



Session 21: Episode 5(6)

Writing & the rise of autocratic religions, states and empires

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Tonight

- Last time, based on Lynne Kelly's revolutionary insight, I discussed how something began to happen around 50,000 years ago that breached the limitations to facilitate developing much more sophisticated hunting technologies, and then completely new technologies underlying the Agricultural Revolution.
- Tonight I will continue Episode 5 by reviewing some of the archaeological evidence suggesting that formalized mnemonics favored the maintenance of egalitarian social systems and how the invention of writing placed the administration of knowledge, technology, property and people in the hands small essentially autocratic elites. It also enabled the faster accumulation of new knowledge for the development and application of increasingly sophisticated technologies over reducing time scales.

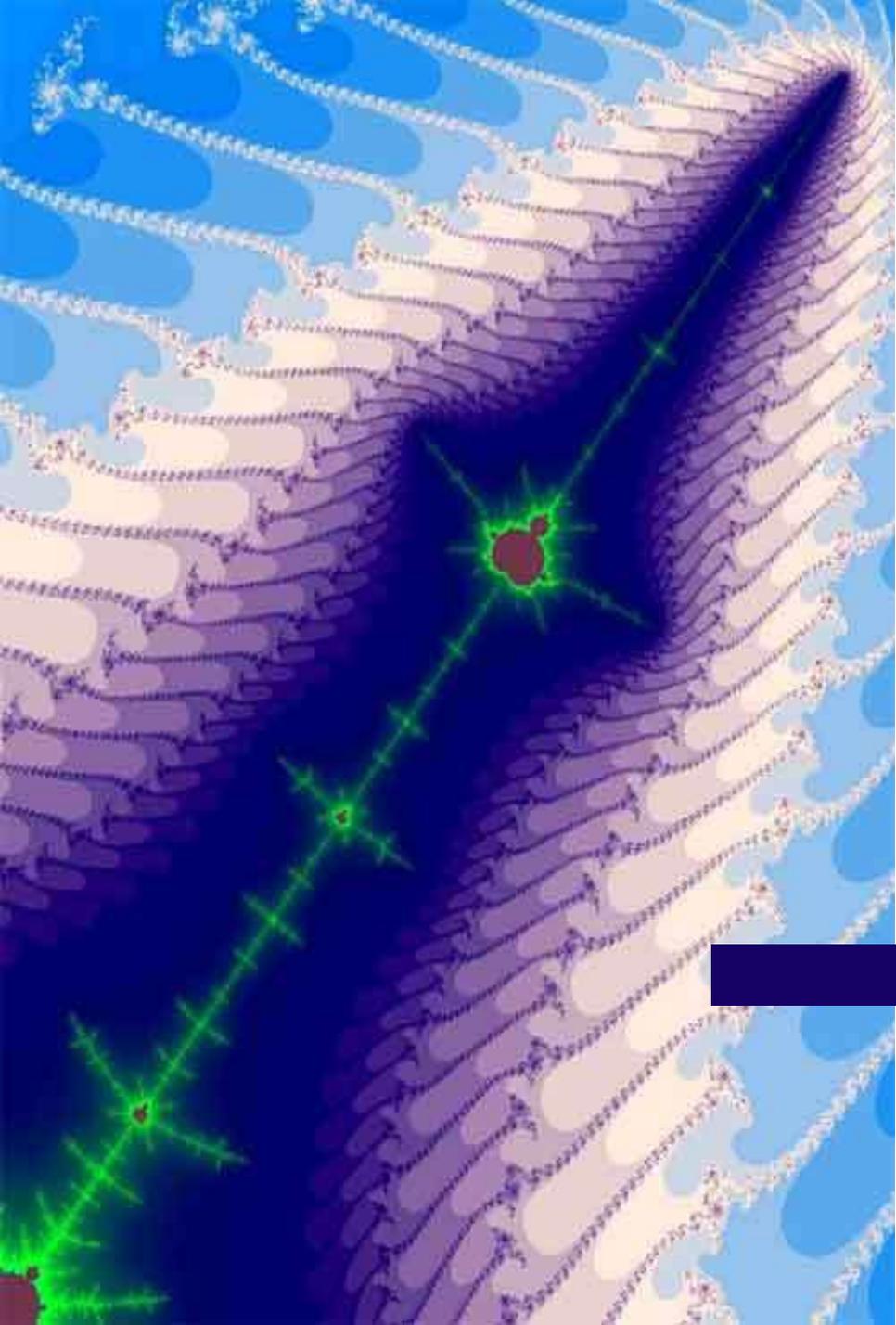
Emergence of the socio-technical organization

- Revolutionary cognitive technologies lead to grade shifts in organizational cognition and niche expansion (i.e., Moore's Law and the ever growing global footprint)
- Tribal and cultural accumulation of knowledge using mnemonics
- Settlement gives value to personal/private property that leads to counting and admin
- Writing, social hierarchy and autocratic scribal states

Another look at the critical cogno-technological revolutions and their “socio-cultural” implications

“Grade shifting” cognitive tools initiating major changes in the ecological nature of humans considered in this book. I did not recognize that **formal mnemonics** existed when I started project. **Counting/writing** is tonight’s topic. **Printing** will be the focus of the next session (See also Session 4, slides 11-16)

- Speech, fire and compound tools (300-200 kya)
 - Egalitarian and cooperative human groups competing with other groups to construct & expand their niche in the natural world
- **Formal mnemonics, cultural differentiation and agriculture (20-7 kya)**
 - **Rise of ~egalitarian “civilization”**
 - **Families, trades, & guilds construct their niches in economies and compete**
- **Counting (> 9 kya), writing (~ 5 kya), nations and empires**
 - **Rise of knowledge-based orgs (military, cultural, religious & trading)**
 - **Control of powerful technology by elites to control people facilitates despotism**
 - **Knowledgeable power can be projected on continental scales to control people, trade & resources**
- **Printing, the Scientific and Industrial Revolutions, and corporations**
 - **Knowledge-based power over the natural world and begins to grow and accumulate at ever faster rates**
 - **Rise of chartered companies and limited corporations**
- Information & communications systems, state and multinational control
 - Fascism, Communism and other monolithic systems to project power & control
- Microelectronics, humano-technical cyborgs and autopoietic socio-technical organizations



