

Vowel Writing and the Role of Grammar in Writing System Evolution

Grapholinguistics in the 21st Century: From Graphemes to Knowledge
Daniel Harbour, Queen Mary University of London

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Instead of the vowels being unrepresented, or only represented by points, as in all Semitic writing that was first applied to a Semitic language, we have in the cuneatic inscriptions every vowel definitely expressed. The Semitic language appears in a disguise similar to what the Maltese does in Roman letters, or the Punic in the well-known passage of Plautus. — (Hincks 1852, 295, cited in Cathcart 2011, 7)

[T]he Assyrian mode of writing laboured under a great disadvantage, as compared with that used for other Semitic languages, so far as respected the imperfective roots. — (Hincks, 1863, 27)

(1) Theses

- a. Empirical thesis. When writing is transmitted within the Afroasiatic family, vowel writing is systematically neglected; when writing is transmitted beyond Afroasiatic, vowel writing increases.
- b. Analytic thesis. This increase is a response to grammatical differences. Vowels play very different roles in the grammar of Afroasiatic versus non-Afroasiatic languages. Underrepresentation of vowels therefore has very different consequences within versus beyond the family.
- c. Broad project. Writing systems adapt to the grammar of the languages they are used to write. Changes in grammar (especially, via adoption for another language) can result in maladaptation, triggering further evolution of the system. Grammar is therefore a driving force in writing system evolution.

(2) Sharpening the question

- a. Strictly vowelless writing: (ca. 500 BCE) golden Pyrgi tablets, a bilingual Etruscan-Phoenician text (Schmitz 1995, O'Connor 1996b; by convention, the Phoenician is rendered in the Aramaic script used for Hebrew). Five vowels (/a e i o u/), none in the Phoenician, irrespective of length or position in the word. Glides ⟨w⟩ and ⟨y⟩ occur only as consonants, as onset /wašanat/ or coda /rabbotay/.

Phoenician:

ושנת למאש אלם רבתי שנת כמ הככבם אל

Right-to-left transcription:

lʔ mbkxh mk tnš ytbr mlʔ šʔml tnšw

/wašanat limuʔiš ʔilim rabbotay šanat kima hakokabīm ʔelle/

‘And may the years of the god’s statue be as many as these stars’

- b. Vowel-reduced: the Old Testament. ‘The stars’ (e.g., Judges 5:20, Ecclesiastes 12:2): הכוכבים ⟨khwhbym⟩ /hakkokābīm/. Two of four vowels, /o/ and /ī/, written by the corresponding glides ⟨w⟩ and ⟨y⟩ (*matres lectionis* ‘mothers of reading’). Underdetermine the vowel for which they stand: ⟨y⟩ for /ē/ (and /o/ unwritten) in ככבי ⟨kkby⟩ /kəkəkəbē/ ‘as the stars of’ (Nehemia 9:23); ⟨w⟩ for /ū/ (unwritten /ī/) in זיהרו ⟨yzhrw⟩ /yazhīrū/ ‘they will shine’ (Daniel 12:3).

a. Initially significantly phonetic, then imitated Arabic orthographic conventions, before settling on a system distinct from both. In this literary passage (Egypt, circa 1600), only long vowels are indicated (Hary, 1996, 733–734):

b. Judeo-Arabic: מולאנא אל מלך אן נחן לך עביד אן שית
 Right-to-left transliteration: tyš n? dybʕ kl nḥn n? klm l? ?n?lwm
 /mawlānā il malik inna naḥnu lak ʕabid in šīt/
 ‘We are truly slaves to you, and if you wish ...’

(7) Arabic

a. Developed by the Nabataeans, who spoke Arabic but wrote Aramaic. Shows significant linguistic insight and sophistication (Daniels 2014, 29, citing Diem 1979–1983). Aramaic lacked sounds that Arabic preserved. So, Arabic needed new letters. Several were derived but adding a single dot to existing letters. The choice of which letter to dot reflected pairs of cognate sounds. Orthography recapitulates etymology, not in irregular spelling (<k> in <knot>), but in letter design itself.

