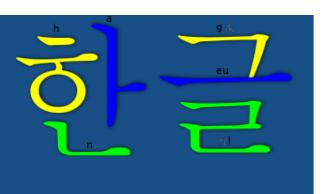
History of Information

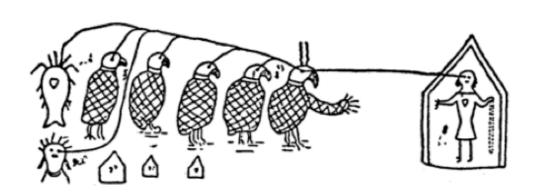
Writing Systems: The First "IT"





Geoff Nunberg

IS 103
History of Information
Jan. 26, 2017



Bancroft Tour

Sign up on google docs form on bcourses.

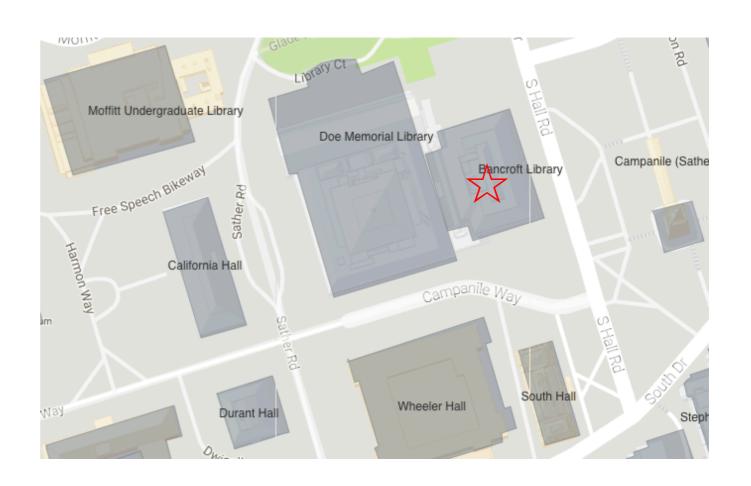
Mon Jan 30, 2:00-3:00

Tues Jan 31, 2:00-3:00

Weds Feb I, 10:00-11:00 & 12:00-1:00

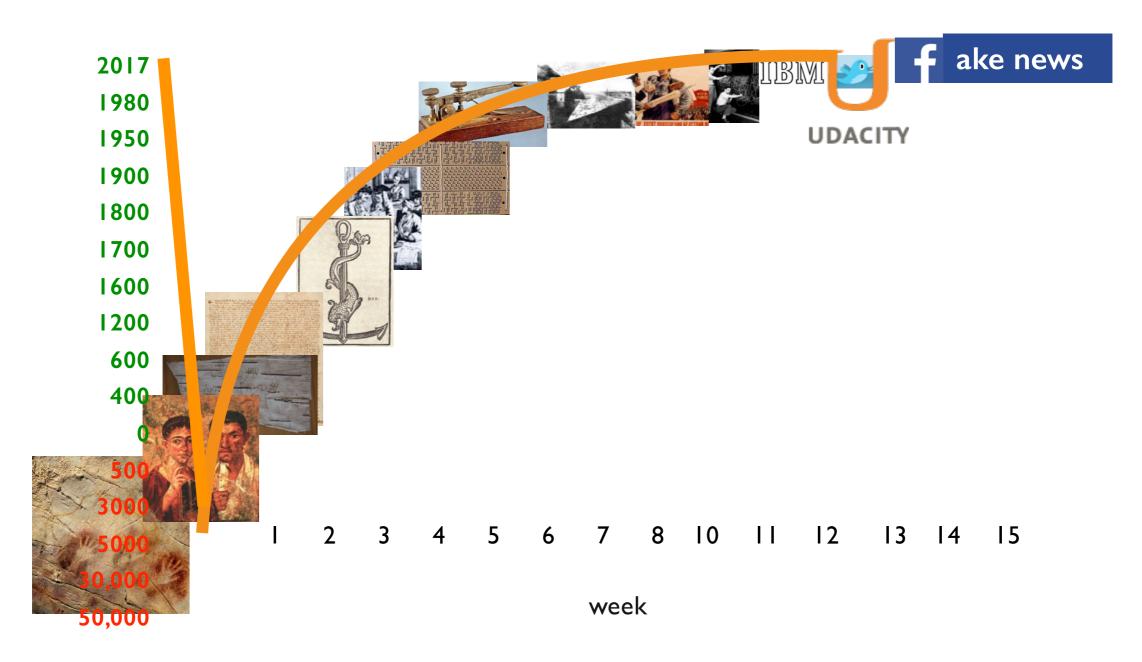
Thurs Feb 2, 12:30-1:30

Note: only paper & pencil allowed; bring quarters for locker.



History of Information

The Journey Begins



Itinerary, 1/26

The Dawn of Information
The Emergence of Representation
The Variety of Signs
Origins and Development of Writing
Systems
Types of Writing Systems
Independent Inventions of Writing Systems

History of Information

What kind of "information" has a history?

The Beginnings of Information

The Emergence of Representation

The Variety of Signs

The Origins and Development of Writing Systems

Types of Writing Systems

Independent Inventions of Writing Systems

... it's always there when we look for it, available wherever we bother to direct our attention. We can glean it from the pages of a book or the morning newspaper and from the glowing phosphors of a video screen. Scientists find it stored in our genes and in the lush complexity of the rain forest. The Vatican Library has a bunch of it, and so does Madonna's latest CD. And it's always in the air where people come together, whether to work, play, or just gab.

What is it that can be so pervasive and yet so mysterious? Information, of course.

John Verity in *Business Week*, special number on the "Information Revolution," 1994

History of Information

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The Emergence of Representation

The First "Information System": Language



Psamtik I, 654-610 BCE



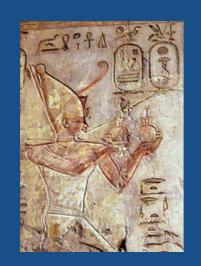
James V of Scotland

The Egyptians...believed themselves to be the most ancient of mankind....This king contrived the following method of discovery: He took two children of the common sort, and gave them over to a herdsman to bring up at his folds, strictly charging him to let no one utter a word in their presence, but to keep them in a sequestered cottage... His object herein was to know... what word they would first articulate. ...

The herdsman obeyed his orders for two years, and on one day opening the door of their room, the children both ran up to him with outstretched arms, and distinctly said "Bekos." ...He informed his lord, [who then] learnt that "bekos" was the Phrygian name for bread. In consideration of this circumstance the Egyptians yielded their claims, and admitted the greater antiquity of the Phrygians.