Origins of the capacity to
write and read
Some ideas from
RK Bednarik's 2014
Exograms
and
Merlin Donald's 1991
Origins of the Modern Mind
(not available free to the Web)



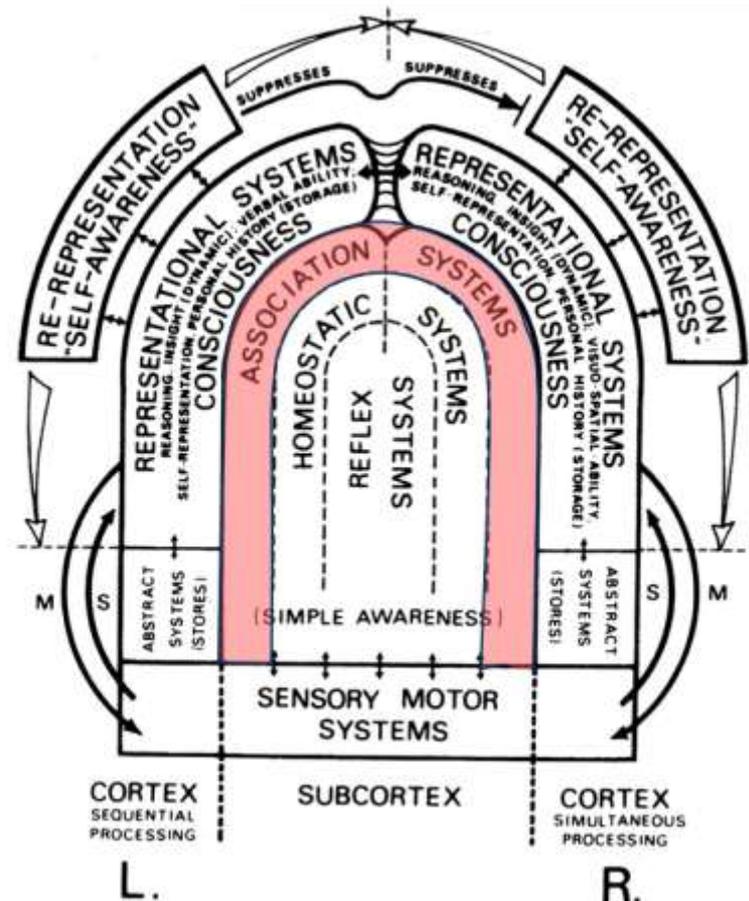
A rough model of the functional organization of the human brain

Figure 5.1 Oakley's (1985) anatomical model of systems of representation and awareness in the human brain. The nervous system is schematically represented as a bilaterally symmetrical layered structure, with the most archaic brain systems (reflexes and homeostatic functions) in the center, and the newest systems (self-representation) on the outside shell. The computational styles of left and right cerebral cortex are depicted as "sequential" and "simultaneous."

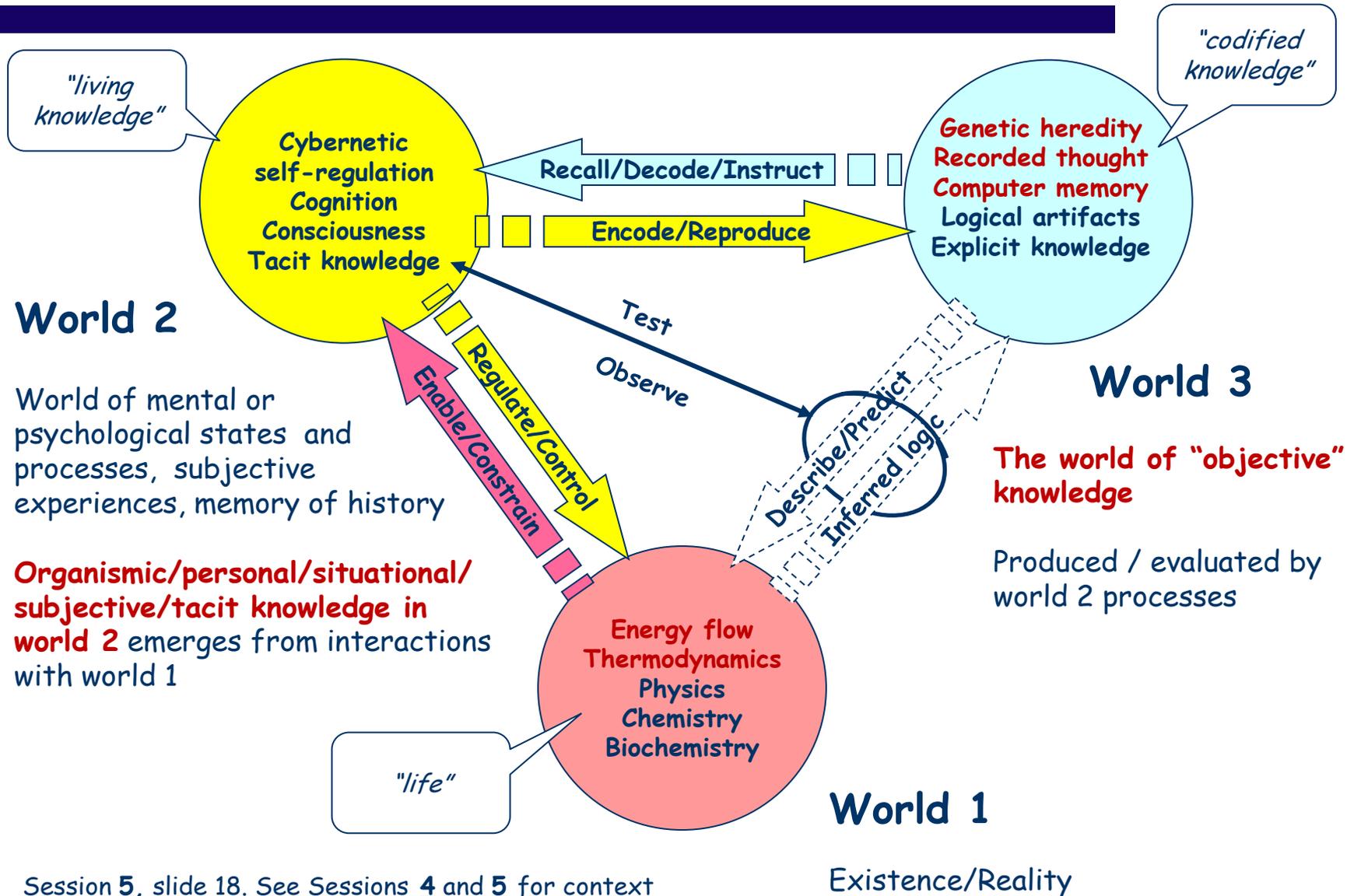
"Association systems" (pink) correspond to the relational indexing and retrieval function of the hippocampal region of the brain. L and R refer to the left and right hemispheres. S arrows correspond to sensory input from the world. M arrows correspond to motor outputs to act on the world.

