The Interactive Word Object

5th Language Creation Conference
Austin, TX May 2013

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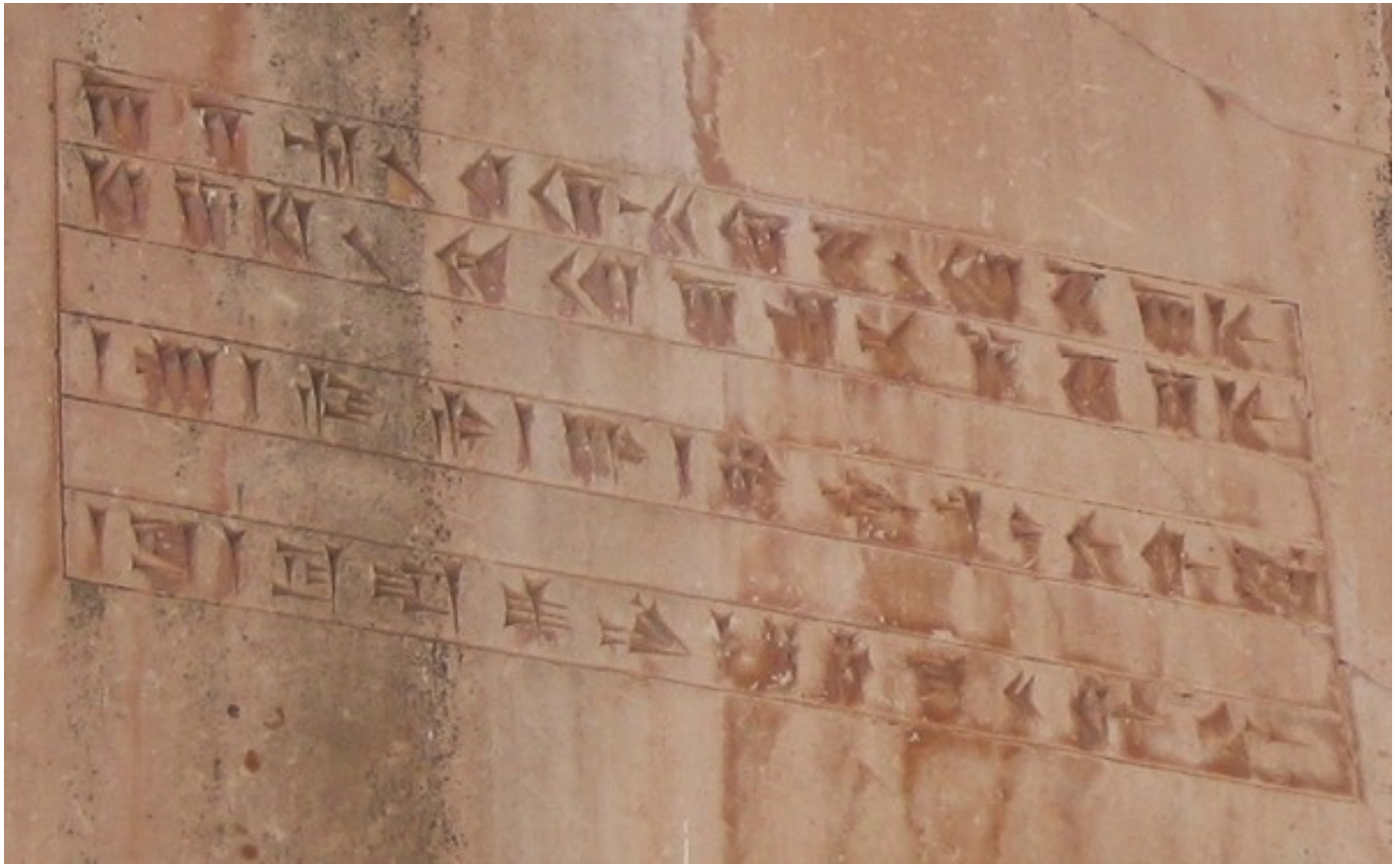
Part 1: History / Prehistory

Written text *is* an object



Written text *is* an object (cont.)

