNCTUATION DANDA as well as combinations with DOUBLE DANDA, FLOWER, and CIRCLE.

figure 32. KAWI PUNCTUATION SPACE FILLER in several inscriptions. From left to right: Sobhāmṛta, Tuhanyaru, Kakurungan, and Kamban inscription. Note that SPACE FILLER faces to the right-hand side in some inscription like Tuhanyaru.

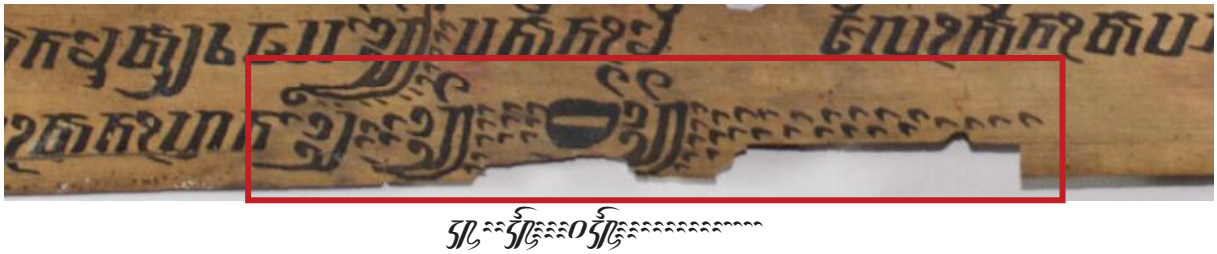


figure 33. Above: Multiple SPACE FILLER, along with DANDA and DOT, in Serat Catur Bumi gebang MS (1445 ŚE/1523 CE). Documentation by the Lontar Foundation. Below: Elaborate punctuation composed of SECTION MARKER – ALTERNATIVE SECTION MARKER – CIRCLE, as well as succeeding TRIPLE DOT – DOUBLE DOT – DOT in Nipah, Kropak 24 (BL, EAP280/1/2/5)

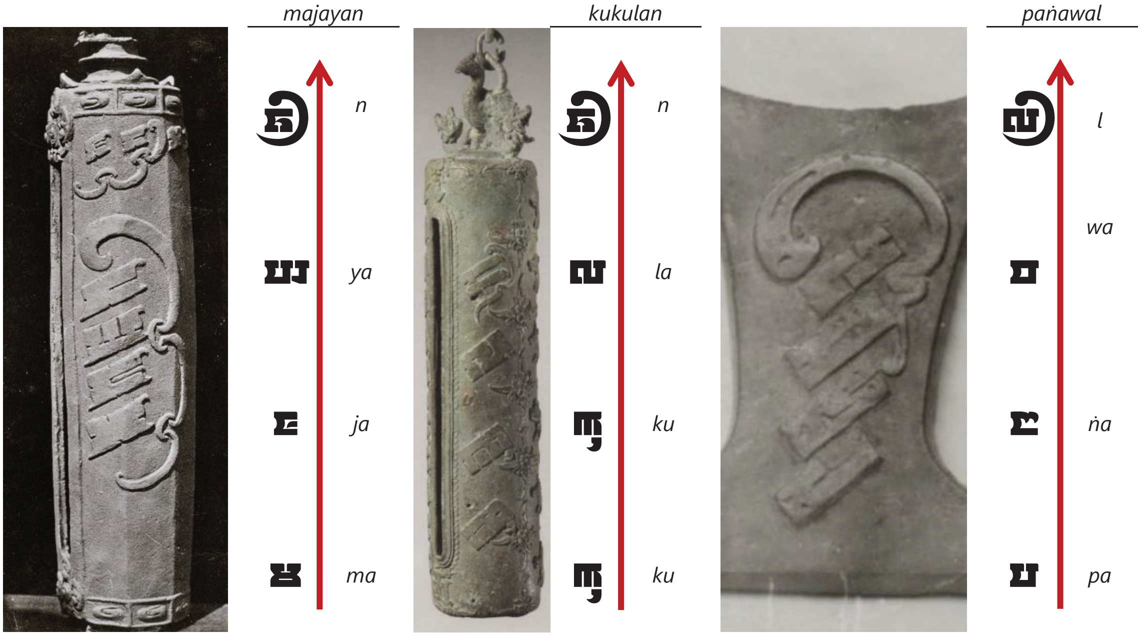


figure 34. Bronze artefacts with vertical oriented Kawi inscription. Left: slit drum from Galuh, West Java (LEID UL, P-023964). Center: slit drum (MMA NY, 1987.142.31). Right: mirror handle (LEID UL, OD 13250).

