Accumulation and Emergence in Cultural Evolution: The case of the Neolithic "Revolution"

Albert F. H. Naccache
anaccash@nidal.com

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During the last few decades our "mechanistic" scientific worldview has been superseded by a "unified" one, better able to account for all phenomena, from the smallest and simplest to the largest and most complex. The shock-wave is now reaching the Social Sciences and Humanities, rendering obsolete all their underlying theoretical paradigms still reflecting, positively or negatively, the old scientific worldview. We have therefore no choice but to start overhauling these paradigms, as Cauvin prodded us to do for the field of Neolithic studies, which is in need of « une relecture générale des données disponibles plutôt que le replâtrage au jour le jour de la théorie existante » (Cauvin 1997: 19).

I have recently proposed an overarching framework designed to integrate Human History into the Natural Sciences (Naccache 1999). Here I would like to use it to help reflect upon the phenomena of accumulation and emergence in Cultural Evolution, using the Neolithic "Revolution" of the Near East as a data-base. To provide a methodological grounding, we start with an overview of the changing theoretical assumptions subtending the field of Neolithic studies. Then we sketch how selected evolutionary and cognitive approaches can be combined into a framework offering a descriptive perspective on Human History, compatible with modern Darwinian Evolutionary thinking, and yet not reductive of Culture to Biology. The final part illustrates how this framework could be fleshed-out from the Near East Neolithic archaeological data-base, and the kind of heuristic patterns that can be discerned when this is done.

Not all new buds in a first efflorescence will be well-formed or fruitful. This is why they have to be so numerous.

Before proceeding, I would like to pay tribute to all the archaeologists who, with Cauvin, have not only unearthed and analyzed the rich Neolithic record of the Near East (Fertile Crescent, Northwest corner of Southwest Asia/Mashriq), but also made it widely accessible through comprehensive publications (Aurenche and Kozlowsky 1999; Guilaine 2000; Kuijt 2000b; not forgetting the continuous stream from *Paléorient*).

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We start by observing that the analysis of the Neolithic phenomena, in the Near East as elsewhere, are based on the assumption that Late Upper Paleolithic societies were stable systems that changed in response to adaptive pressures, or alternatively, in recent studies, through ideological innovations (Bar Yosef 1998; Price 2000; Fuller and Grandjean 2001),[1] the most famous of the latter being Cauvin's "bold hypothesis" (Watkins 2000) of a "Révolution des symboles" (also "Révolution culturelle" or "mutation mentale").

This situation is the natural outcome of the epistemological landscape over which prehistorians and archaeologists have had to position themselves, a landscape dominated

by two intersecting divides: the 18th century Nature v/s Nurture (*aka* Innate v/s Learned or Rationalists v/s Empiricists), and the 19th century Infrastructure v/s Superstructure (*aka* Economy v/s Ideology or Materialists v/s Idealists) dichotomies.[2] Percentages fluctuate, but it is safe to advance that archaeologists are found on both sides of the latter, while, momentarily leaving aside those of the Evolutionary persuasion, they belong overwhelmingly in the Empiricists camp, and consider at least the Upper Paleolithic to fall squarely in the Cultural (Nurtured and Learned) province, well beyond the reach of Biological explanations (Clark 2002: 51).

Such an epistemological stance was hardly debatable till recently. It was congruent with the "Sudden and Recent Origins" paradigm of Human Evolution, according to which "Modern Man" flashed into existence some 40,000 years ago, itself reflecting the widespread tacit understanding that Culture took only over after Biology had finished its handiwork, and the overall perception of an "Eternal Man in Transient Societies" rather than of a "Fleeting Man in an Unchanging Society"—a major result of the impact of the religious mind upon our conception of history, as noted by Hannah Arendt.

But the SRO paradigm has been inoperative since the discovery that "modern" morphology preceded "modern" behavior by at least 50,000 years; "Expanded biological synthesis" Darwinians have reconciled with ecological and developmental biology and would not want to be caught reducing the specificities of Cultural Evolution to biological explanations; and Anthropologists and Sociologists are learning that "it is naïve to assume … that human behaviour has been as it is now since before the dawn of time or that, if things were once different, the tortuous historical sequence of how it got from some ancestral state to its current form is not an interesting question or one that is open to investigation" (Dunbar 1995).

Clifford Geertz already noted these developments in 1965, when he wrote that while the "traditional view of the relations between the biological and the cultural advance of man was that the former, the biological, was for all intents and purposes completed before the latter, the cultural, began," in the current view "culture, rather than being added on, so to speak, to a finished or virtually finished animal, was ingredient, and centrally ingredient, in the production of that animal itself" (Geertz 2000: 26-27).

Enmeshing Biology and Culture in accounting for Human Evolution has been embraced and elaborated on by only a few anthropologists (Brace 1995). Similarly, few historians participated in the historicization of all sciences, from Physics to Biology (Nitecki and Nitecki 1992; Cleland 2001). But that should not prevent either from reaping the benefits of the new unified scientific worldview, whose ability to grasp the dynamics of nonlinear systems "has made it possible, perhaps for the first time, to articulate conceptions of nature that are expansive enough to accommodate many of the distinctively value-laden experiences, practices, and institutions that humanists and hermeneuts have been trying to protect" (Depew and Weber 1995: 495).

This is not the place for an excursus on complexity, causation, control, self-organization (Pattee 2000) or the resulting expanded evolutionary synthesis (Carroll 2000) with its concepts of teleonomy—goal-directedness through the operation of a double program embodied in the genome (Mayr 1974), and trends—dispositional properties and propensities (Gilbert et al. 1996), which, in synergy, endow human children with a genetic

propensity to acquire and participate in culture as a way of expressing their phenotypes (Jablonka et al 1998; Naccache 1999).