This is Donald's somewhat simplified version of Oakley's diagram from "Cognition and memory in animals". (In) Oakley, D. (ed.), Brain and Mind. Methuen, London (1985).

Evolutionarily newer systems are layered on top of the older systems typical for all vertebrates.



Reminder: Popper's second big idea from Objective Knowledge: "three worlds" ontology



"Exograms" or memory tools

- Donald 1991: "An exogram is simply an external memory record of an idea. ... Exograms can be made permanent, outlasting individuals and, at times, entire civilizations. ... The most important feature of exograms as storage devices is their capacity for continuous refinement. Exograms are *crafted*.. They are symbolic inventions that have undergone a process of iterative examination, testing, and improvement"
- Characteristics
 - Virtually unlimited media
 - Unconstrained and reformatable
 - May be inertly persistent
 - Number of potential signs is unlimited
 - May link to small or large memories
 - May be refined through iteration
- Bednarik 2014: "...Externalized memory trace"
- **Authors using the term exogram confuse**
 - **the symbolic key indexing a specific memory in a living brain**
 - The only record exists in the living brain.
 - In this sense "exogram" is a specific natural or artificially constructed configuration of the physical world (W1) serving as a symbol to trigger a hippocampal link to an internally stored memory or idea - i.e., where W2 and W3 intersect
 - **With a memory that has been symbolically encoded into the physical structure of a material object (i.e., a "document")**
 - Implies a shared linguistic capability and relationship between language and its codification

Level 1 - Environmental cultural transmission

Level 2 - Mimetic cultural transmission

- Donald is concerned with the different modes (“levels”) by which cultural heritage is assembled by the individual and transmitted (read this in conjunction with Session 20, slides 24-28)
 - **Level 1:** Environmental memory/transmission (E) is based on the default primate system where information is indexed /recalled via temporal (episodic) and geospatial memory systems
 - Individuals learn from observing conspecifics actions in the environment
 - **Level 2:** Mimetic cultural transmission (M) involves cognitive processing to understand meaning of, model and replicate actions and expressions of another, and to express own ideas via gestures, vocalization and actions

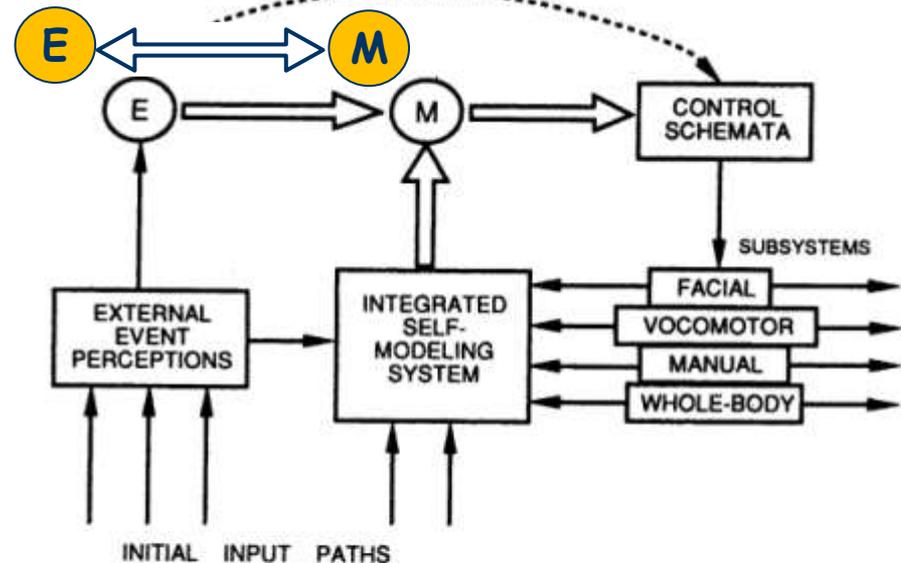


Figure 6.1 The mimetic controller (M) juxtaposed with its principal input paths from episodic memory (E), and self-representational systems. M controls and unifies the outputs of various motor subsystems involved in mimetic action; it also serves as a comparator-modeler for external events and actions of self.