Aramaic	PrSem	Arabic	Aramaic	PrSem	Arabic
t	{ *t *θ	t ت θ ث	tʕ	{ *tʕ *θʕ	tʕ ط θʕ ظ
ḥ	{ *ḥ *x	ḥ ح x خ	sʕ	{ *sʕ *ʕ	sʕ س ʕ ظ
d	{ *d *ð	d د ð ذ	ʕ	{ *ʕ *y	ʕ ع y غ

b. Despite this sophistication and innovation, vowels remained underrepresented. In fact, the Nabataean script had several deficiencies, such as pairs of nearly indistinguishable letters. This led to problematic ambiguity, which was tolerated for a surprisingly long time. Nonetheless, its solution did not involve investment in vowel writing.

(8) Ugaritic

a. A fascinating Mesopotamian–West Semitic hybrid: cuneiform in appearance, but consonantal in structure.
 b. Different from West Semitic prototype: three syllabic signs, <ʔa>, <ʔi>, <ʔu>, instead of plain consonantal <ʔ>. Otherwise, vowels underrepresented (Schmiedewind & Hunt, 2007).

(9) The oldest case?

a. Darnell et al. (2005): two Wadi el-Ḥōl inscriptions. Alphabetic, given the number of repeated glyphs. Language: not Egyptian but is likely Semitic, given the connection of several signs to later West Semitic letters. Sign origins: clear Egyptian prototypes. So, a very early case of transmission.
 b. 28 characters in the two inscriptions. 22 occurrences of full consonants (b, ḥ, l, m, n, p, r, šʔ, t, tʔ, ʕ). 6 (ʔ, hʔ, w) from what later served as *matres lectionis*. 22 consonants: 11 closed (CVC) syllables or 22 open (CV) syllables. So, even if the inscriptions recorded some vowels via *matres lectionis*, the majority of vowels were unwritten.

(10) Transmission beyond Afroasiatic

a. Arabic, Aramaic, Egyptian, Hebrew, and Phoenician: script donors to non-Afroasiatic languages.
 b. A range of families and borrowing scenarios.
 c. Vowel marking: more complete and more often obligatory than from intra-Afroasiatic borrowing.

- a. From Aramaic. Used for an Iranian language, further adapted for Altaic (Skjærvø, 1996): Uyghur, Mongolian, the Clear Script and Manuchurian (Kara, 1996), the last two, alphabetic.
- b. Even before full alphabetism, vowel marking was systematic and substantial. Uyghur: ⟨ywkwñwrñn⟩ /yükiñürmen/ ‘I prostrate myself’, ⟨ʔwydwn⟩ /ödüñ/ ‘time.LOC’, ⟨qwtynkʔ⟩ /qutüñga/ ‘majesty.POSS.DAT’, ⟨yyqylqw [l]wq yn⟩ /yiyilyuluqin/ ‘meeting place’.
- c. Note: front/back vowel pairs undifferentiated. Uyghur is vowel harmonic. So, this underrepresentation may, again, be tied to grammar: front/back is predictable for most vowels in a given word. Turkic runes, a separate offshoot of Sogdian: several consonant phonemes corresponded to pairs of letters, one used if the following vowel was front, the other, otherwise (a solution that Ottoman Turkish would later reinvent, utilising otherwise ‘dead’ letters of the Arabic script, Daniels 2014; cf, Vydrin 2014, 221, 224 on Mande languages).
- d. And in Sogdian: ⟨βγw xwtʔw⟩ ‘lord master’ and ⟨nmʔcyw spʔtzʔnwky⟩ ‘reverently with bended knee’ were read /βayu xutāw/ and /namācyu spātzānuk/: only short /a/ is unrepresented (occurs as ⟨ʔ⟩ in the same text).

(16) Persian

- a. From Arabic. Like Aramaic, initial adoption by an Iranian language, Persian, then other families (e.g., Indo-European and Malayo-Polynesian) (Kaye, 1996).
- b. *Matres lectionis* were used, though non-initial short vowels were often unrepresented: compare, for instance, ⟨z⟩ /ze/ ‘from’ with ⟨kh⟩ /ke/ ‘that’, or ⟨rxy⟩ /roxī/ ‘face’ with ⟨xvšbʔš⟩ /xošbāš/ ‘be happy’. And again as with Sogdian, Persian had offshoots, such as Kurdish, that became fully alphabetic.
- c. Of all cases, this seems to show the smallest increase in vowel writing. Plan: compare (non-borrowed) homophones in the two languages.