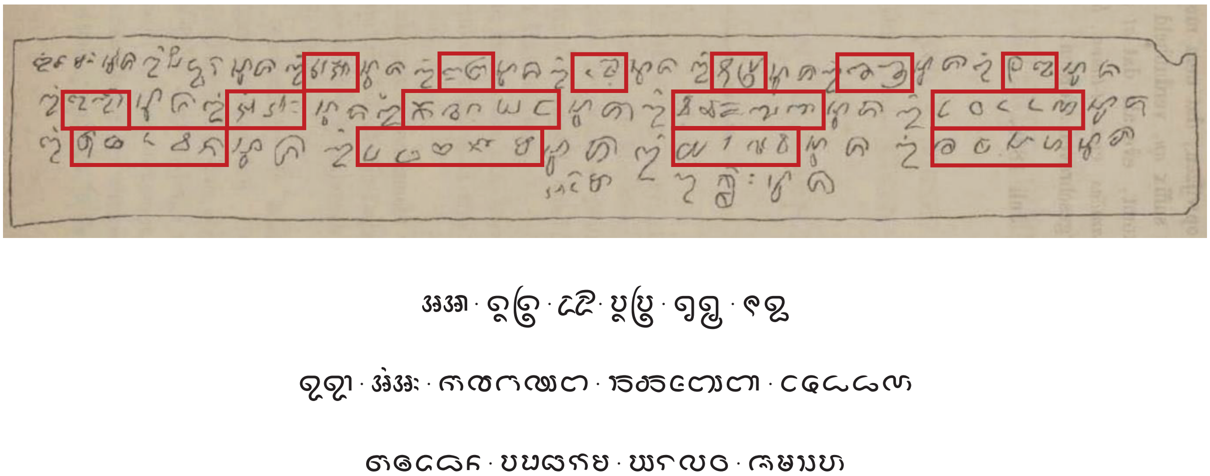


figure 35. Tracing of Desa Jeruk Gold Plate discovered in Klaten, Yogyakarta in March 1888. The inscription contains a mantra made with the complete Kawi sequence of independent vowel and consonant letters in the Brahmic order. Tracing was published in Tijdschrift voor Indische Taal-Land- en Volkenkunde deel XXXII (1889), p 441. Notice that this abecedarium lists TTA, DDA, and DDHA but does not differentiate their glyphs.

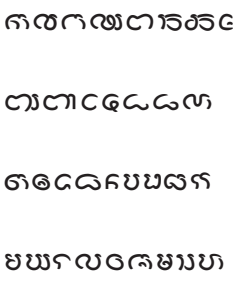


figure 36. Sumberwatu Gold Plate discovered in Sleman, Yogyakarta (now kept by BPCP DIY, item BG.911) contains the complete 33 Kawi consonant set in the Brahmic order, written twice as a mantra.

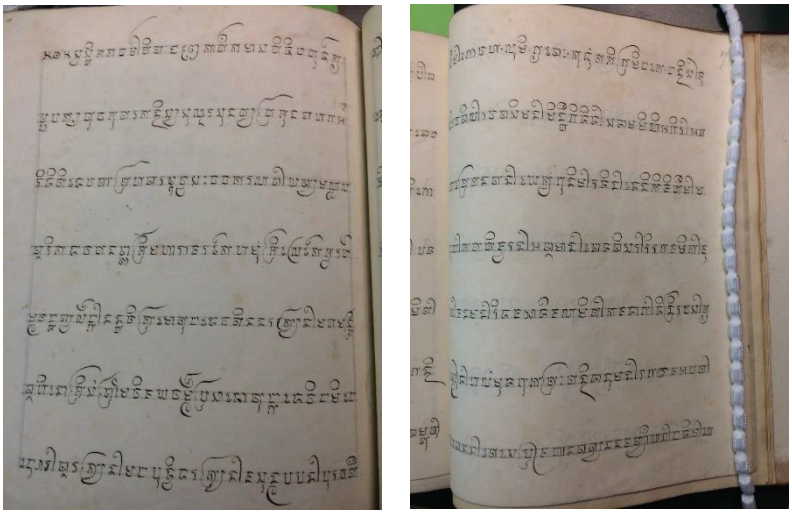


figure 37. Kawi transcription in a modern Javanese manuscript (British Library Add MS 12321), from the collection of John Crawford obtained during his official residence in Java, circa 1811-1815. Documentation by Ben Mitchell. During this period, the Kawi script has been displaced from active use, and this sample is a copying attempt from an unidentified inscription.

figure 38. An example of modern Kawi use, "Introduction to Kawi Script and its Implementation in Digital Environment" event hosted by Segajabung Community in Yogyakarta. The title of the event is in Bahasa Indonesia, rendered in digital Kawi font which appropriated Javanese and Balinese Unicode points.