Herodotus, Histories, 2.2

The First "Information System": Language



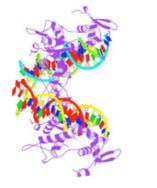
Psamtik I, 654-610 BCE

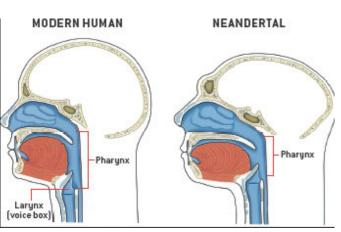
Early theories: "bow-wow," "uh-oh," "pooh-pooh," etc.

1886: Linguistic Society of Paris forbids "toute communication concernante l'origine du langage" [All papers dealing with the origin of language]

The First "Information System": Language

FOXP2 gene







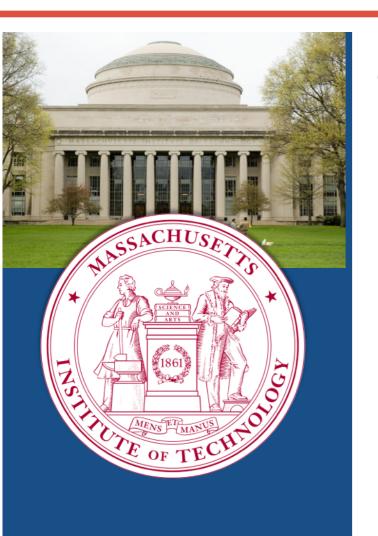
Was development of language gradual or sudden?

Homo erectus (1.5 m years)? Homo sabiens (ca 100-150k years)?

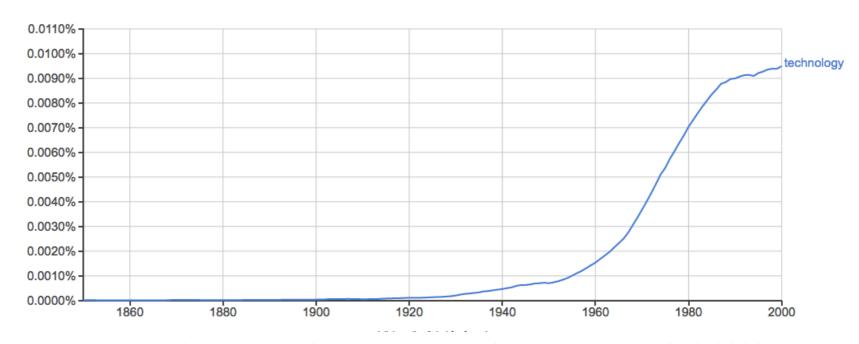
Homo erectus (1.5 m years)? Homo sapiens (ca 100-150k years)? But surely by 60k BP

"The momentum we see in cultural revolution after [the dispersion] was no longer genetically based... Darwinian evolution in the genetic sense continued, and underlies the rather superficial differences that are observed between different racial groups today... but the newly emerging behavioral differences between the groups were not genetically determined. They were learned, and they depended on the transmission of culture." Colin Renfrew

Representational Artifacts: Displacing Representation



On "technologies" of information



Relative frequency of 'technology' in Google Books, 1850-2000

Technology: artifacts, systems, settings

History of Information

The Varieties of Signs

The Beginnings of Information

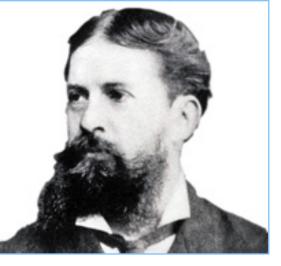
The Emergence of Representation

The Variety of Signs

The Origins and Development of Writing Systems

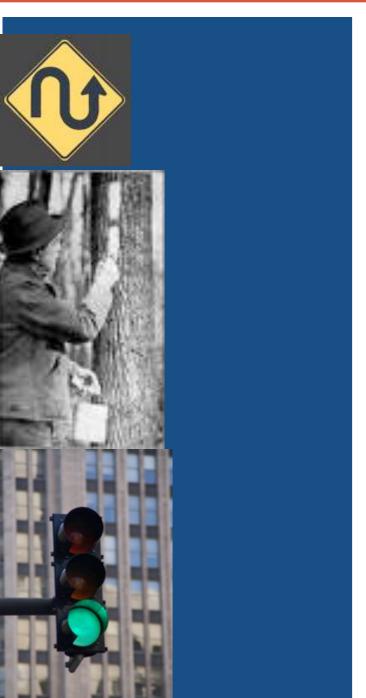
Types of Writing Systems

Independent Inventions of Writing Systems



Charles Sanders Peirce

The Varieties of Signs



3 Types of signs (after Charles Peirce):

Icon: sign resembles signified

Index: sign connected to signified

Symbol: sign conventionally attached to signified

The Varieties of Signs



Icon: sign stands in relation of resemblance or similarity to signified (though often only roughly).









The Varieties of Signs: Indexical



Index: stands in causal/spatial relation to the signified (pawprint to bear, blaze on tree to act of marking)







The Varieties of Signs



Symbol: Arbitrary relation between sign and thing signified





tree

(vs arbre, Baum, shù, namu etc)

The complexity of Signs



Many signs combine several types

History of Information

Early Indexical Signs

The Beginnings of Information

The Emergence of Representation

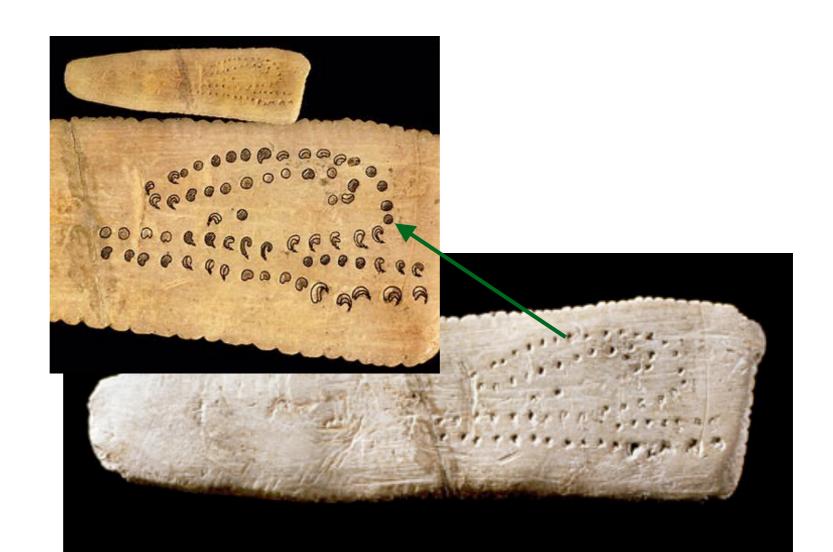
The Variety of Signs

The Origins and Development of Writing Systems

Types of Writing Systems

Independent Inventions of Writing Systems

"... whereas notations of whatever sort were apparently means of recording the passage of time in terms of culturally significant events." Marshack