- Architecture is a larger-than-life object
  - The edifice was meant to be permanent
- Inscriptions serve to convey authority
  - Glorifying deities, kings
  - Often accompanied by art depicting investiture
- Building inscriptions impose text on an entire space

Written text *is* an object (cont.)

Written text *is* an object (cont.)

- A Cuneiform tablet is a physical object
  - Temporary texts could be written on soft (unfired) clay
  - Firing the clay made the text permanent
- Commerce required text object to travel with trade goods
  - E.g. *bill of lading*
  - 75% of documents from major sites (e.g. Uruk) were economic
- Authentication (e.g. a seal) is required to identify the sender

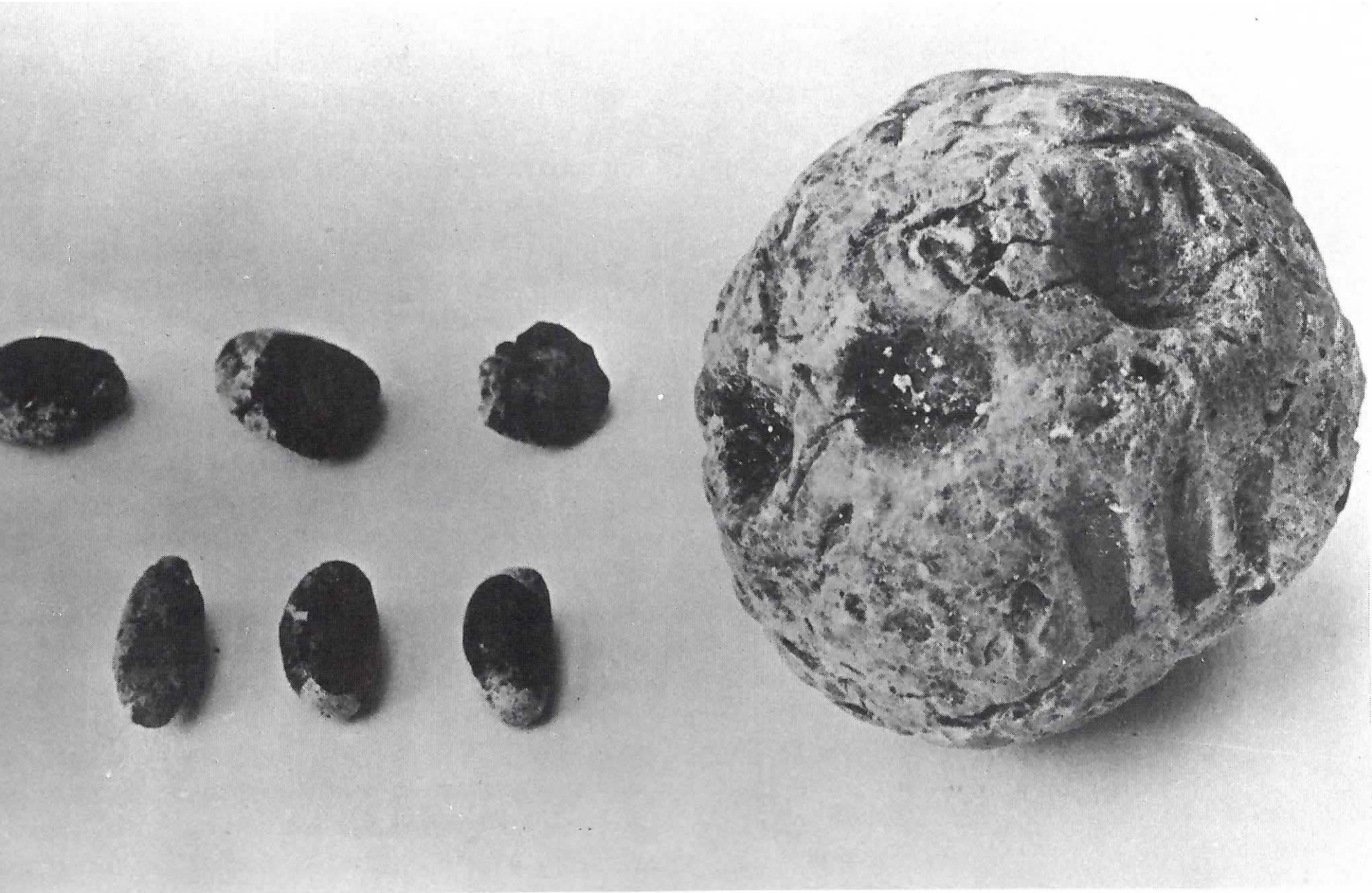
Written text *is* an object (cont.)