Level 3 - Linguistic cultural transmission

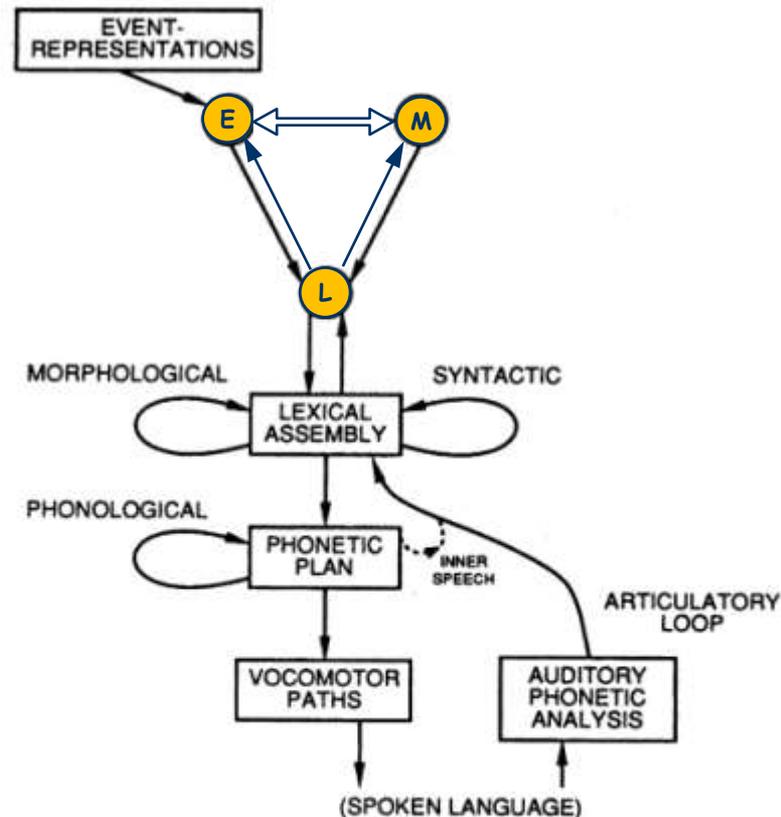


Figure 7.2 The linguistic controller (L) at the peak of a vertically integrated speech system. L constructs narrative models of inputs from episodic memory (E) and the mimetic controller (M); in turn, it drives the lexical assembly process. Lexical assembly involves not only the correct sequencing of lexical entries but also their correct form. The phonetic plan maps the assembled utterance onto neuromotor paths and, ultimately, the vocal musculature. Inner speech constitutes the silent monitoring of a phonetic plan. The articulatory loop constitutes temporary storage of a speech input.

Level 4 Development of “visuo/symbolic” cultural transmission (involving hippocampal indexing)

- Emergence of higher levels of symbolic representation of memory
 - P = pictorial (symbolic triggers not necessarily involving speech system)
 - I = ideographic (symbolic triggers evoking linguistic expression)
 - PH = phonological (symbols relating directly to phonemes in speech system)
- Phonological representation enabled the translation of living memories into symbolically encoded speech that was comprehensible to other individuals using the same code
- External Memory Field (EXMF)
 - Actually external symbols triggering internal neural processes and memories
- External Symbolic Storage System (ESS)
 - Information/knowledge existing in Popper's world 3.

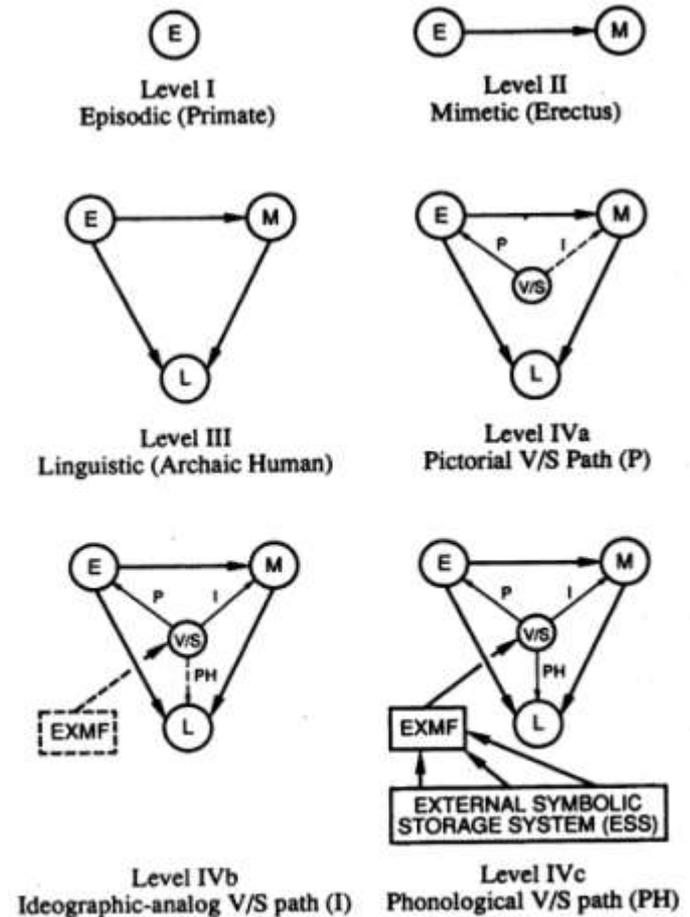


Figure 8.4 Third, or phonological (PH), visuosymbolic (V/S) path, established with the invention of the alphabet in the 1st millennium b.c. With the possibility of written storage of long narratives in the ESS, linguistically based thought gradually incorporated an external iterative loop through the external memory field (EXMF).

Alternative pathways for storing and retrieving information/knowledge from external storage