History of Information

Early Indexical Signs

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Types of Writing

Systems
Independent
Inventions of
Writing Systems

Earliest signs are mnemonics for record-keeping, genealogy, etc. (Tallying systems) upper paleolithic

"The first step in data processing" Denise Schmandt-Besserat



Notched Bone, England, upper paleolithic, 12,000 years old



Notched Bone, Turkey, ca 3000 BC

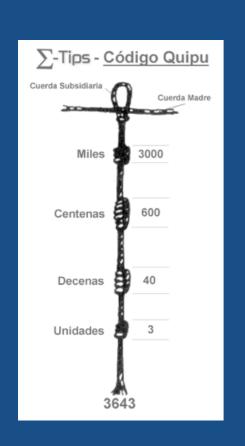


Notched bone, Congo, ca. 25,000 BC -- may. represent lunar calendar

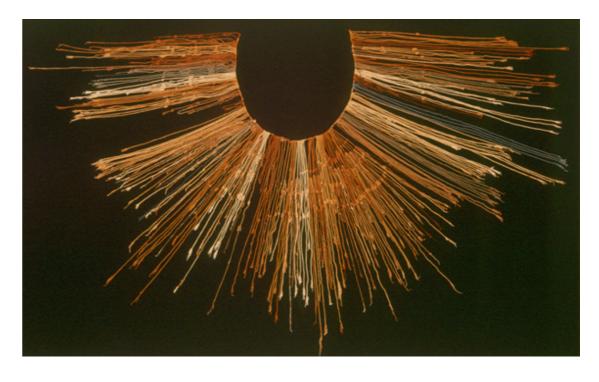


Elaborated Indexical System: The Inca qipu

Knots of varying colors in llama or alpaca hair







Early iconic signs



Rock carving, Hong Kong (Kau Sai), 3000 BC



Petroglyphs, Bhimbetka, India, 9000 BC

"Images and symbols... were markers of periodic and continuous cultural processes, of rites, and of repetitive myths and stories..."

Alexander Marshack

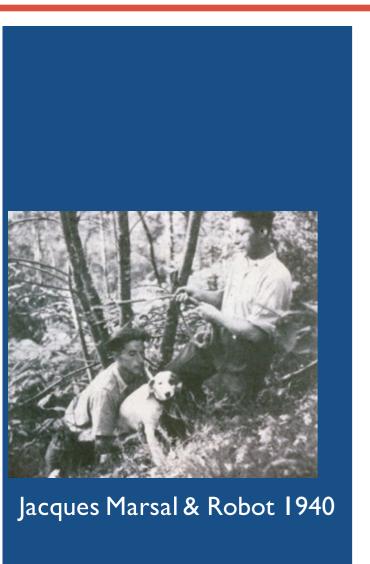


Spotted Horses Peche Merle, France





"The Sistine Chapel of Prehistoric Art"



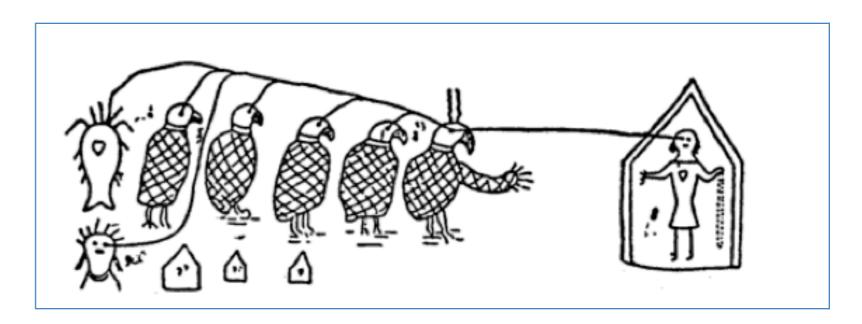
Cave paintings, Lascaux, France: ca 15-13,000 BC



The Origins and Development of Writing Systems



Pictographic (Iconic) Communication Systems



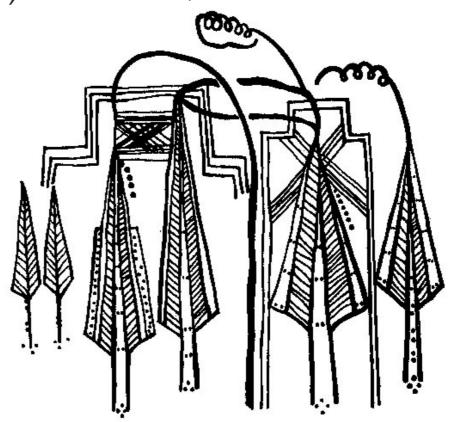
"Letter of credence" presented by Chippewa delegation to Washington, 1849

"The chief salutes the president, and his warriors belonging to the eagle and catfish totems are in harmony with him and are willing to accept the white man's ways."

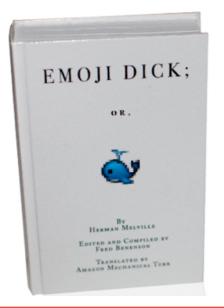
History of Information

Pictographic Systems

Yukaghir (Siberia) "love letter," late 19th c.

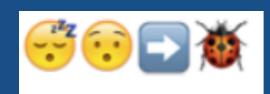


"I know you're fighting with that Russian girl you broke up with me over. I'm unhappy in my house as I think of you, but you should know there's another guy hitting on me, so get your act together before I get married and have children."



Abstraction in pictographic systems





Extending pictographic systems to deal with abstract or relational notions. E.g., "brother," "go," etc.

Form signs for abstract entities by extending or combining signs for concrete things (ca. 3300 BC)

foot = "go, come, walk, etc."

person + mountain = "foreigner"

eye + water = "weep," "sad," etc.

Cf modern use of "metonymic" icons

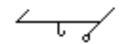




John Wilkins' universal language



Explaining the symbol



The generic character this ignify the genus of space, the acute angle on the left side doth denote the first difference, which is Time. The other affix signifies the ninth species under the differences, which is Everness. The Loop at the end of this affix denotes the word is to be used adverbially; so that the sense of it must be the same which we express by the phrase, For Ever and Ever.

John Wilkins "'An Essay Towards a Real Character and a Philosophical Language' 1668

History of Information

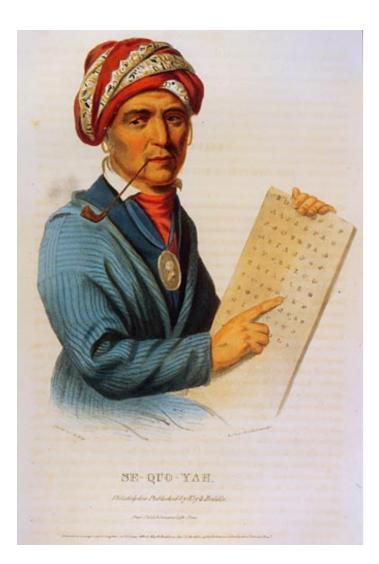
The limits of ideographic/semasiographic systems

Semasiographic/ideographic system: symbols stand directly for ideas, not for words of a language.