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ISO/IEC JTC 1/SC 2/WG 2
PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS
FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646[10]
Please fill all the sections A, B and C below.
Please read Principles and Procedures Document (P & P) from http://std.dkuug.dk/JTC1/SC2/WG2/docs/principles.html **for guidelines and details before filling this form.**
Please ensure you are using the latest Form from http://std.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html**.**
See also http://std.dkuug.dk/JTC1/SC2/WG2/docs/roadmaps.html **for latest *Roadmaps*.**

A. Administrative

1. **Title:** *Preliminary Proposal to encode Kawi in the UCS*
2. Requester's name: *Aditya Bayu Perdana, Ilham Nurwansah*
3. Requester type (Member body/Liaison/Individual contribution): *Individual contribution*
4. Submission date:
5. Requester's reference (if applicable):
6. Choose one of the following:
   This is a complete proposal:
   (or) More information will be provided later: *v*

B. Technical – General

1. Choose one of the following:
   a. This proposal is for a new script (set of characters): *v*
      Proposed name of script: *Kawi*
   b. The proposal is for addition of character(s) to an existing block:
      Name of the existing block:
2. Number of characters in proposal:
3. Proposed category (select one from below - see section 2.2 of P&P document):

A-Contemporary		B.1-Specialized (small collection)		B.2-Specialized (large collection)	
C-Major extinct		D-Attested extinct	v	E-Minor extinct	
F-Archaic Hieroglyphic or Ideographic				G-Obscure or questionable usage symbols	

4. Is a repertoire including character names provided? *yes*
   a. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document? *yes*
   b. Are the character shapes attached in a legible form suitable for review? *yes*
5. Fonts related:
   a. Who will provide the appropriate computerized font to the Project Editor of 10646 for publishing the standard?
   Arif Budiarto and Aditya Bayu Perdana
   b. Identify the party granting a license for use of the font by the editors (include address, e-mail, ftp-site, etc.):
6. References:
   a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided? *yes*
   b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached? *yes*
7. Special encoding issues:
   Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)? *yes*

8. Additional Information:

Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at http://www.unicode.org for such information on other scripts. Also see Unicode Character Database (http://www.unicode.org/reports/tr44/) and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

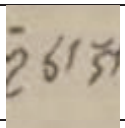
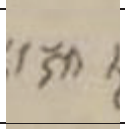
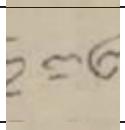
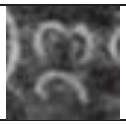
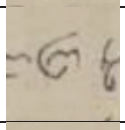
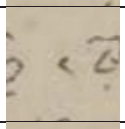
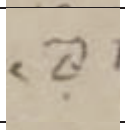
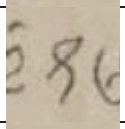
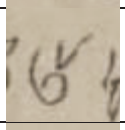
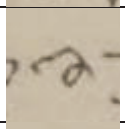
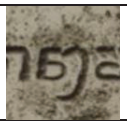
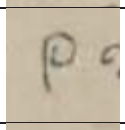
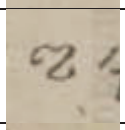
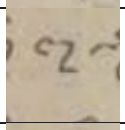
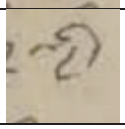
[10] Form number: N4502-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11, 2005-01, 2005-09, 2005-10, 2007-03, 2008-05, 2009-11, 2011-03, 2012-01)

C. Technical - Justification

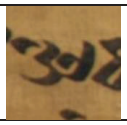
1. Has this proposal for addition of character(s) been submitted before? *yes*
   If YES explain *Preliminary version was made by Anshuman Pandey in 2012 (L2/12-125)*
2. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)? *yes*
   If YES, with whom?
   If YES, available relevant documents:
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included? *yes*
   Reference: *this document*
4. The context of use for the proposed characters (type of use; common or rare)
   Reference:
5. Are the proposed characters in current use by the user community? *yes*
   If YES, where? Reference: *this document*
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP? *no*
   If YES, is a rationale provided?
   If YES, reference:
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)? *yes*
8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence? *no*
   If YES, is a rationale for its inclusion provided?
   If YES, reference:
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters? *yes*
   If YES, is a rationale for its inclusion provided? *yes*
   If YES, reference: *this document*
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to, or could be confused with, an existing character? *yes*
    If YES, is a rationale for its inclusion provided? *yes*
    If YES, reference: *this document*
11. Does the proposal include use of combining characters and/or use of composite sequences? *yes*
    If YES, is a rationale for such use provided? *yes*
    If YES, reference: *this document*
    Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided? *yes*
    If YES, reference: *this document*
12. Does the proposal contain characters with any special properties such as control function or similar semantics? *no*
    If YES, describe in detail (include attachment if necessary)
13. Does the proposal contain any Ideographic compatibility characters? *no*
    If YES, are the equivalent corresponding unified ideographic characters identified?
    If YES, reference:

