Writing Systems: The First “IT”

Geoff Nunberg

IS 103
History of Information
Jan. 26, 2017
Sign up on google docs form on bcourses.

Mon Jan 30, 2:00-3:00
Tues Jan 31, 2:00-3:00
Weds Feb 1, 10:00-11:00 & 12:00-1:00
Thurs Feb 2, 12:30-1:30

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

History of Information

fake news

UDACITY

week
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
What kind of "information" has a history?

... 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.

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John Verity in Business Week, special number on the "Information Revolution," 1994
The Emergence of Representation
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

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]
Was development of language gradual or sudden? *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

Technology: artifacts, systems, settings
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
"... whereas notations of whatever sort were apparently means of recording the passage of time in terms of culturally significant events." Marshack
Early Indexical Signs

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

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

Petroglyphs, Bhimbetka, India, 9000 BC

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

Spotted Horses Peche Merle, France
“The Sistine Chapel of Prehistoric Art”

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

"Man's first affirmation of himself" — Maurice Blanchot
The Origins and Development of Writing 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."
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
Explaining the symbol  

The generic character \( \ell \) th signify 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
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 origins of true 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

"We were away a year ago"
The origins of true writing

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

**The Beginnings of Information**

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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, wǔ, 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.
Tokens as origins of Sumerian writing?

**Figure 7** Pictographic tablet from Urin, 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.

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<th>Token</th>
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<th>Old Sumerian</th>
<th>Nea-Assyrian</th>
<th>Neo-Babylonian</th>
<th>English</th>
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The Origins of "complete" writing

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

Rebus: Icons of things that stand in for their (phonetic) names
Rebus principle leads to logogrophic system

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

\[=\] "water" /a/ \rightarrow "in" /a/

\[T\] oracle /me/ \rightarrow 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

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
Development of Written Symbols

Iconic
Development of Written Symbols

Simplification of sign

Iconic

Semasiographic/ideographic

Proto-writing
Development of Written Symbols

Simplification of sign

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Rebus extension
Development of Written Symbols

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Rebus extension

[εlvIs]

logographic

"True" (glottographic) Writing
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Simplification of sign

- Iconic
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  - Proto-writing
- Rebus extension
- [εlvIs]
- /εl/

- logographic
- syllabic
- "True" (glottographic) Writing

Phonographic writing
Development of Written Symbols

Simplification of sign

Iconic
Semasiographic/ideographic
Proto-writing

[εlvIs] /εl/ /ε/
logographic syllabic alphabetic
"True" (glottographic) Writing

Phonographic writing

Rebus extension
Types of Writing Systems

- **Logographic**: modern 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

The Origins of Western Literacy

Figure 1.1. Origin of the Alphabet

Later Developments

boustrophedon

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Later Developments

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

Cherokee Phoenix: First American Indian newspaper (1828)
Independently invented writing systems:
Korean Hangul

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.

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

The word ‘hangeul’ in hangul
Readings for 2/3


Additional Materials


All online
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.
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