Cf mathematical notation: $10^9 = 1,000,000,000$

But language-independent systems appear inadequate to express the full range of thoughts & information

The origins of writing



Sequoyah (George Gist) (c.1770—1843

The Beginnings of Information

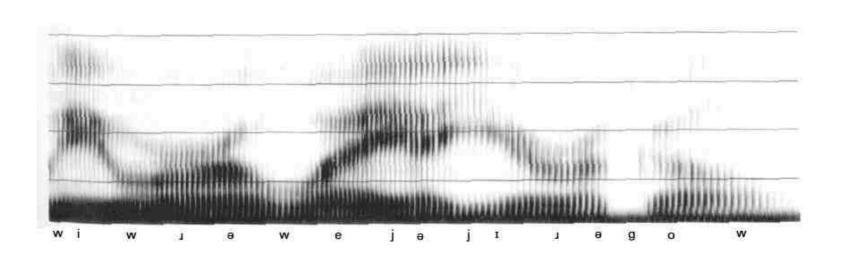
The Emergence of Representation

The Variety of Signs

The Origins and Development of Writing Systems

Types of Writing Systems

Independent Inventions of Writing Systems



wiyw3rə'weyə'yirəgow

"We were away a year ago"

The Beginnings of Information

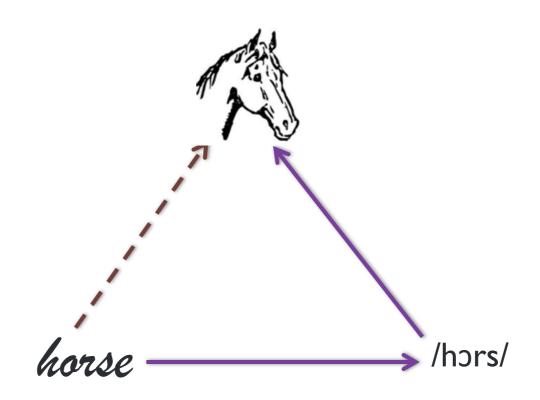
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True Writing: symbols represent elements of language rather than directly representing things in the world.

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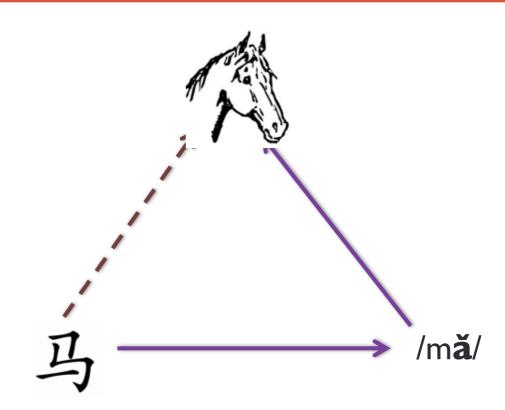
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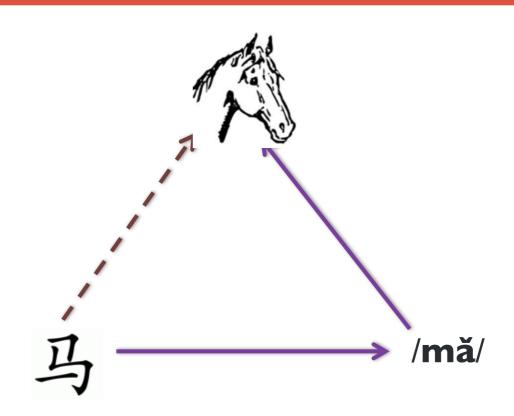
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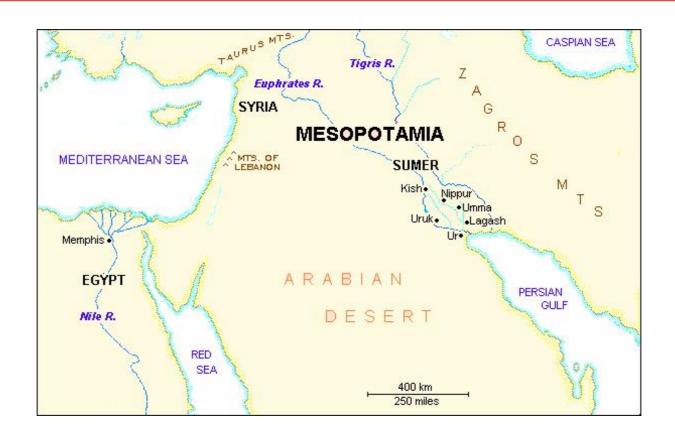
Independent Inventions of Writing Systems



True Writing: symbols represent elements of language rather than directly representing things in the world. i.e. true writing is GLOTTOGRAPHIC

Contrast "5" vs five, cinque, fünf, wů, etc. "\$" vs "dollars," etc.

Origins of Writing in Sumer



Origins of Writing in Sumer

8-5000 BC -- earliest use of clay tokens.

4,000 BC -- earliest clay bullae

3500-3300 BC -- earliest clay tablets from Uruk.







Bullae and tokens

Early cunieform

Tokens as origins of Sumerian writing?



Figure 7 Pictographic tablet from Uruk, Iraq, late fourth millennium B.C. The account in the upper central case, for example, shows the sign for sheep and five wedges standing for the abstract numeral 5. Courtesy Vorderasiatisches Museum, Staatliche Museen zu Berlin, East Germany.

Evolution from Token to Cuneiform Writing										
Token	Pictograph	Neo-Sumerian/ Old Babylonian	Neo-Assyrian	Neo-Babylonian	English					
*	$\oplus \oplus$	田	胆	胀						
	00	<>	(<>	Cattle					
4		准阻		KI-MI	Dog					
dib			√ 17	4						
9	\Diamond	命	年	4	Oil					
	0	運		<u> Ir</u>	Garment					
•	•	(受烊	得	Bracelet					
9		金鱼	-Itt	ATT	Perfume					

The Origins of "complete" writing

The Beginnings of Information

The Emergence of Representation

The Variety of Signs

The Origins and Development of Writing Systems

Types of Writing Systems

Independent Inventions of Writing Systems

Glottographic system: signs denote words/signs of the language

But how to signify "abstract" words? Creation, after, but, believe, faithful, if, etc.

Metaphoric extension (cf extended meanings of head, hand, foot, etc.)