APPENDIX
KAWI GLYPH ATTESTATION

A. Independent Vowel Letters

		TVIT32	OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
A	𑼃							*
AA	𑼄							*
I	𑼅							*
II	𑼆							*
U	𑼇							*
UU	𑼈							*
VOCALIC R	𑼉							*
VOCALIC RR	𑼊							*
VOCALIC L	𑼋							*
VOCALIC LL	𑼌							
E	𑼍							*
AI	𑼎							*
O	𑼏							*
AU	𑼐							*

Additional Attestations from Various Sources

A	ଅ							
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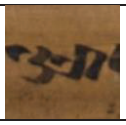
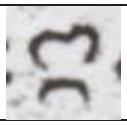
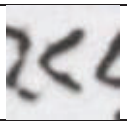
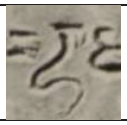
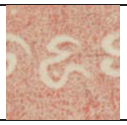
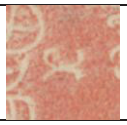
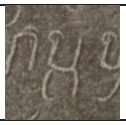
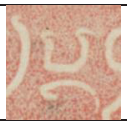
AA	ଆ							
		LCPI	EAP280/1/2/5	MS Sch. I-21				
I	ଇ							
		OD 18736	OD 10024	P 024084	LCPI	EAP280/1/2/5	MS Sch. I-21	
II	ଈ							
		OD 18736	OD 10024	MS Sch. I-21				
U	ଉ							
		P 024084	LCPI	OD 3890	KERN E34	KERN E37	EAP280/1/2/5	
UU	ଊ							
		SRK2	TRA1	EAP280/1/2/5				
VOCALIC R	ଋ							
		KERN E19	OD 10024	KERN E34	KERN E25a			
VOCALIC RR	ୠ							
		KERN E19						
VOCALIC L	ଌ							
		KERN E19	OD 2155	KERN E34	KERN E37	KERN E23a		
E	ଏ							
		OD 18736	KERN E5a	EAP280/1/2/5	EAP280/1/2/1			
AI	ଐ							
		OD 18736	OD 10024	KERN E34	KERN E23a			
O	ଓ							
		KERN E25a	KERN GD02137	KERN E23a	OD 2155	MNI D54		

AU	ๅา							
		KERN E25a	KERN E37	EAP280/1/2/5				

VOCALIC R CONJUCT	◌ๅ							
		KERN E25a						

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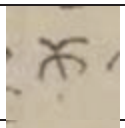
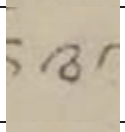
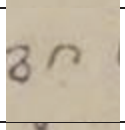
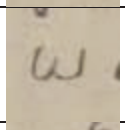
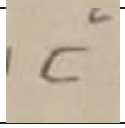
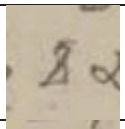
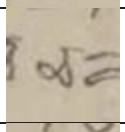
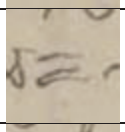
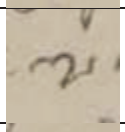
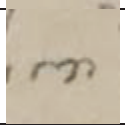
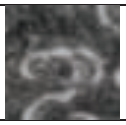
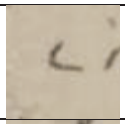
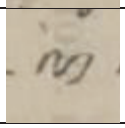
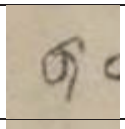
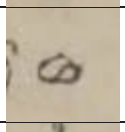
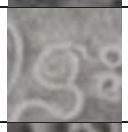
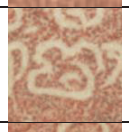
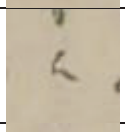
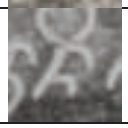
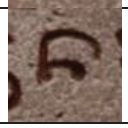
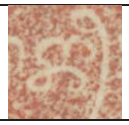
B. Consonant Letters