(17) Arabic script in Africa

- a. A wide range of indigenous writing traditions throughout Africa (Mumin, 2014).
- b. Apparently all non-Afroasiatic languages with established Arabic-script literacy make vowel writing obligatory.
- c. Representative examples include, from West Africa, Old Kanembu and Kanuri (Bondarev, 2014) and Mandinka (Vydrin & Dumestre, 2014), and, from East Africa, Swahili (Luffin, 2014) and Chimi:ni (Banafunzi & Vianello, 2014). Some Afroasiatic languages, including for instance Kabyle Berber, also marked vowels fully (Souag, 2019) (see below).

(18) Old Kanembu, Kanuri

- a. Around Lake Chad. Manuscripts, late 18th to early 20th century. Orthography not standardised across/within manuscripts, relies substantially on speaker knowledge. Consonants and vowels are both significantly underrepresented.
- b. Some letters reassigned to Kanembu/Kanuri sounds in a one-to-one fashion (Ar. ث /θ/ to Ka. /ts/; Ar. غ /ɣ/ to Ka. /g/). Some one-to-many (Ar. ج /ʒ/ to Ka. /dz, dʒ, ndz, ndʒ/); prenasalisation stops often unwritten. No orthographic /o, u/ distinction (comparable to some Arabic varieties), but, for high tone, /ó/ optionally distinguished from ambiguous /ó, ú/ sign.
- c. The three-tone system is underrepresented by a two-way graphic distinction, repurposing /ʔ, w, y/ from vowel length into tone marking (high/falling).
- d. Despite mismatches, these writing systems invested in obligatory vowel marking rather than expansion of the consonant inventory, as is graphically obvious from the numerous diacritics in the examples below (Bondarev, 2014, 121, 131, 133–4).

/šīn al-ḥabīb non bibireyu adbolarey demandare/
'Without my lover I will not live; I will fly away to seek [him].'

- c. Several vowels are unrepresented. Yet *matres lectionis* more used than in Hebrew, both in variety (⟨ʔ⟩ is used for both /a/ and /e/) and in extent (the prepenultimate use of vocalic ⟨ʔ⟩ is un-Hebraic; /kōkābīm/ 'stars' is never written with ⟨ʔ⟩ for /a/).
- d. The written vowels are towards the end of the word, where Romance stress is typically located—precisely where Semitic *matres lectionis* had first taken hold more than 1500 years earlier (Cross & Freedman, 1952).
- e. A later Romance text in Arabic script, from the early 15th century or before, is fully vowelized, like the African writing above; Martínez Ruiz 1974.

(23) Correlation

- a. Within Afroasiatic: minimal vowel increase
- b. Beyond Afroasiatic: substantial vowel increase
- c. Initial indications from a statistical project (that fell victim to lockdown) are that the correlation is significant—and that (25), not (24), is implicated.

(24) Why?

- a. Shortfall in donor vowels? Probably not. Hebrew to Judeo-Spanish. Arabic to Mandinka. Phoenician to Greek.
- b. Shortfall/mismatch in donor consonants? Probably not. Hebrew to Yiddish. Aramaic to Sogdian. Nabataean to Arabic, Arabic to Persian. (Willing to invent consonants, abandon useless ones.)
- c. Mismatch in syllable inventories (higher frequency of vowels in adapting languages)? Probably not. Aramaic, Arabic, Hebrew, Phoenician syllable structure is in general as or more restricted than in adoptive languages (Berber, Greek, Sogdian, Yiddish).

(25) Hypothesis: morphosyntax, not phonology

- a. Vowels encode morphosyntactic information in Afroasiatic languages.
- b. The morphosyntactic information is omissible because:
 - (i) Language-wide factors constrain the search space for missing vowels;
 - (ii) Morphosyntax constrains it further;
 - (iii) Recoverable from consonants alone (with minor ambiguity);
 - (iv) For unresolvable cases, the written language approximates morphologically impoverished language, i.e., one that is grammatically legitimate structure for a language.

(26) False start

- a. Vowel-reduced writing does not conduce ambiguity in Afroasiatic languages?
- b. p-r-t vocalises in many more ways in English than in Hebrew:
 - (i) part, pert, port, prat, prate, parrot, pirate, pyrite, pirouette
 - (ii) *prat* 'detail', *peret* 'list, to detail', *parat* 'to break', *porat* 'to be detailed'
- c. However, counterbalancing: many triplets of English consonant phonemes admit only one vocalisation (/m-ɔ̄-k/, /p-k-l/, /r-ð-m/, /θ-k-n/). In Hebrew, however, nearly every three-consonant string is subject to multiple vocalisations. The question is whether, cumulatively, ambiguities in a system like Hebrew outnumber those of languages like English.