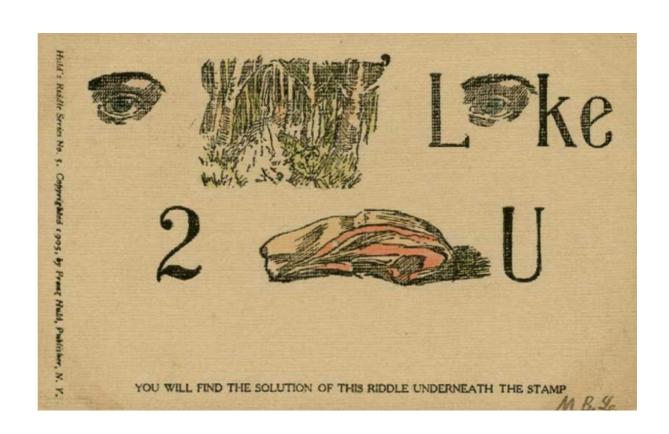
The Rebus Principle





carved in wall of Exeter

Cathedral



Rebus: Icons of things that stand in for their (phonetic) names

Rebus principle leads to logographic system

The Beginnings of Information

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Rebus principle allows signs to be reutilized to signal abstract words, functional elements, etc. Signs stand directly for words

"water"
$$/a/ \rightarrow$$
 "in" $/a/$

oracle" /me/ → plural suffix /-me/

Cf English logograms &, \$, £, @

(primarily) logographic systems



Sumerian

Egyptian Hieroglyphs (logograms + determinatives – cf "funny ha ha")

Chinese

Japanese kanji



Logography to Syllabic System

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Logographs ultimately perceived as having purely phonetic value.

Cf English logographs – @, &, £, ¢ imagine the word h@b&

Texting: CU@*\$, ne14Xs?