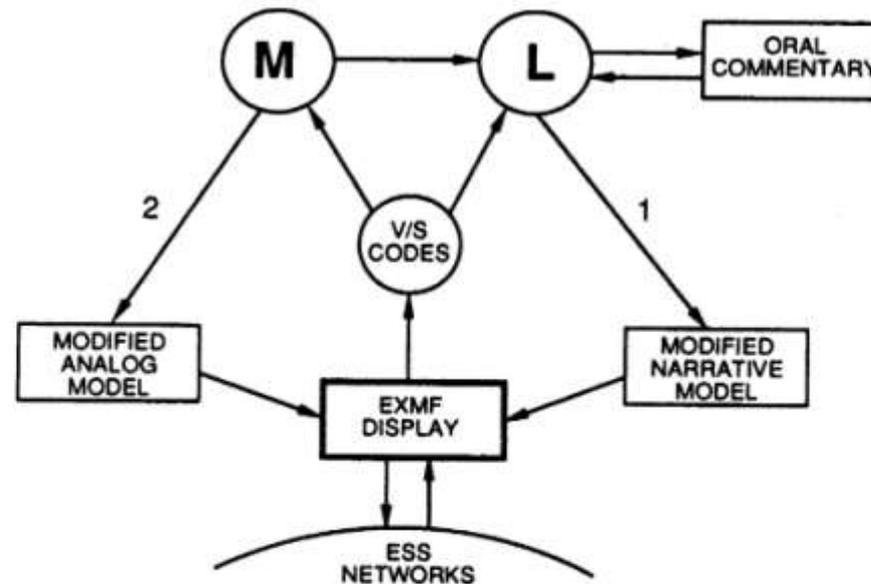


Figure 8.6 Schematic of two external working memory arrangements in common use. Path 1 involves the development and refinement of written narrative models by means of successive iterations through the linguistic controller (L) and the external memory field (EXMF). Path 2 involves a parallel refinement of visual analog models, primarily through the mimetic controller (M) and the EXMF. Both loops also profit from the generation of concurrent narrative commentaries on their progress. V/S codes: visuosymbolic codes.

Where we are today

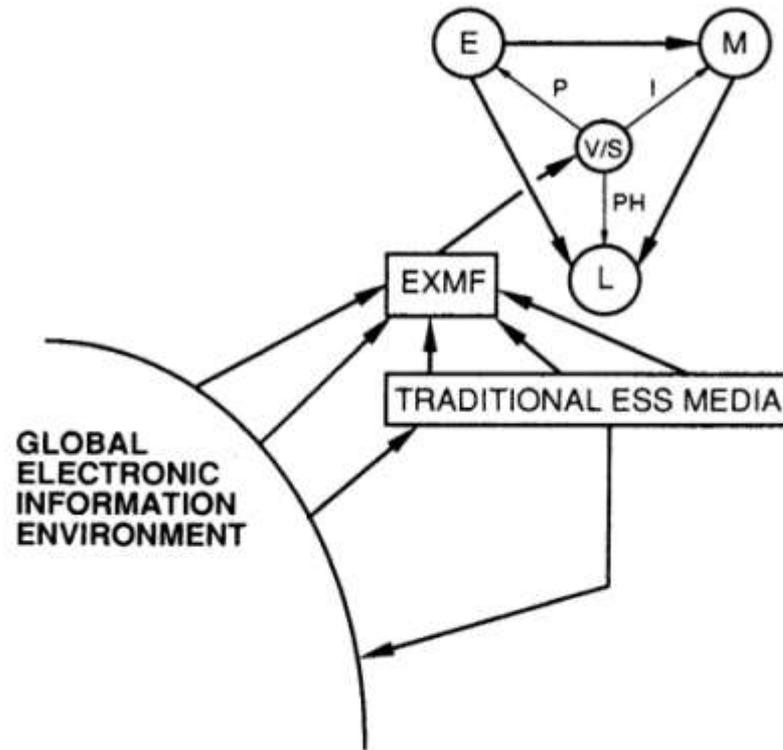
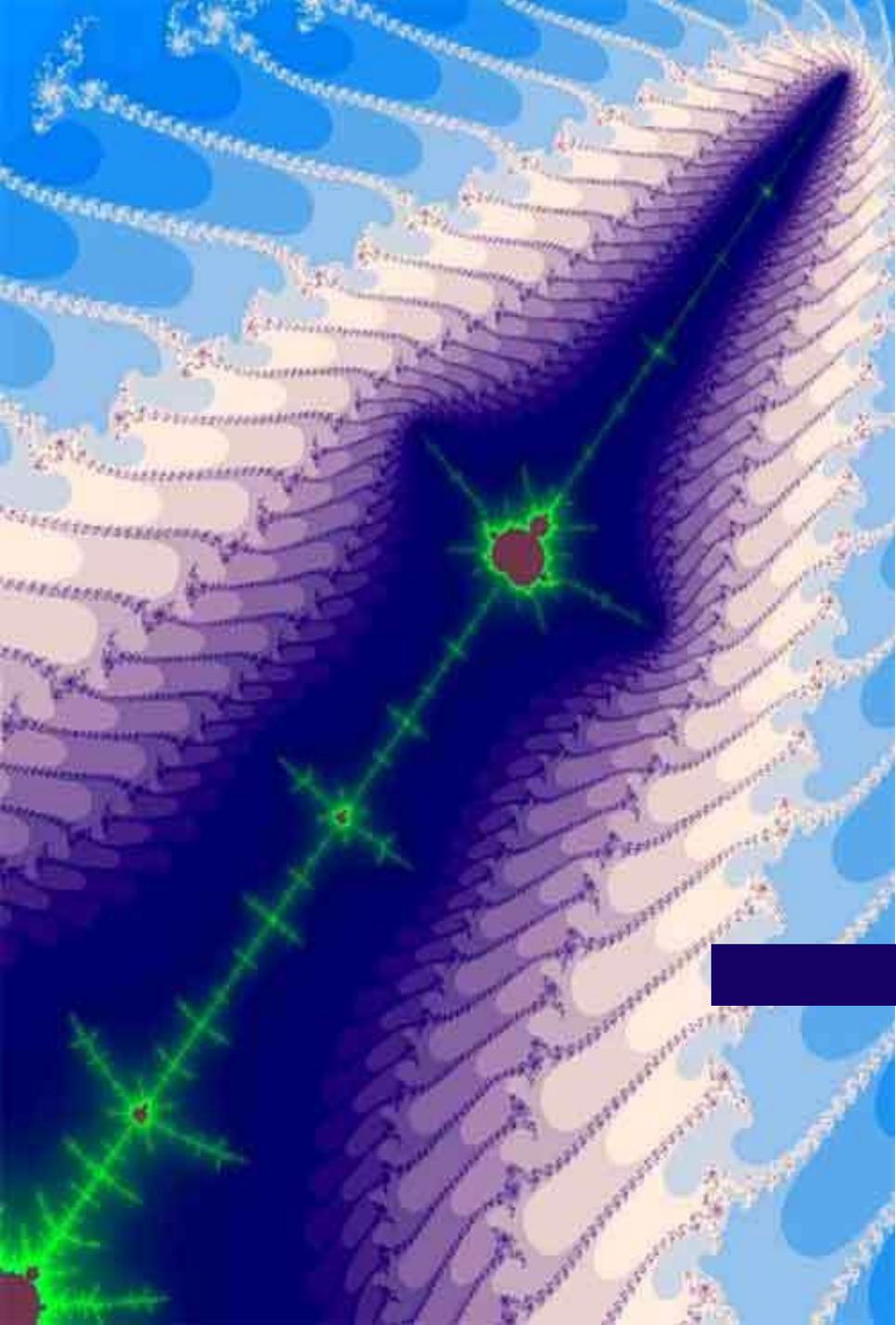