Written text *is* an object (cont.)

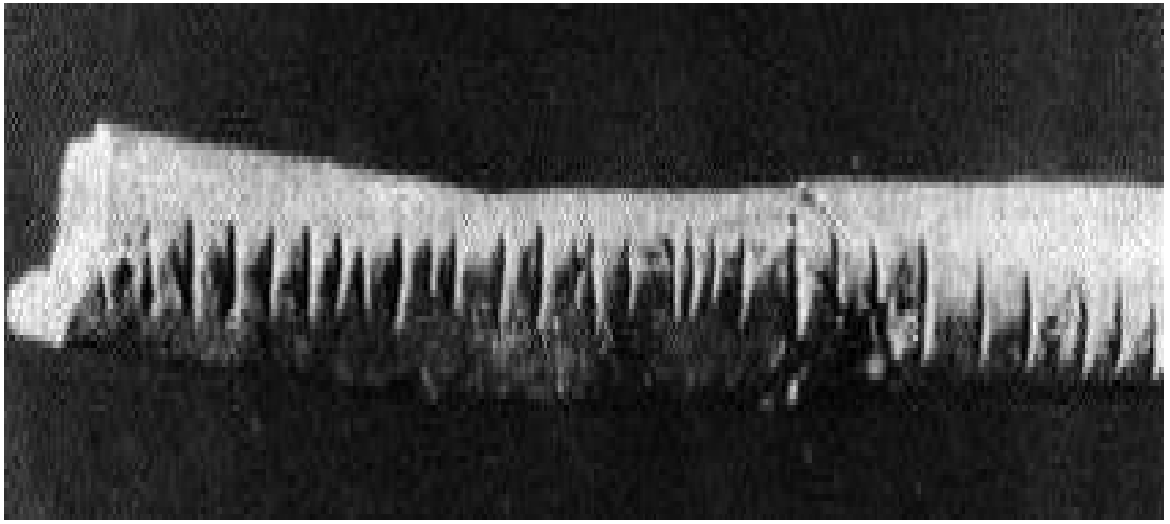
- Cylinder Seal
  - Found at Memphis, depicting Darius, King of Persia
    - Contains both a narrative scene and an inscription
    - Inscription reads “Darius the great king”
  - The impression is an object and the seal is an object
    - The seal is a ***machine*** for reproducing text objects

Origin of Writing Token Theory

- Denise Schmandt Besserat theory of the origin of writing in Mesopotamia
  - Small ceramic tokens used as accounting bill of lading indicators
  - Then enclosed in a ceramic “envelope” (called a *bulla*)
    - ***What’s in the bulla?*** You have to break it to find out!
  - Then impressed onto the outside of the envelope to indicate its contents
  - Then a tablet with token impressions replaced the ceramic envelope