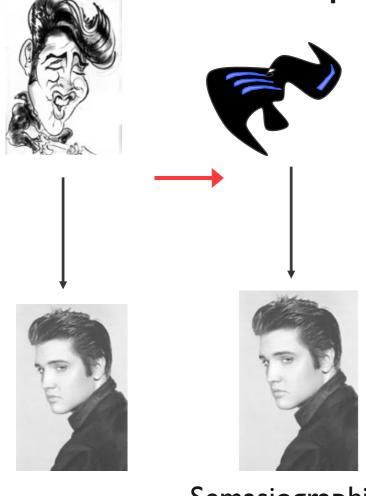
Signs come to stand in for syllables





Iconic

Simplification of sign



Iconic

Semasiographic/ ideographic

Proto-writing

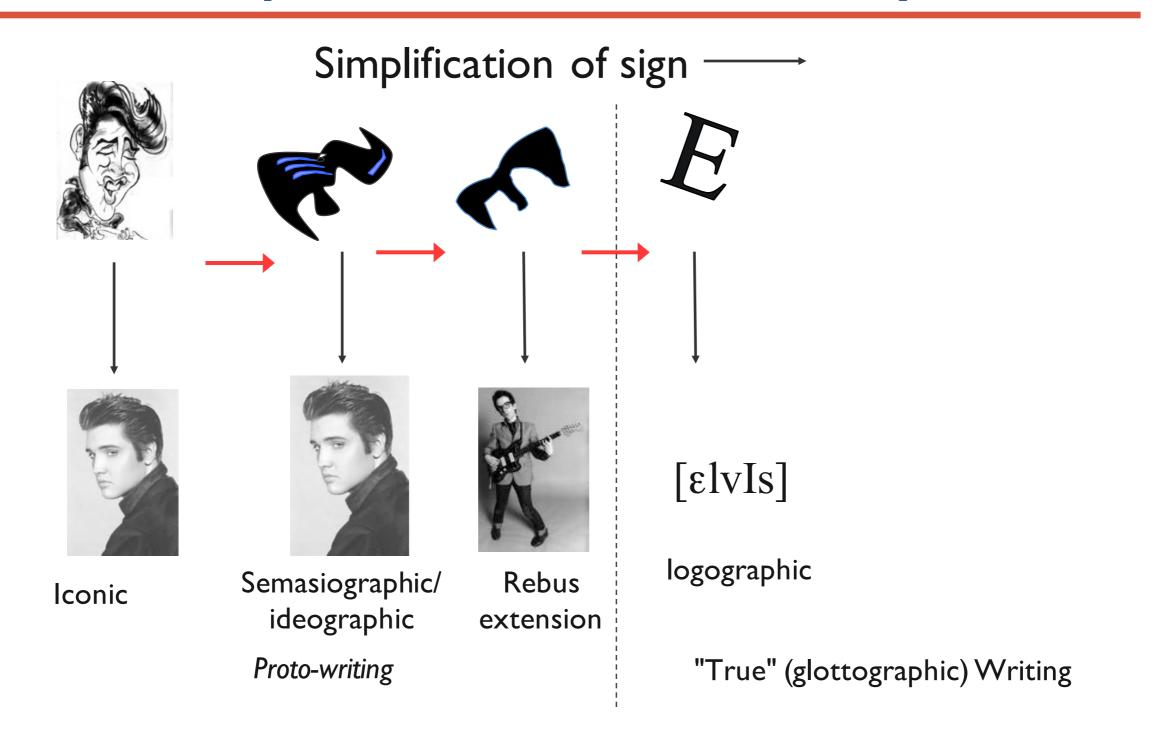
Simplification of sign

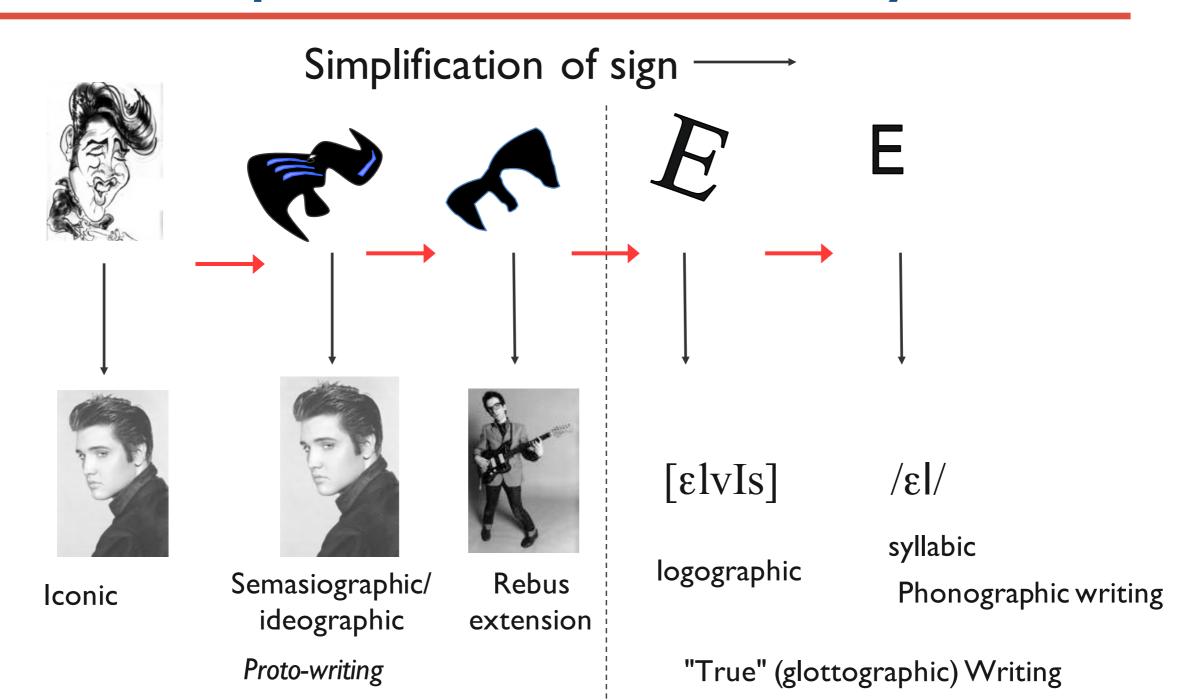
Iconic

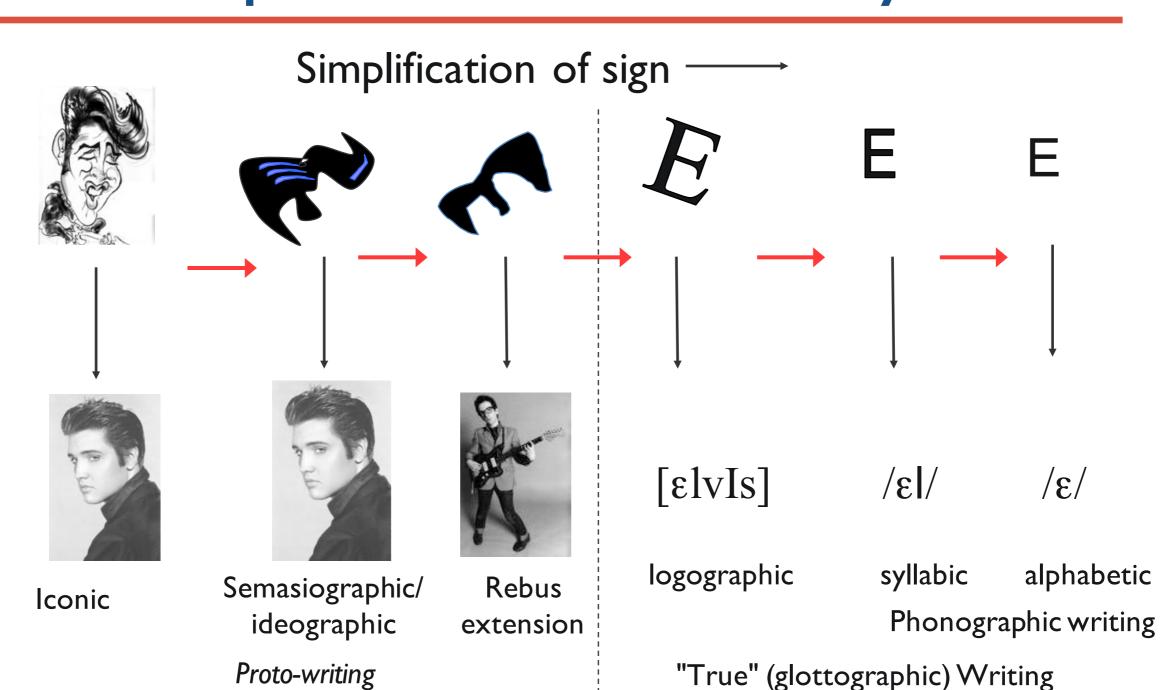
Semasiographic/ideographic

Rebus extension

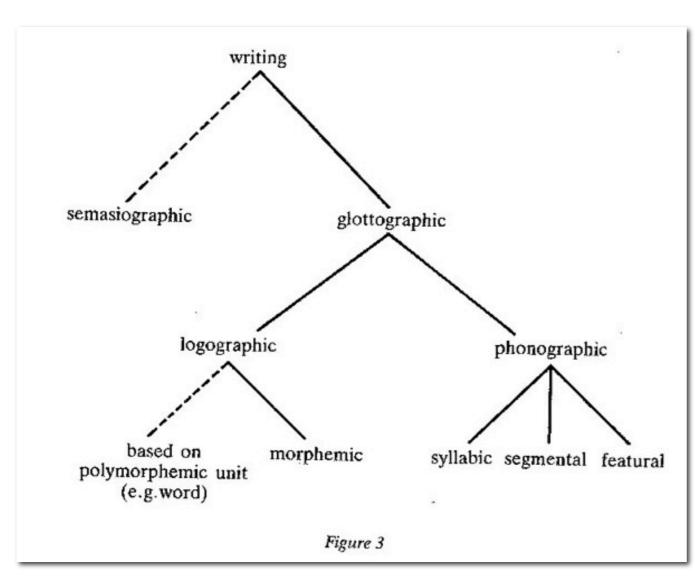
Proto-writing







Types of Writing Systems



Logographic: mod. Chinese (logosyllabic), Japanese kanji

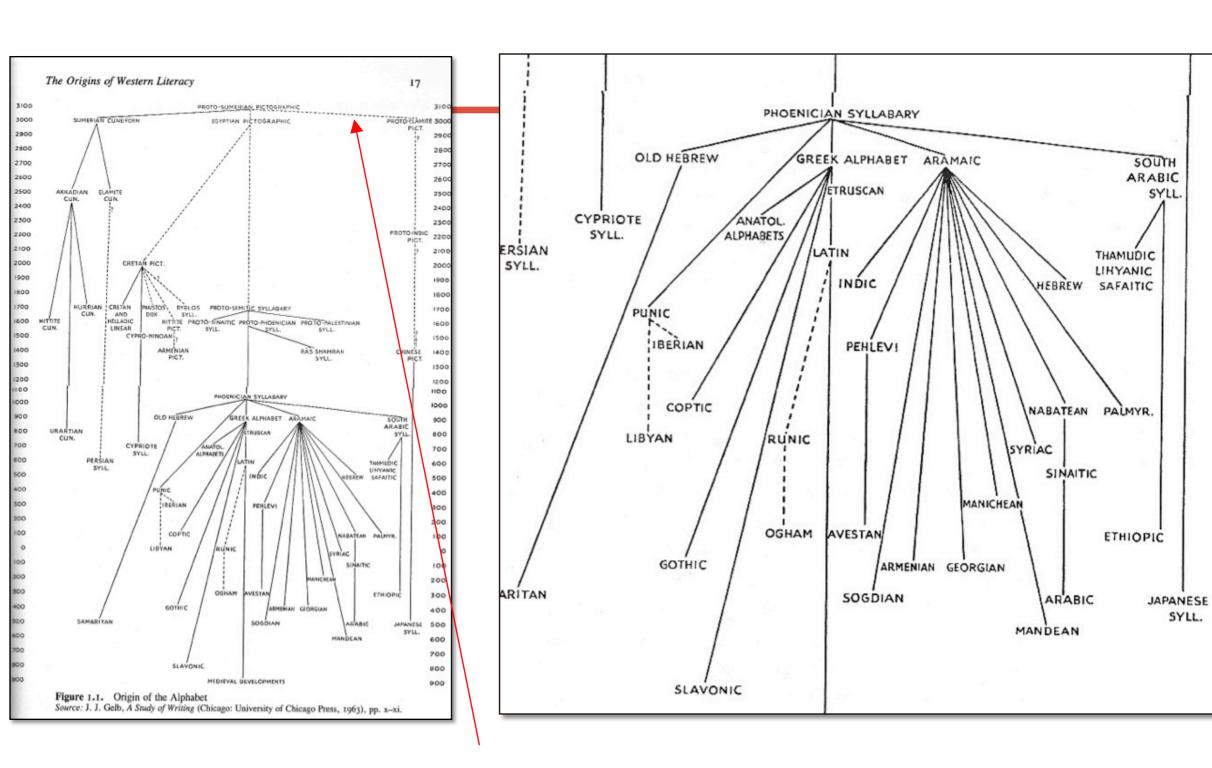
Syllabic: Phonecian, Linear B, Cherokee, Korean Hangul (featural), Japanese (hiragana & katakana), Bengali, Gujurati...