Figure 8.8 Juxtaposition of human representational architecture with the developing global electronic information environment. Many ordering rules and search functions that were entirely internal to biological memory are now resident in external memory systems. A variety of other cognitive operations are now entirely offshore, that is, found only in external memory. Most operations, however, still employ the EXMF loop. EXMF: external memory field; E: episodic memory; M: mimetic controller; L: linguistic controller; ESS: external symbolic storage



Counting and writing led to increasing control over the physical world and profound shifts in individual and social cognition

Premise formal knowledge management systems based on mnemonics are inherently egalitarian

- For knowledge to be retained in a culture it must be shared and transmitted across generations
 - No one individual can retain all of a culture's body of knowledge
 - An individual's knowledge is fallible
 - Knowledge is lost with death
 - Even in life memory is fallible - facts and understandings can be lost or corrupted
 - Controlled sharing and group rehearsal required for accurate maintenance
 - Specialized guilds provide mechanism for redundant preservation of memories
 - Peer review to ensure equality of memories
 - At all times must have at least three and preferably more masters to identify and correct an error of rehearsal
 - Must have members in training to replace lost masters
 - Accepted levels or "degrees" of qualification to recognize mastery (e.g., see Freemasonry)
- Cultural implications
 - No one guild knows enough to manage the whole social system
 - Society only works successfully if guilds work together
 - Leaders, chiefs or judges may be required to make decisions to act
 - To be effective, they must refer to guilds for the supporting knowledge
 - All that is required to depose the bad leader is to withhold essential knowledge
 - Does not compromise overall egalitarianism of mnemonic society
- Knowledge based guilds as autopoietic entities

Transition periods from KM with mnemonics to KM with counters & writing: Ubaid to Uruk

- Çatalhöyük traces mnemonic cultural changes from 7300 to 6000 BCE
- Ubaid culture ca. 6500 to 3800 BCE
 - no physical indications of social mnemonics but something like this would be required to support high technologies, e.g.,
 - Herding, farming & irrigation
 - Basket making & weaving(?)
 - Lime plaster making
 - Sophisticated patterned & painted pottery common during the mid-late 7th millennium BCE & common throughout Middle East by c.6100 BCE, including high temperature kiln glazing and faience
 - Beginning of urbanization (4500-4000 BCE)
 - Use of counting tokens (for accounting) & stamp seals (to indicate ownership?)
 - Still egalitarian
- Uruk ca. 4000-3200 BCE
 - Proto-cuneiform numerical notation + ideograms for record-keeping, accounting and administration (social control activities)
 - First cuneiform writing systems around 3600 BCE
 - Control of powerful technology to control people facilitates despotism