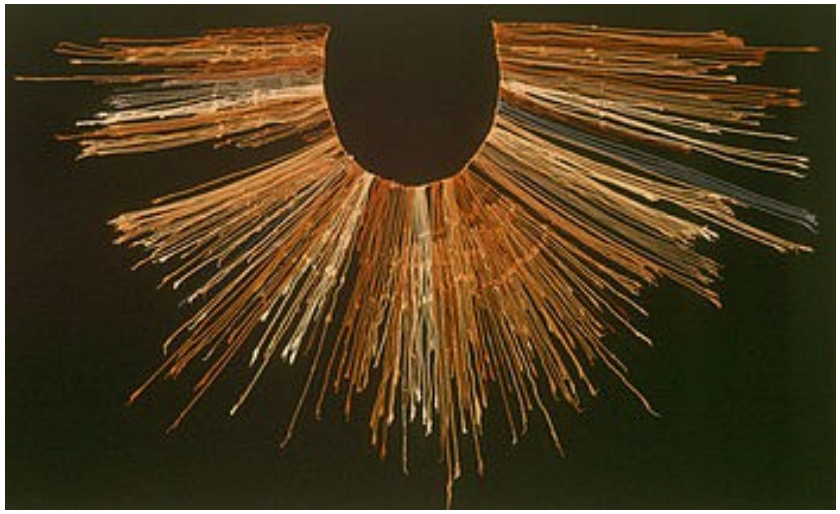


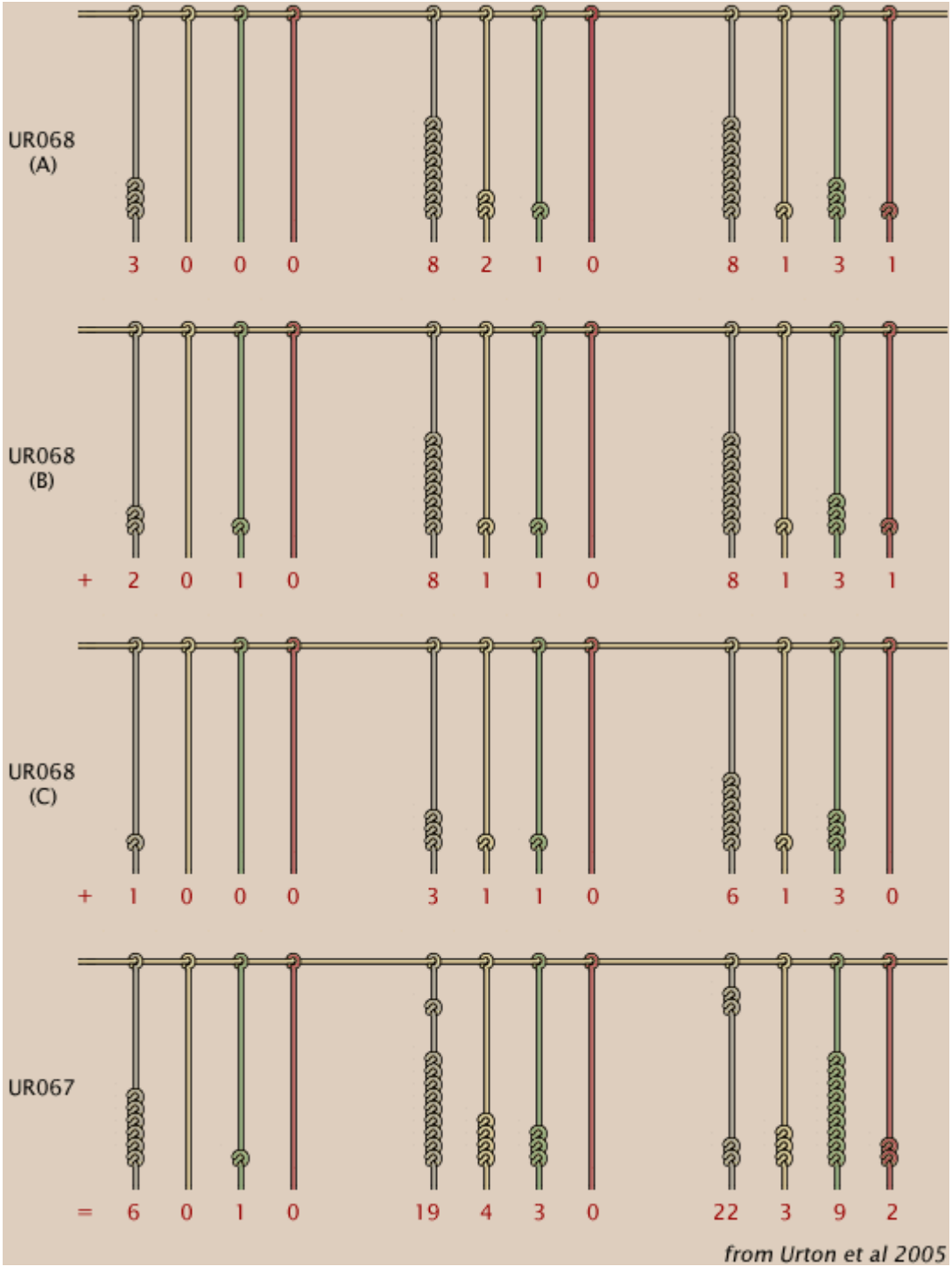
Notation Objects



Notation Objects (cont.)

- Quipu





Part 2: An Interactive Word Object Sampler (demo)

Part 3: Benefits of Interactive Word Objects

Structure

- Non-linear navigation
  - “Traditional” hypertext links
    - E.g. reference to other text
    - The link can be *typed*
  - Gathering
    - Bring resources ***in*** to the current text
      - (“traditional” hypertext link arrow should be reversed)
  - Multidimensional mapping
    - Syntax relationships can simply be drawn / pictured

Structure (cont.)

- Escape from topology
  - Structures that are difficult to render in two dimensions can be mapped by actions
- Gestalts for “difficult structures”
  - Null structure
    - Elements juxtaposed “without structure”
  - Rings
  - Overlapping structures that don’t nest

Structure (cont.)

- Gestalts for “difficult structures” (cont.)
  - Part / whole relationships
  - Feedback loops
  - Self reference
- Externalized structure (e.g. syntax)
  - The text contains its own storage
  - Built-in visualization
  - Loci for behavior

Behavior

- In hypertext activity theory the minimal unit of behavior is called *acteme*
- Expand / Collapse
- Show / hide / access control
  - Conditional legibility
  - One-time names
- Attract / repel
- Travel to / return from

Behavior (cont.)

- View control
- Placemarking
- Reader-adjusted kinetics
- Units controlling other units
- Other-user modulation

Part 4: Issues / Conundrums

The Shannon Paradox

- There is a layer underlying communications: the *energy transaction*
- Communication occurs when
  - The writer has a clear vision of how the energy transaction will occur
  - It does occur that way and the reader is energized
- Energy transactions may occur where communications don’t