Alphabetic: Roman, Cyrillic, Gk, Hebrew, etc,

From Sampson, 1990

Genealogy of Writing Systems

SYLL.



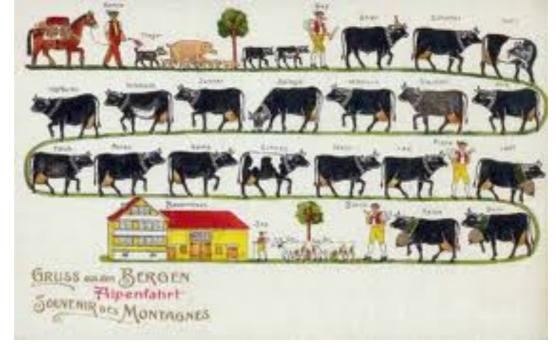
Later Developments

boustrophedon

OXIΔONAΦ
ĒMITOPMOK
OTZOJTAĢ

TPOKONNH
ALE:KAIYΠΟΚ
Α΄ΔΕ:ΚΑΙΥΠΟΚ
Α΄ΙΗΘΜΟΝ:ΕΣΠ
ΠΟΙΗΝΑΤΥΘ
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Later Developments



Subsequent development of further orthographic elements: word-spacing, punctuation, paragraphing, etc.

JESVSEVAGOANICESEXATVESPASCSHAEVENJITHE THANKACOVRAT FVEKAOTIAZA-VVJMOKTYVVJ TVEMMJVJETYTAVITIYEJVJFEACERVHT LAYICO.TICACNAPOTETCTOMARTHAHMINISTRKABATCEASARUSO VCROVNXVSEKATTE-ATSCOUPTENTATEVSCVJO MARTALERGOACE CEP TILKTERACTYN NGENTIJNARATPFIJIICIALRELIONZIEINNEXTIPE decrevactexterriticanplikismsvispepacseripietaombesim PLFITAESTEEXUNGEINTTOALEREATXALTERGOVENVOEXAGTSCTPUAL TIGIVIXIVAXXCARIORIII YVITERATOU LOTRALITIVRYI 9TVARCLOCON LENVIVONONXVENVITGRECENPATSAENZARVSETAALTUMESGTE GENTEL AIXINUTEMADECNONQUITA DECA ENTSPERRIMENTAL Adiviosidantolkelkiellonchiospersecadarcontileps NOTANDLES PELEGIZILENKOLEZPAZZINE BITTTONNILY MEGAZ CPVLGTVKACOSCACSCRVNCTILLANAPAVPACRESCNATOSCOPGERBA bectisnobliiscumficaviciononsestiperhaubenschogno VILLEROTZVKBAMVALTACKTMVAACTSTAVTATLOLICESTKETVENE ARVATNONAPROTEPRIESU = ETANT + O OSE AVILUZAR V O PUTA ER Ch -TTYVEOREUSCIAOUITAMORRIUISCPOGITAVKERUNIAHVIEMP RVTMCTPEJSSACEHCAOTVOVOTETLAKARVOTNATERFICHRENTY LVIA OYLVIIPROPYTCKILLX VOZ HTHONTCX VOT- 2 CTSNCTCKCd depantinies vo JESV. OCACLA . UVINERUM + SPES . VNZ . PONITENTIVO. PER. Macdalana . lackymas + PERATA . NOSTRA . dilvas .

Independent Invention of Writing Systems



Independent writing systems: The Cherokee Syllabary



Sequoyah [George Gist] and the "talking leaves": 1819

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Independently invented writing systems: the Cherokee Syllabary



VOL. I.

NEW ECHOTA, THURSDAY MARCH 6, 1828.

NO. 3.

EDITED BY ELIAS BOUDINOTT. PRINTED WEEKLY BY

ISAACH. HARRIS. FOR THE CHEROKEE NATION.

At 9250 if paid in advance, \$3 in months, or \$3 50 if paid at the end of the

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All letters addressed to the Editor, post paid, will receive due attention,

CWY JEAVON AD BEJECGA. POAGERA TAAP UN INCRAA 1-484. BOAR JACONJRY KTA DAP COURS PARA, TOX TEMOS DOLGARAL TOZ. PEP TOOA TE DEJORDAL, KT Dtq GOJEJ 1-42J. DTJAREZ TE YW DOJARI-RAI, C-YAT DSP C-OJEJI 1-4RJ. OWYZ OOR JACONJAY, WENT DOG COLEMN PARA TRADE, TOX TEMOS DO JAMPAJ. KTAZ DSP YW 65 02JBA

LAKE OF ARDENT SPIRITS.

U.IR DOJARNA.I.

Ma. Entron-In recently turning over the pages of a Magazine printed in the year

[CONCLUDED.] CONSTITUTION OF THE CHERO. KEE NATION,

Formed by a Convention of Delegates from the several Districts, at New Echola, July 1827.

ARTICLE VI.

Sec. 1. Whereas the ministers of the Gospel are, by their profession, dedicated to the service of God-and the care of souls, and ought not to be diverted from the great duty of their function, therefore, no minister of the Gospel, or public preacher, onEuca TEGOPALI SP4RA, De of any religious persuasion, whilst be continues in the exercises of his pastoral functions, shall be eligible to the office of Principal Chief, or a Seat in either house of the General Council.

Sec. 2. No person who denies the being of a God, or a future state of rewards & punishments, shall hold any office in the civil department of this Nation.