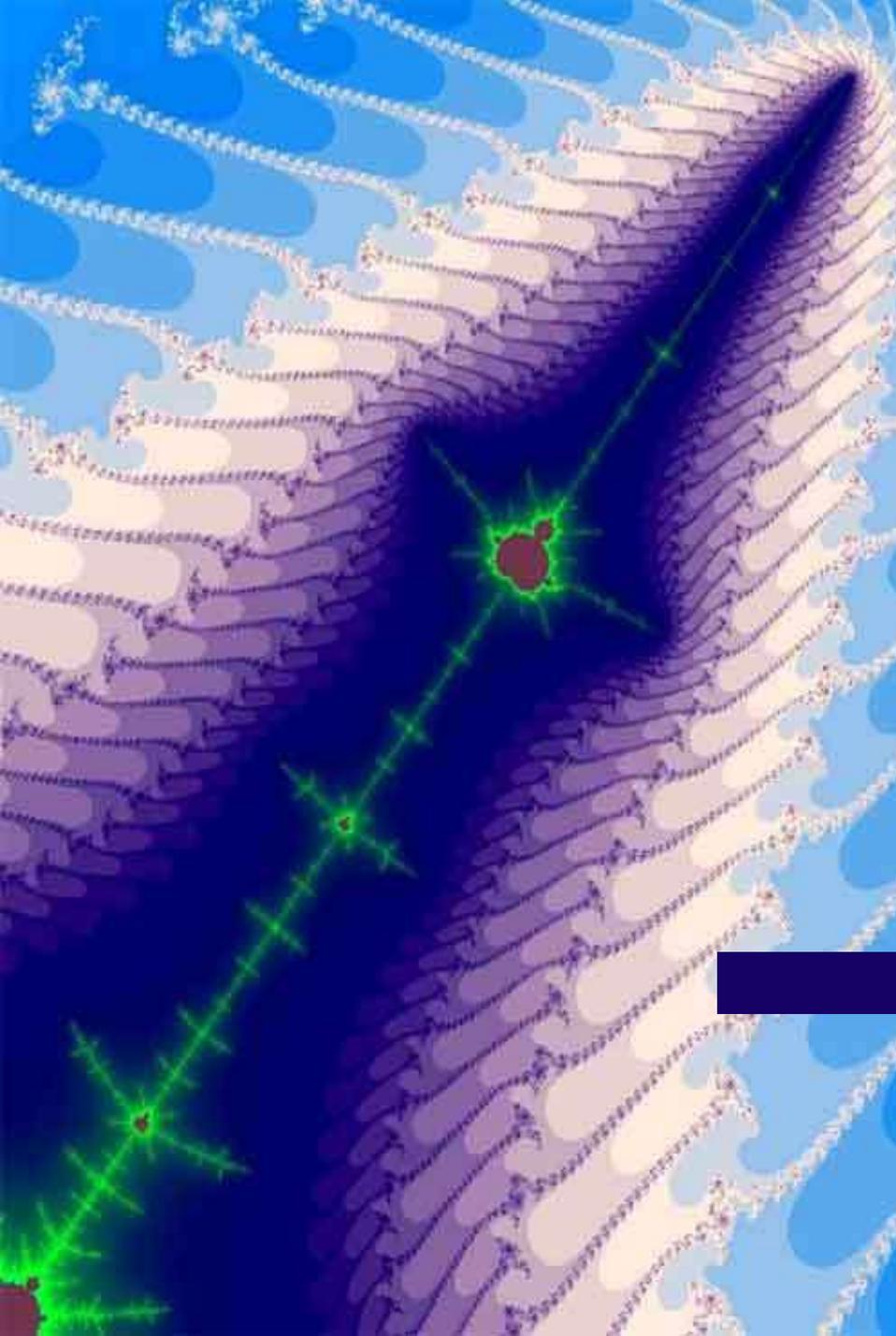
Antiquity 74(285),
Sep 2000, pp 475-476

Antecedents of writing

- Origins of writing
 - Arguably:
 - Writing did not evolve from the mental processes of mnemonics
 - Mnemonics and writing are directly competing methodologies for managing knowledge of the world
 - Writing emerged primarily from tokens and systems to assist the administrative control of property and the allocation of resources
 - The equivalence metaphor - a 1:1 relationship between a tangible token and a tangible object of value
 - Different shaped tokens referred to different commodities
 - Easy step to inscribe the shape of the token as a metaphor for the token
- Counting and administration (beginnings seen in Çatalhöyük and Ubaid)
 - Sealed bullas secure records against alteration
 - Stamp seals used in Çatalhöyük to identify owners & participants
- Administrators impose taxes and control allocation of resources - thus control those who require access to those resources
 - Multigeneration ownership
 - Contractual relationships span time
 - Individuals can contract labor for agreed benefits
 - People as property for the value of their labor



Tokens and a bulla



**Accounting & writing
facilitate the accumulation
and control of knowledge**

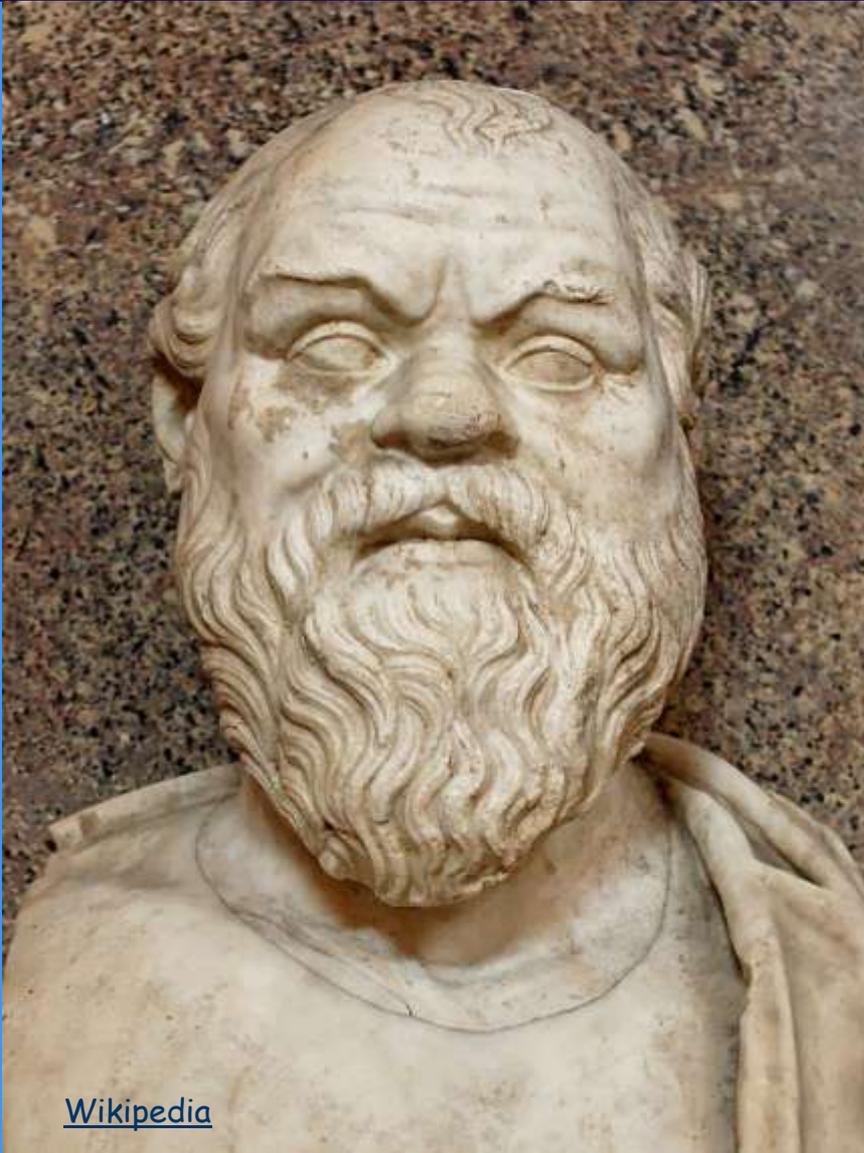
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Knowledge leads to power!

Needs more work!