The Shannon Paradox (cont.)

- Art may be made to target the energy transaction layer *directly*
  - Such art may seek to ***maximize inclusion*** of the energy transactions that can occur
- The Shannon Measure of Information measures information by how much is ***excluded***
  - Information is measured by the number of possibilities that might have been there but aren’t

The Shannon Paradox (cont.)

- The Shannon Paradox is the juxtaposition of:
  - *Inclusion*-oriented energy transaction approach
  - *Exclusion*-oriented communication approach
- The Shannon Paradox is “resolved” by considering the text both ***code*** and ***channel*** simultaneously
  - And even oscillating between code and channel
  - Information theory does embrace inclusive channel vs. exclusive code

Is the Text Stateless?

- There are venerable traditions that consider “the word” immutable
  - e.g. religious scriptures
- Writing turned language units into physical objects that couldn’t change state without document substitution
- However, social processes can apply state to text
  - The legislative process can transform a bill into a statute

Is the Text Stateless? (cont.)

- Social processes can apply state to text (cont.)
  - A person can legally change their name
  - Documents can be voided or rescinded
  - Information processes can transform a statement into a question and vice versa
- Versioning
  - A document may exist in multiple versions
  - There may be a formal system for recording versions

Is the Text Stateless? (cont.)

- Transactions
  - An exchange of mutual state changes among parties regarding a shared text
  - E.g. Order → Confirmation → Invoice
  - *Pathological states*
    - Examples:
      - An *overdrawn* account
      - A *fraudulent* signature
    - Is database NULL a value or a state?
    - Is the result of 2 / 0 a value or a state?