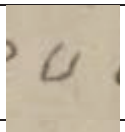
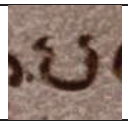
		TVIT32	OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
KA	ꦏ							
KHA	ꦐ							*
GA	ꦒ							
GHA	ꦓ							
NGA	ꦔ							

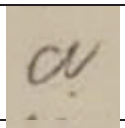
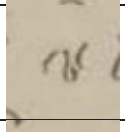
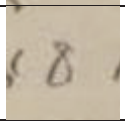
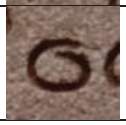
		TVIT32	OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
CA	ꦕ							*
CHA	ꦖ							*
JA	ꦗ							
JHA	ꦘ							*
NYA	ꦙ							

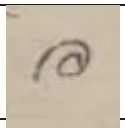
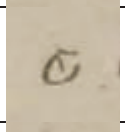
		TVIT32	OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
TTA	ꦛ							
TTHA	ꦜ							*
DDA	ꦝ							

DDHA	᨞							*
NNA	᨟							

		TVIT32	OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
TA	ᨠ							
THA	ᨡ							
DA	ᨢ							
DHA	ᨣ							
NA	ᨤ							

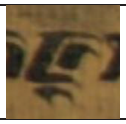
		TVIT32	OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
PA	ᨥ							
PHA	ᨦ							*
BA	ᨧ							
BHA	ᨨ							
MA	ᨩ							

		TVIT32	OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
YA	ꦪ							
RA	ꦫ							
LA	ꦭ							
WA	ꦮ							

		TVIT32	OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
SHA	ꦰ							
SSA	ꦱ							
SA	ꦯ							
HA	ꦲ							

		TVIT32	OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
JNYA	ꦓ							*

Additional Attestations from Various Sources

KHA	ಠ							
		LCPI	KERN E10	OORKONDE A	EAP280/1/2/5			
CA	ಚ							
		OD 10024						
CHA	ಛ							
		OD 10024	VG7					
JHA	ಝ							
		KERN E12a						
TTHA	ಢ							
		JDS						
DDHA	ಡ							
		AA68						
PHA	ಬ							
		OD 10024	KERN E25a	KERN E23a				
JNYA	ಞ							
		OD 2155	KERN E37	KERN E21a	EAP280/1/2/1			
RO	ರ							
		07.106	PNRI L 630					

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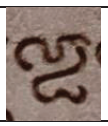
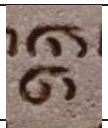
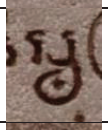
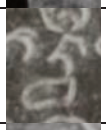
C. Consonant Conjunct

		OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
KA	◌ꦓ						
KHA	◌ꦔ						
GA	◌ꦒ						
GHA	◌ꦖ						
NGA	◌ꦕ						

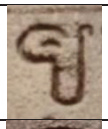
		OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
CA	◌ꦕ						
CHA	◌ꦗ						
JA	◌ꦗ						
JHA	◌ꦘ						
NYA	◌ꦚ						

		OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
TTA	◌ꦛ						
TTHA	◌ꦜ						*
DDA	◌ꦝ						
DDHA	◌ꦞ						

NNA	◌ꦟ						

		OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
TA	◌ꦛ						
THA	◌ꦜ						
DA	◌ꦝ						
DHA	◌ꦞ						
NA	◌ꦤ						

		OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
PA	◌ꦥ						
PHA	◌ꦦ						
BA	◌ꦧ						
BHA	◌ꦨ						
MA	◌ꦩ						

		OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
YA	◌ꦪ						
RA	◌ꦫ						
LA	◌ꦭ						

WA	◌ᩅ						

		OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
SHA	◌ᩈ						
SSA	◌ᩔ						
SA	◌ᩈ						
HA	◌ᩉ						

Additional Attestation from Various Source

TTHA	◌ᩆ						
		JDS					

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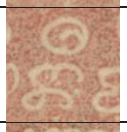
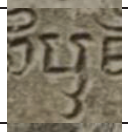
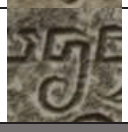
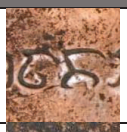
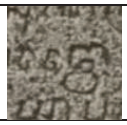
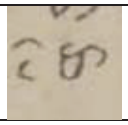
D. Dependent Vowel Signs

		OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
SIGN AA	◌ា						
SIGN ALTERNATE AA	◌ါ						
SIGN I	◌ិ						
SIGN II	◌ី						
SIGN U	◌ុ						
SIGN UU	◌ូ						
SIGN VOC. R	◌ួ						
SIGN VOC. RR							
SIGN VOC. L	◌ឲ						*
SIGN VOC. LL							
SIGN E	◌ើ						
SIGN AI	◌ៃ						*
SIGN O	◌ោ						
SIGN AU	◌ៅ						*
SIGN EU	◌ឺ						
SIGN EUU	◌ឹ						

Additional Attestation from Various Source

SIGN VOC. L	◌ೃ						
		KERN E25a					
SIGN AI	◌ೈ						
		OD 3780	LCPI	KERN E5a	KERN E10		
SIGN AU	◌ೌ						
		OD 3780	TVIT32				

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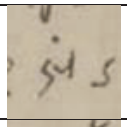
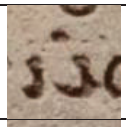
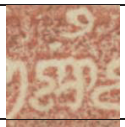
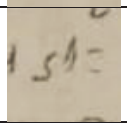
E. Miscellaneous Signs

		TVIT32	OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
CANDRA BINDU	◌ँ							*
ANUSVARA	◌ं							
VISARGA	◌ः							
VIRAMA	◌्							
REPHA	◌ॅ							

Additional Attestation from Various Source

CANDRA BINDU	◌ँ							
		KERN GD02137	OD 2155	MNI D54	KERN E37	KERN E25a	KERN E23a	

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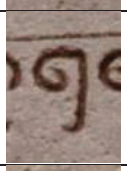
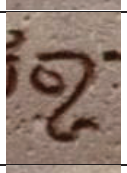
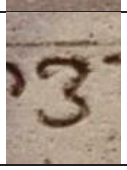
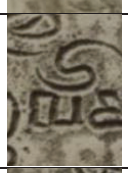
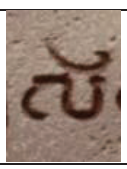
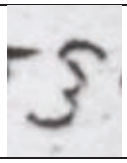
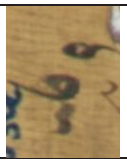
F. Numerals

		OD 13695	OD 3871	OD 741a	MSS Jav 106	KERN E29	various
0	ꦆ						
1	ꦇ						*
2	ꦈ						*
3	ꦉ						*
4	ꦊ						*
5	ꦋ						*
6	ꦌ						*
7	ꦍ						*
8	ꦎ						*
9	ꦏ						*

Additional Attestations from Various Sources

1	๑						
		OD 2155	KERN E25a	OD 6376	EAP280/1/2/1		
2	๑						
		KERN E12a	KERN E5a	KERN E25a	EAP280/1/2/1		
3	๒						
		KERN E12a	KERN E5a	KERN E21a	OD 6376	EAP280/1/2/1	
4	๓						
		OD 2155	KERN E25a	EAP280/1/2/1			
5	๓						
		P 024084	KERN E25a	OD 6376	EAP280/1/2/1		
6	๙						
		OD 2155	EAP280/1/2/1				
7	๙						
		P 024084	EAP280/1/2/1				
8	๙						
		P 024084	OD 2155	KERN E21a	OD 6376	EAP280/1/2/1	
9	๙						
		KERN E23a	KERN E21a	EAP280/1/2/1			

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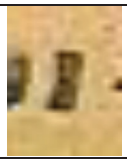
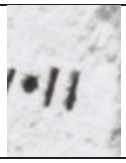
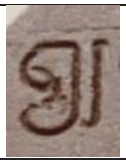
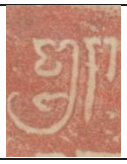
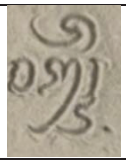
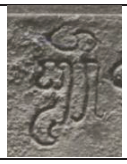
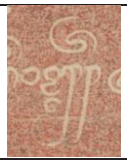
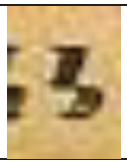
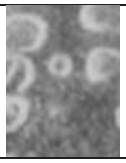
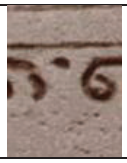
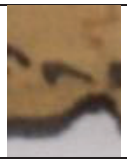
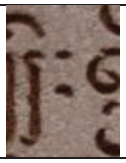
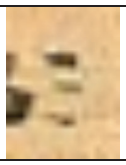
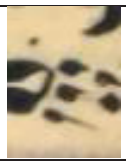
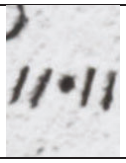
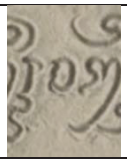
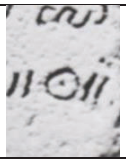
G. Punctuation