Socrates did not welcome writing

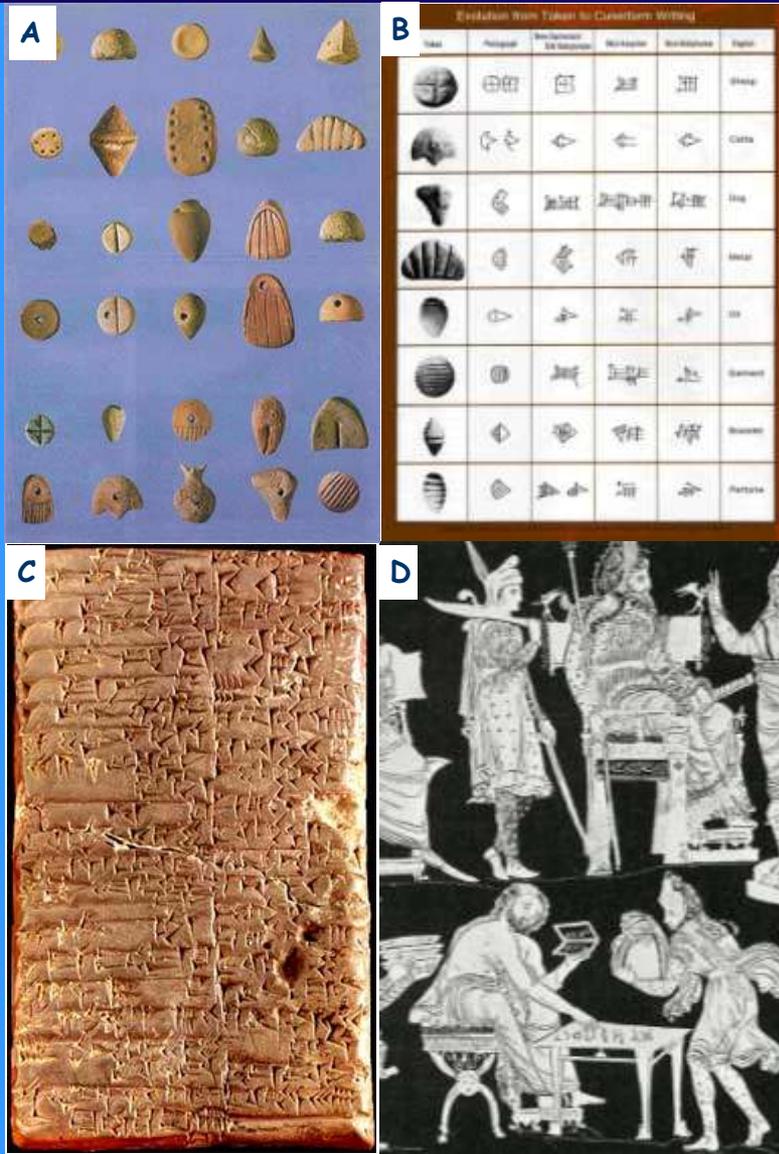


- Without criticism

[Writing] will create forgetfulness in the learners' souls, because they will not use their memories; they will trust to the external written characters and not remember of themselves. The specific [concept of writing] which you have discovered is an aid not to memory, but to reminiscence, and you give your disciples not truth, but only the semblance of truth; they will be hearers of many things and will have learned nothing; they will appear to be omniscient and will generally know nothing; they will be tiresome company, having the show of wisdom without the reality.

- But, writing with criticism against reality creates science

But, accounting and writing gave administrative control of the realm to those controlling the stored knowledge



- Mnemonic storage of cultural knowledge requires sharing & is essentially egalitarian within the group
 - Different groups/guilds may compete on the basis of what they know
 - Individuals within groups must cooperate to replicate and transmit knowledge within the group
- Writing offers administrators essentially unlimited storage capacity and durability
 - Writing with limited access/capacity for copying may be tightly controlled
 - May be carried over large distances
 - Is only understandable by the small number of individuals who can read
 - Centralized codification of laws and economics (taxation) enables social control
 - Reinforces concepts and accumulation of ownership & property
- See Session 6 for historical development

A. Clay tokens from ~ 3,100 BCE (Schmandt-Besserat 1977)
 B. Tokens transformed to writing (Schmandt-Besserat 1979)
 C. Cuneiform script tablet ~2400 BCE (Wikimedia Commons)
 D. Darius I supported by accountant - Darius Vase

Evidence suggesting that centralization of the control of knowledge made the autocratic state possible

- Tentative proposition:
 - As long as all cultural knowledge had to be preserved in living memory it had to be shared & rehearsed by viable groups
 - Çatalhöyük as described by Hodder appears to have been "aggressively egalitarian" (as supposed by Lynne Kelly for a mnemonic culture)
 - Development of hierarchy through Halaf, Ubaid, and Uruk cultures
 - Absence of evidence for chiefs or aggregation of wealth (Stein 1994; Lamberg-Karlovsky 2003; Frangipane 2007; but see Costello 2002)
 - When knowledge was preserved in writing and accounts, those who controlled access to the records controlled the knowledge
 - Rise of the priestly clerks and scribes
 - Presumably the origin of bureaucracy
 - Enabled the control and taxation of trade and distribution
 - Better weapons and military organization led to regional hegemony
- The ability to research this area has not benefited from electronic publishing: many pubs and books only on paper
- Most of the critical area is inaccessible due to religious fanatics seeking to destroy the historical and archaeological record

Next session

- Tonight, I continued Episode 5 by reviewing some of the archaeological evidence suggesting that formalized mnemonics favored the maintenance of egalitarian social systems and how the invention of writing placed the administration of knowledge, technology, property and people in the hands small essentially autocratic elites. It also enabled the faster accumulation of new knowledge for the development and application of increasingly sophisticated technologies over reducing time scales.
- In the next (and next to last) session, rather than present my Cadenza, I'll consider how the printing revolution again fundamentally changed the structure of society from a largely autocratic system to freer and more egalitarian systems. Mass printing and near universal literacy removed most controls over access to technical knowledge, enabling the Reformation and the Scientific and Industrial Revolutions. It also provided the basis for the emergence of individual entrepreneurs and knowledge based corporations as autopoietic systems.

Printing: “freedom” and the emergence of knowledge based autopoietic corporations

- Replication and universal literacy
- Increasingly rapid peer review cycles leads to explosion of ever more accurate knowledge
- Rapidly increasing individual power and power centers makes centralized control difficult
- Then there is the Web where anyone can access the world body of knowledge
- The “Global Brain”?