Is the Text Stateless? (cont.)

- Contracts may explicitly describe state
  - E.g. what happens under *default*
  - Stateful text can be *traded*
    - E.g. credit default swaps
  - An interactive text can contain its own state indicators
    - As opposed to state being external

Is the Text Stateless? (cont.)

- State-embracing text has its own form of Shannon Paradox
  - *Inclusive* of states
  - *Exclusive* of what is to happen in a given state / transition

Is the Text a Machine?

- The *substrate* of text is becoming almost exclusively machines
- There are many arenas of generative text:
  - The Law
    - Statute → Regulation → Litigation
  - Religion
    - Scripture → Commentary / Exegesis
  - Literary
    - Text → Criticism

Is the Text a Machine? (Cont.)

- Arenas of generative text (Cont.)
  - Journalism
    - Statement → “Other Side”
- Interactive text externalizes generativity

Is the Sentence a Machine?

- Formal language theory shows the equivalence of
  - Grammars
  - Abstract Machines
- Still important in computer science
  - “Chomsky Hierarchy” still useful

Is the Word a Machine?

- Names:

Is the Word a Machine? (cont.)

- Object-surrogates for names are thousands of years old
  - Cartouche
    - Oval surrounding an Egyptian royal name
    - Instrumental as the “entry point” to deciphering hieroglyphics
      - Intepretable *as* a name across millennia even absent any decipherment
  - Seal impression
    - Still in use in some places as a signature
  - RFID name badge

Is the Word a Machine? (cont.)

- The RFID badge is unequivocally a word which is a machine
  - A surrogate name
  - A radio machine that *responds* to a signal with information
    - Encodes state
      - authorized / not authorized
    - Encodes information
      - ID number
      - Facility Code

Pathologies / Challenges of the Interactive Word Object

- Bugs, Features, and Weird Machines
  - The Interactive Word Object can be hijacked
- Who owns the words?
  - Plays have already been made to own words
    - Microsoft Smart Tags
    - Google Ad Words
  - Legislation / litigation already exists
    - DMCA
      - Web site takedowns
      - eBooks with DRM

Pathologies / Challenges of the Interactive Word Object (cont.)

- Who owns the words? (cont.)
  - Train wrecks have already occurred
    - Kindle *1984* remote deletion
- How do you *preserve* the interactive word object?
  - Old NASA tapes can’t be decompressed
  - Portation may conflict with intellectual property
    - No source code for “old” environments
    - File formats may be undocumented / proprietary

Pathologies / Challenges of the Interactive Word Object (cont.)

- How do you *preserve* the interactive word object? (cont.)
  - Insider communication vs. outsider unintelligibility has ALWAYS been part of language

Part 5: Interactive Word Object Futures

As In Mesopotamia: IT'S ACCOUNTING

- Algorithms already:
  - Make trading decisions
    - Faster than the speed of reflex
  - Are written into the instruments traded
  - Are written into the accounting rules
- Accountancy is in crisis
  - Tainted money cannot be traced
  - Instruments are bundles with unknown contents
    - WHAT'S IN THE BULLA!!

IT’S ACCOUNTING (cont.)

- Accountancy is in crisis (cont.)
  - Trading systems cannot handle negative numbers
    - But negative wealth is being traded
  - No consciousness of the implications of NULL
    - Assets became “toxic” not because their value became 0, or even negative: they became NULL
      - “Has Unknowable Value” was not a recognized state

What gets exchanged?

- Wal-mart is mandating RFID tags
- Just-in-time manufacturing has required EDI for decades
  - Standards (e.g. X12 / Edifact) for business documents
    - This is a form of language creation
    - EDI code lists are a form of constructed lexicon

Move the contents of the bulla from the inside to the outside

- Stateful trading instruments can describe their contents in real time
- The instrument *responds* to state changes
- Provenance carried with the instrument allows problems to be traced
- Cryptography provides the usual services:
  - Authentication
  - Non-repudiation
  - Authorization