DANDA	꣸						
		OD 1647	BR 634				
DOUBLE DANDA	꣹						
		OD 13695	P-024084	OD 1647	OD 18736	KERN E12a	
SECTION MARKER	꣺						
		OD 741a	OD 3871	KERN E10	KERN E22		
ALTERNATE SECTION MARKER	ꣻ						
		OD 741a	OD 5496	OD 6376	OD 14330	KERN E29	
FLOWER	ꣿ						
		D 198-6469	OD 1647	MSS Jav 106			
SPACE FILLER	꣼						
		OD 6376	KERN E21	KERN E25	MSS Jav 106	BR 634	
DOT	ꣽ						
		OD 13695	OD 3871	OD 741a	MSS Jav 106	EAP280/1/2/5	
DOUBLE DOT	ꣾ						
		OD 741a	OD 14330	KERN E23a	L 1097	EAP280/1/2/5	
TRIPLE DOT	ꣿ						
		BR 634	L 1097	EAP280/1/2/5			

CIRCLE	ꣻ						
		P-024084	OD5496	OD 6376	KERN E12a		
FILLED CIRCLE	꣼						
		P-024084	KERN E22	MSS Jav 106	L 1097		
SPIRAL	ꣽ						
		OD 3871	D 198-6469	OD 18736	KERN E23a	MSS Jav 106	
CLOSING SPIRAL	ꣾ						
		D 198-6469	KERN E29	KERN E10	KERN E23a	MSS Jav 106	

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List of Inscriptions

Object	aka	Documentation/ Current Location	Ref. number	Place of origin	Year	
					ŚE	CE
Airkali Inscription		LEID UL	KERN E34	Malang, East Java	905	983
Air Tabar B Inscription	Pandak Bandung	LEID UL	OD 3868~3874	Bali	905	983
Amoghapasa Statue		LEID UL	OD 3780	Padangroco, West Sumatra	1208	1286
Baliwangan Inscription		MNI	MNI D54	Malang, East Java	813	891
Bantiran I Inscription		LEID UL	OD 3890	Sading, Bali	923	1001
Bronze mirror handle		LEID UL	OD 13250			
Bronze slit drum		LEID UL	P 023964	Galuh, West Java	1151	1229
Bronze slit drum		MMA NY	1987.142.31			13~14 century
Desa Jeruk Gold Plate		TVIT32 p. 455	TVIT32			
Dharma Pātañjala Gebang MS	MS Schoemann I-21	GIS16/SBB	MS Sch. I-21	West Java		
Gandhakuti Inscription		LEID UL	KERN E23a~E23d	Sidoarjo, East Java	964	1042
Geger Hanjuang Inscription		MNI	MNI D26	Tasikmalaya, West Java	1033 or 1333	1111 or 1411
Gilikan Inscription (alt)	Bhatara i Glam?	LEID UL	OD 10024~10025		845	923
Gita Sinangsaya Lontar MS		PNRI	L 212	Merapi-Merbabu, Central Java		
Gold foil deposits		LEID UL	KERN GD 02 137			
Jurungan Inscription	Polengan III	LEID UL	OD 13695~13700	Karanganyar, Central Java	798	876
Kakurungan Inscription	Majapahit I	LEID UL	KERN E22a~E22e	Mojokerto, East Java	945	1023
Kamban Inscription	Pelem	LEID UL	KERN E21a~E21c	Mojokerto, East Java	863	941
Joko Dolog Statue		Taman Apsari, Surabaya	JDS	Trowulan, East Java		
Karmawibhangga Relief from Candi Borobudur, panel 127		VG7 p. 155	VG7	Magelang, Central Java		±850
Laguna Copper Plate Inscription		PMP	LCPI	Laguna de Báý, Luzon, Phillipines	822	900
Mantyasih I Inscription		LEID UL	OD 18736~18737	Magelang, Central Java	829	907
Mantyasih Statue from Candi Jago		AA68 p. 308	AA68	Malang, East Java	1265	1343
Manuscript copy of an unidentified inscription	Add MS 12321	BL	Add MS 12321			1811~ 1815
Mpu Mada Inscription from Candi Singhasari	Singhasari	LEID UL	OD 741a	Malang, East Java	1214	1351
Mulak I Inscription	Ngabean I	LEID UL	KERN E5a~E5d	Malang, East Java	800	878
Nipah, Kropak 24	Sa Hya Hayu?	EAP BL	EAP280/1/2/5	Kabuyutan Ciburuy, West Java		15~17 century
Nipah, Kropak Ciburuy I	Buana Pitu?	EAP BL	EAP280/1/2/1	Kabuyutan Ciburuy, West Java		15~17 century
Pabuharan Inscription		BL	Ind Ch 57			10~15 century
Pakis Wetan Inscription		LEID UL	OD 2155	Trowulan, East Java	1188	1266