(27) Crellin (2018)

- a. Levels of ambiguity in two languages that more or less recreate one of the crucial transmissions of writing beyond Afroasiatic, Old/Classical Greek and, as a proxy for Phoenician, Biblical Hebrew.
- b. Rewrite Greek texts as per Hebrew norms (glottal stop for initial vowels, glides for others, and yet

others, and geminate consonants, unmarked). Ambiguity measure: the product of types and tokens for each consonant string in the first 80,000 words of each text. Second experiment: vowel length ignored. Under both conditions, eight most frequent C-strings were counted.

- c. In both, ambiguity without vowels was higher in Hebrew, the language that managed without writing them. Only for the frequent items in the second (no length) experiment is Greek more ambiguous than Hebrew (by about 10%). In all other measures, Hebrew is the more ambiguous, at times by a much greater factor (50–100%). Crellin concludes that the Greek coining of vowels cannot have been to escape unacceptably high levels of ambiguity.

	Frequent	Total	Frequent	Total
Hebrew (Pentateuch)	91278	280180	77910	248288
Greek (Pentateuch)	56916	140325	48657	121853
Hebrew (Judges)	103177	315650	85418	275729
Greek (Herodotus)	93035	212666	93260	227089
Greek (Xenophon)	89148	212098	96159	224733

(28) Consonantal roots

- a. Sampson 1985, Coulmas 2003, inter probably many alia: much lexical meaning in Afroasiatic languages is carried by consonants. ‘read’ (q-r-ʔ) versus ‘write’ (k-t-b), inheres entirely in consonants. Vowels and further consonants encode whether an occurrence of these roots is nominal, verbal, etc.; if verbal, whether finite; if finite, whether active or passive; and so on.
- b. Oversimplification: consonantal roots carry all lexical meaning, omission of vowels preserves all lexical meaning. Arad 2005: lexical meaning = consonantal root + vocalic pattern. s-p-r means ‘count’ with vowels -a-a-, but ‘tell’ with vowels -i-e-. All templates derived from -a-a- and -i-e- preserve the meanings of ‘count’ and ‘tell’, respectively (e.g., *sfira* ‘counting’, *sipur* ‘story’). The pattern -i-e- no more derives ‘tell’ from s-f-r than the prefix *er-* derives *erzählen* ‘tell’ from *zählen* ‘count’. Thus, underrepresentation of vowels is not undetrimental to lexical meaning in Afroasiatic languages.

(29) Limiting the search space I: language-wide factors

- a. Afroasiatic morphology uses a limited number of vowel templates: -o-u- possible in English (*bonus*, *chorus*, *nodule*), but not in Hebrew; -i-i- is highly limited in Hebrew (e.g., *ḥiriq*, name of /i/ diacritic), but unremarkable in English (*limit*, *lipid*, *visit*).
- b. Afroasiatic facilitates resolution of the ambiguity by limiting the search space.

(30) Limiting the search space II: morphosyntax

- a. Syntax restricts the search space further:
 - (i) -e-e- pattern is restricted to nouns (*qešer* ‘knot’, *peret* ‘list’, *sefer* ‘book’, *gefen* ‘vine’);
 - (ii) -a-u- is confined to adjectival participles (*qašur* ‘fastened’, *gamur* ‘completed’, *barux* ‘blessed’);
 - (iii) -a-i- excludes verbs (*qašir* ‘connected’, *ragil* ‘regular’, *nagiš* ‘accessible’).
- b. Syntactic cues as to category may come either from word order (in a verb-initial language, a verbal pattern is likely at the start of a sentence) or from context (a nominal pattern is more likely in the direct vicinity of determiners or adjective, or after the clitic prepositions ⟨b⟩, ⟨k⟩, ⟨l⟩).

(31) Further facilitation: from affixal C to root V

- a. Many languages: affixal consonants enable a reader to predict affixal vowels. English ⟨fxng⟩ is to be read as /f-x-ng/. Clearly, root f-x and affix -ng. Affixal consonants determine the affixal vowel:

/f-xing/. But no handle on the root vowel: /faxing/, /fixing/, /foxing/.