Sec. 3. The free exercise of religious worship, and serving God without distinction, shall forever be allowed within this Notion: Provided, That this liberty of conscience shall not be so construed as to excuse acts of licentiousness or justify practices inconsistent with the peace or safe-

Sec. 4. Whenever the General Counell shall determine the expediency of appointing delegates, or other public Agents, for the purpose of transacting business with the Government of the United States; the Principal Chief shall have power to recomniend, and by the advice and consent of the Committee, shall appoint and commission such delegates or Public Agents according-1813, my attention was attracted by a calthe rights of the citizens of this Nation. | 1-48.1.

GOOGPALI GIVY OUTS. [augaca]

1. ELF TALISHQUALARSON I DACKLEY, SOWI OVE DE SE ABABADA, E DEZ ASIM GINAALA of, day town Dhublay gotte hase sewa phonasy pr. if ore 25Wei Egobwiel ortel.

2. TON YOUNGE EN QUARTE O TP-4xt.1, De TABTE DE TSPSTP" IL PET CALPRIAL, IS DES DEAT 7.1 AP4R.I. DEGWY SPAIL

S. AD GWY TOAL, ONLEG AA TOUGH, DORF OUTSAL, GARF DOLO-DAR TOOPAL 1-42.15QW.; RAJNOOGPAL, ISSYNZO- OD KIE AY OLAJIES DE GWY AAS ER DIS LAIRY ECOPALALAL AFFRA

4. TOZ AGAG OPO TOWE ANT WOY ATSE DAPAPAL OLEGOA. De Chegga thata beer into SARY, OWYRYS DESCA INCAL THE LEAGUE OF YOUR OF PARTY OF D050-500Y, ABP 04" 40-711 3/7.1 P42.1. GRYZ OM RASH DAA 4L TEGOPALAL PROPERTA COOK EAS BY, ORY OUTGOADS DE MAY THA RESIZ OROGA JOSANNAL

shall so continue until altered or repealed | page apayage apageag name by the legislature, except where they are LE oc. th is Gurgas. temporary, in which case they shall expire at the times respectively limited for their duration; if not continued by act of the legis-

Sec. 13. The General Council may at any time propose such amendments to this Constitution as two thirds of each house shall deem expedient; and the Principal Chief shall issue a proclamation, directing all the civil officers of the several Districts to promulgate the same as extensivey as possible within their respective Districts, at least nine mouths previous to the next General election; and if at the first session of the General Council after such General election, two thirds of each house shall, by year and mays, ratify such proposed a- onner, AJEARAL PART 20000 mendments, they shall be valid to all intents and purposes, as parts of this Consti- FAAW TRO-A 0-24-24 0-014-07-A tution; Provided, That such proposed amendments shall be read on three several days, in each house, as well when the same are proposed, as when they are finally rat-

Done in Convention at New Echota, this twenty-sixth day of July. in the year of our Lord one thous ty seven; In testin

Delegates of C JNO. ROSS. 1 JOHN BALDI

each of us, hereus

Delegates of GEORGE LOWKET JNO. EROWN, EDWARD GUNTER.

Delegates of Coosquatee District. JOHN 5 ARTIN.

14. he: DSP opage To z ewy theog. 14m. I ad alooke, is out Ad Abdad, the ore-yewes Ja-WOY DEAGRAPAL. TEPAYEZO GPACE TAAP CLASIFIES OF SAT 2.1 read, the ore-saws: .mws Y SAKAL DAPAPAL.

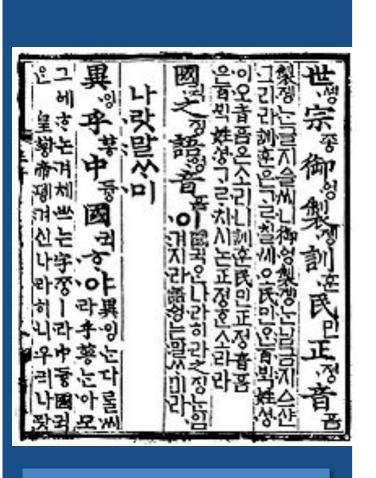
15. orgo velves dawny, Thy SOLTE ET TIME WIT BELARD, AD JOSCHAI SAGER DAPARAJ, OF hATRA PARA 9AP DOLOGAET. DAY OF OUR OCCUPA PARA CAP SY JOSELA STISS THE PARALLA, DE JAPR JAWEY, OZYZ WPA TAW" SPAJ OFG JAWEY, WP SOLTE KT TAKE WP LIBERAL DRAPEL Dhahalabal Tras linksy on AUT OF CAY ADOCTED hered SPAJ. KTAYBED JAMEP OBCK AJ P48J, SAGER DAPSPOJ, De

Cherokee Phoenix: First American Indian newspaper (1828)

> A.I. share. JYCAN PRATAK MITT,

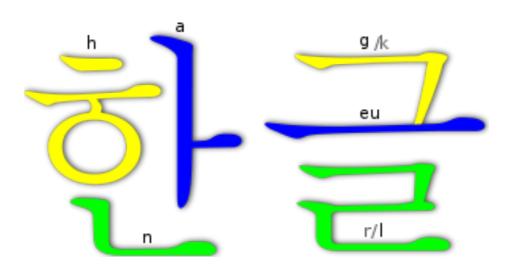


Independently invented writing systems: Korean Hangul



Hunmin Jeong-eum Exemplar (1446): Earliest Hangul text

Writing system invented in mid-15th c. to replace hanja (Chinese-based writing system). Invention credited to King Sejong ("the Great"), who introduced it to increase mass literacy



The word 'hangeul' in hangul

Readings for 2/3

Havelock, Eric, "The Greek Legacy," in David Crowley, ed. Communication in History: Technology, Culture, Society. Allyn & Bacon. Pp. 55-62.

Gough, Kathleen. 1968. "Implications of literacy in traditional China and India," In Goody, Jack (ed.). Literacy in Traditional Societies. Cambridge: Cambridge University Press, 44-56.

Additional Materials

Scribner, Silvia and Michael Cole. 1988. "Unpackaging Literacy." Social Science Information, 17, 1

All online

Assignment for 1/31

Havelock writes:

The introduction of the Greek letters into inscription somewhere around 700 B.C. was to alter the character of human culture, placing a gulf between all alphabetic societies and their precursors. The Greeks did not just invent an alphabet, they invented literacy and the literate basis of modern thought [55]....It is no accident that the pre-alphabetic cultures of the world were also in a large sense the pre-scientific cultures, pre-philosophical and pre-literary.[58]

Consider just **one aspect or element** of this broad claim. Taking into consideration both Havelock and Gough's articles, evaluate the claim from the point of view of either McLuhan or Williams. (E.g., what would Williams say about the claim that the alphabet was a necessary condition for science? etc.) Be sure to back up your argument with specific references to the texts.

≤200 Words!

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