Pamintihan Inscription		LEID UL	OD 6376	Bojonegoro, East Java	1385	1463
Patapan II Inscription	Surabaya XI	LEID UL	KERN E29	Surabaya, East Java	1340	1418
Pohsarang Inscription	Luçem	Kediri, East Java		Kediri, East Java	934	1012
Ra Mwi Inscription	Ngabean VI	LEID UL	KERN E10	Magelang, Central Java	804	882
Sang Hyang Raga Dewata Gebang MS		Sri Baduga Museum, Bandung	07.106	West Java		
Satyapura Inscription		LEID UL	KERN E37	Tulungagung, East Java		
Serat Catur Bumi Gebang MS	Sanghyang Hayu	PNRI	BR 634	West Java	1445	1523
Siksa Kandang Karĕsian Gebang MS	Sikṣa Kandaṅ Karṣian	PNRI	L 630	West Java	1440	1518
Singhasari Inscription		LEID UL	OD 740	Candi Singhasari, Malang, East Java		
Sobhāmṛta Inscription		BL	MSS Jav 106	Sidoarjo, East Java	Majapahit era copy of a charter from 861 ŚE/939 CE	
Srokodan II Inscription			SRK2		837	915
Sukamerta Inscription		LEID UL	OD 14330	Mojokerto, East Java	1218	1296
Sumberwatu Gold Plate		BPCB DIY	BG.911	Sleman, Yogyakarta		9~10 century
Surawasa I Inscription	Suroaso I	LEID UL	OD 1647	Suroaso, Pagaruyung, West Sumatra	1296	1374
Taji Inscription	Ponorogo II	LEID UL	KERN E12a~E12d	Ponorogo, East Java	823	901
Tamblingan I Inscription	Bañu Rara I	VBG66 pp. 7~13	OORKONDE A	Pura Batur, Buleleng, Bali	844~888	922~966
Tamblingan III Inscrption		LEID UL	OD 5496	Pura Batur, Buleleng, Bali	1320	1398
Trunyan A1 Inscription		Pura Trunyan?	TRA1	Bali	813	901
Tuhanyaru Inscription	Sidoteko/ Sidateka	LEID UL	KERN E25a~E25k	Mojokerto, East Java	1245	1323
Unidentified Gebang MS in Old Sundanese		PNRI	L 1097	West Java		
Wukiran Inscription	Pereng	LEID UL	P 024084	Yogyakarta	785	863

AA68 : *Artibus Asiae, vol 68 no 2* (Pauline Lunsingh Scheurleer, 2008) "The Well-Known Javanese Statue in The Tropenmuseum, Amsterdam, and its Place in Javanese Sculpture"
GIS16 : *Gonda Indological Studies, vol 16* (Andrea Acri, 2011) "Dharma Pātañjala: A Śaiva Scripture from Ancient Java Studied in the Light of Related Old Javanese and Sanskrit Texts" (published as a book in 2018)
BL : British Library
BPCB DIY : Balai Pelestarian Cagar Budaya Daerah Istimewa Yogyakarta (Cultural Heritage Conservation Office of Yogyakarta)
EAP BL : Endangered Archive Program, British Library
LEID UL : Leiden University Library (photography collection)
MMA NY : Metropolitan Museum of Art
MNI : Museum Nasional Indonesia (The National Museum of Indonesia)
PMP : Pambansang Museo ng Pilipinas (The National Museum of The Philippines)
PNRI : Perpustakaan Nasional Republik Indonesia (The National Library of Indonesia)
TVIT32 : *Tijdschrift voor Indische Taal-, Land- En Volkenkunde deel XXXII* (J.L.A. Brandes, 1889) "Een Oud-Javaansch Alphabet van Midden Java"
SBB : Staatsbibliothek, Berlin
VBG66 : *Verhandelingen van het Koninklijk Bataviaasch Genootschap van Kunsten en Wetenschappen deel LXVI* (P.V. van Stein Callenfels, 1926) "Epigraphia Balica I"
VG7 : *Verspreide Geschriften, Zevende deel* (H. Kern, 1917) "Over de Bischriften op het Beeldhouwwerk van Boro-budur"

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