- b. Afroasiatic: affixal consonants frequently provide (near) unambiguous cues to all unwritten vowels, whether affixal or internal to the root.
- c. In a nominal context, tCCct is read as tiCCoCet (with /i/ changing to /a/ for some consonants):

תזמרת	⟨tzmrt⟩	/tizmoret/	‘orchestra’	<	/tizmer/	‘orchestrate (v)’
תכתבת	⟨tkbt⟩	/tixtovet/	‘correspondence’	<	/tiktev/	‘dictate (v)’
תרשמת	⟨tršmt⟩	/tiršomet/	‘details’	<	/tiršem/	‘outline (v)’
תחבשת	⟨tqšrt⟩	/taxbošet/	‘bandage’	<	/tixbeš/	‘bandage (v)’

- d. Similarly, hCCCh is read as haCCaCa:

הסברה	⟨hsbrh⟩	/hasbara/	‘explanation’	<	/hisbir/	‘explain’
הזהרה	⟨hzhrh⟩	/hazhara/	‘warning’	<	/hizhir/	‘warn’
הקדמה	⟨hqdmh⟩	/haqdama/	‘introduction’	<	/hiqdim/	‘introduce’

- e. Monoconsonant affixes often leave residual ambiguity. For instance, nCCC can be either third person masculine singular past “passive”, niCCaC, or first person plural future active, nCaCeC. Similarly, mCCC can be a nonagentive nominal, miCCaC, or an agent nominal / present participle, mCaCeC, amongst other patterns.

נקשר	⟨nqšr⟩	/niqšar/	‘it was tied’	מחקר	⟨mxqr⟩	/mexkar/	‘research (n)’
		/nšaqr/	‘we will tie’			/mxaker/	‘researcher/ing’
נשבר	⟨nšbr⟩	/nišbar/	‘it was broken’	מספר	⟨mspr⟩	/mispar/	‘number’
		/nšaber/	‘we will break’			/msaper/	‘narrator/ing’
נלמד	⟨nlmd⟩	/nilmad/	‘it was learned’				
		/nlamed/	‘we will teach’				

(32) Vowel-reduced is morpheme-reduced

- a. Residual ambiguity often concerns functional vocabulary. E.g., ambiguity between ‘research’ and ‘researcher’ amounts to the neutralisation of morphological derivation, making an agentive noun identical to what such agents produce. Many languages would not make such a difference to begin with.
- b. E.g., /šiber/, /šivar/. Active, passive of the same verb, ‘break’. Without vowels: both ⟨šbr⟩. Cf, English causative/inchoative alternation: *I broke it* versus *it broke*.
- c. Three parallels:
 - (i) Artificial language learning
 - (ii) Invention of writing
 - (iii) Transmission of writing

(33) Artificial language learning paradigm

- a. Expose experimental subjects to data from a fictitious language, induce them to extrapolate beyond what they are taught.
- b. Learners often converge on typologically common systems even though neither their native tongue nor the data they have been given overtly biases them to (Martin et al., 2019).
- c. Cf, early writers of Afroasiatic languages: writing system was akin to an artificial language of a more common typological ilk, namely, one with less morphology.

(34) Chinese parallel

- a. Words with different meaning and pronunciation, related by now defunct derivational processes (Baxter & Sagart, 2014), but not orthographically distinguished
- b. 乘 was both /Cə.ləŋ/ ‘drive’ and /Cə.ləŋ-s/ ‘wagon’ (modern *chéng* and *shèng*, respectively).

- (35) Chinese/Japanese parallel
- a. Early Japanese writing was syntactically Chinese. The reader was expected to supply missing Japanese morphemes on the fly.
- (36) Sumerian parallel
- a. Large amounts of morphology were only sporadically written for several centuries. E.g., *The Instructions of Šuruppak* (Alster, 2005, 176, 180): two copies, several centuries apart.
 - b. The “standard Sumerian” of Nippur, Ur, Kiš, and Susa marks ergative, possessive, dative, object agreement, and imperfective.

šuruppak-^{ki}- e dumu-ni- r na na- mu- n- ri- ri
 šuruppak-CITY-ERG child- his-DAT “instruct” PVB-VENT-3SGO-lay-IMPF_{RED}
 ‘The Man from Šuruppak gave instructions to his son.’
 - c. Absent from the Abū Šalābikh (Early Dynastic) version even though the sentence recorded is taken to be the same:

šuruppak dumu na na- mu- ri
 šuruppak child “instruct” PVB-VENT-lay
 ‘The Man from Šuruppak gave instructions to his son.’
 - d. The representation of morphology was largely mnemonic in Sumerian, aiding the fluent speaker/reader, not aiming at high-fidelity recording of the language. Underrepresentation of functional material creates a writing system that is simply a language of a different grammatical type, but a legitimate one.
- (37) Tables turned: lexically ‘lossy’ orthography in Afroasiatic
- a. Akkadian adoption of Sumerian writing, which routinely omitted coda consonants.
 - b. When used phonetically (rebus writing), ⟨kuš⟩ could stand for /ku(C)/, ⟨gub⟩ for /gu(C)/. With other devices to clarify meaning, Sumerians felt this to be unproblematic.
 - c. Akkadian initially went for largely phonetic orthography. Coda convention posed a problem: /iprus/ ‘separate’ (root p-r-s plus template i--u-), written ⟨i.ru⟩. Erases most of root.
 - d. Akkadians adopted the convention of writing /CVC/ as ⟨CV.VC⟩, expanding the inventory and use VC already available within Sumerian.
- (38) Berber III (Kabyle Berber)
- a. In contrast to the Berber varieties in Souag 2014, Kabyle Berber (Souag, 2019) is fully vocalised in a range of orthographies. Some prior to European influence. Sociological factors cannot be discounted: diacritics distinguished Berber script from secular Arabic (Souag, p.c.), or Quranic Arabic may have been taken as a model. However, linguistic factors may also be at play that may limit the viability vowel-reduced writing in Kabyle Berber. Souag (p.c.) suggests two.
 - b. Afroasiatic grammar is not uniform. The extent of intercalating templates, as opposed to the crosslinguistically more common concatenating, varies. Berber may be more like a non-Afroasiatic language in the relevant respects. — Interesting to examine, e.g., Hausa, Ge’ez.
 - c. Several roots consonants do not emerge phonetically in Kabyle Berber. E.g., ʔ-r-β ‘write’: *y-aru* ‘(that) he write’ (< y-ǎʔrǔβ), *y-ura* ‘he wrote’ (< y-ǔʔrǎβ). — Hebrew *matres lectionis* emerged towards the word end, where consonants were prone to loss.
- (39) Conclusion
- a. Vowel writing:
 - (i) remains most constant when systems are passed within the Afroasiatic family; and

- (ii) increases most when an Afroasiatic writing is adapted to a non-Afroasiatic language.
 - (iii) The ‘sudden’ mass innovation of vowels, whether via diacritics, letters, or syllabograms, appears exclusively within non-Afroasiatic systems, like Brāhmī, Greek, Iberian, Kharoṣṭhī, and Meroitic.
 - b. The driving force behind vowel writing expansion is morphosyntactic:
 - (i) Only Afroasiatic languages structure their lexical and functional vocabulary such that removal of vowels minimally affects lexical vocabulary and amounts, on the whole, only to impoverishment of functional vocabulary.
 - (ii) Supported by other writing systems that underrepresented functional vocabulary.
 - c. Grammar is, therefore, a key force that shapes the evolution of writing systems.
- (40) Speculation
- a. The alphabet as the logical, even teleological, end of writing system development: a radical misreading of grammatical history.
 - b. With one exception, when writing systems have invested in phonetic devices (that is, sound rather than meaning-based writing), the unit of investment has been the syllable: pristine writing systems (Sumerian, Egyptian, Mayan), their descendants (Akkadian, Meroitic, Japanese), adoptions of the idea of writing but invention of a new system (Linear B, Cree, Vai). The exception is Egyptian.
 - c. A syllabary for a language unconcerned with vowel writing is, simply, a consonantal alphabet. Passed onto unrelated languages, in which vowels and consonants have more equal status, the consonantal alphabet acquires vowels.
 - d. So, alphabets are a highly contingent accident of history. At the right time, a language of the right grammatical type, innovated a writing system, that was then simplified by speakers of a related language, before being passed to speakers of others who invested in complete vowel writing. Had different peoples been involved, writing might never have become more finegrained than the syllabary.

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