We will simply take advantage of this new vantage point, first, looking back, to note that "Evolutionary Archaeology" and "Evolutionary-Behavioral Ecology" studies (Durham 1990; Boone and Smith 1998; Murray 2002; O'Brien and Lyman 2002; Shennan 2002) are basically misdirected efforts, no matter what punctual illumination they might provide (Shennan 2000; Boone 2002), not so much, as often pointed out, for their attempts to draw analogues between culture and biology and apply to the former concepts developed for the latter, but because such reductionism is not called for anymore by the expanded biological synthesis. Then, looking forward, and while acknowledging the insights upon the behavior of social systems elicited by viewing the history of human societies through a single feature of the modern scientific worldview, such as complex adaptive behavior (Adams 2001; Bar-Yam in press), to submit that it is only the vantage point afforded by all these features combined that might eventually allow us to subsume Human History under the general field of Natural Sciences and develop an account of "Co-Evolving Humans and Their Societies," that is, to bridge the chasm between Biology and Culture (Trigger 1998).

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Our first step in that direction was to survey this chasm, looking for a narrowing where both banks are solid and could anchor a bridging structure.

The human lineage did not escape the "tyranny of the present" so long ago, and only yesterday we were still enthralled by Essences, and very much like the morning mushroom who "does not know what takes place between the beginning and end of a month" (Chuang Tzu, I.2). But today we know the Age of the Universe and of Life on Earth and that "*there are no things, only processes*" (David Bohm). We can trace this learning curve from Karl Marx's insight that "the coincidence of the changing of circumstances and of human activity can be conceived and rationally understood only as *revolutionising practice*" (3rd thesis on Feuerbach 1845), through Waddington's admonition that "any mode of thought which attempts to attribute to man or any other organism any form of unchanging essence, or any character that is conceived as *being* rather than *becoming*, flies in the face of our whole understanding of biology" (Waddington 1975 (1961): 268), to Bonner drawing "the great lesson that comes from thinking of organisms as life cycles is that it is the life cycle, not just the adult, that evolves. In particular, it is the building period of the life cycle—the period of development—that is altered over time by natural selection. It is obvious that the only way to change the characters of an adult is to change its development" (Bonner 1993: 93).

This "epistemological ford" between Biology and Culture has lured "bridge makers" from both banks, such as Waddington's 1961 projection that "man's ethical feelings are essentially involved with, and in fact are actually a part of, the mental mechanism by which he is developed into a being capable of receiving and accepting socially-transmitted information" (Waddington 1977: 277) that was grasped by Roy Rappaport, who concluded that "if the world is to have any words at all it may be necessary to establish The Word—the True Word—to stand against the dissolvant power of lying words and many words, to stand against falsehood and Babel," and took "the foundry within which the Word is forged to be ritual" (Rappaport 1999: 21); or French Sociologists attempt to unravel the

human cognitive structures by focusing upon the processes of social reproduction (Bourdieu 1970); and the French Middle Paleolithic school of "technological analysis" (Chazan 1997), which looks at artifacts not as finalities, objects to be measured and quantified, but as evidence of the learned knowledge (*connaissance*) and skill (*savoir-faire*) of the people who manufactured the objects, drawing upon the centrality of rituals in the production/re-production of human life.

The second step was to look for "inference cables" that could be spun from both banks. These we found within the vast output of the Cognitive Sciences, the interdisciplinary enterprise devoted to understanding the mind. If many CS schools have relied on formal analysis and purely internal computational terms, and as a result produced theories that do not lend themselves to evolutionary analysis, others have revealed an evolving, embodied and culturally embedded mind.

A group of the latter kind provides a spectrum of perspectives on language, an important aspect of culture, smoothly spanning from Biology to Culture. Most overarching is Gerald Edelman's "Neural Darwinism" (Edelman 1992), a theory, firmly grounded on the Biology bank, of how we came to have minds. Congruent with it and also overarching from Neurosciences to Linguistics, is Sydney Lamb's "Neurocognitive Linguistics" (Lamb 1998), whose "Relational Network Hypothesis" about the activation of the neurons' connections provides a realistic neuroanatomical basis for language. Lamb's model is well supported by the Neurosciences' recent picture of brain evolution (Finlay et al. 2001). Talmy Givón's "Functional Grammar," and more recently "cognitive neuro-linguistics" (Givón 1978; 1998), overlap with Lamb's functional linguistics while highlighting the socio-cultural accretion of the components of language. It is as securely moored on the Culture bank as is P. J. Hopper's "Emergent Grammar" (Hopper 1998), which sees the forms of language as embedded in formulaic construction, basically prefabricated but repeated with local variations. The picture of language revealed by these approaches is that of a communication system consisting in a group of interconnected components that are relatively independent from one another, without fixed structures, shaped by communication in ongoing processes, and whose history of emergence from Biology and accumulation through Culture it is possible to track.

We have tried to reinforce this cable by spinning with it individual strands, contributed by other schools linking evolutionary theory and cultural psychology (Tomasello 1999), or providing grids for tying language and cognition with the social processes of acculturation, through the individual's drive for causal knowledge (Gopnik and Meltzoff 1997), or for interpreting other minds (Bogdan 2000).

The result, overarching however sketchily from Biology to Culture in one coherent and consistent structure, is the Framework of Modes of Evolution (Naccache 1999). How this framework could be used to track the emergence of human language from the communication systems of Advanced Mammals, or to sight late landmarks in the evolution of language, has been explored elsewhere (papers in preparation). Here it will be used to focus attention on the mechanisms of cultural accumulation and emergence.

Only the three later Modes of Evolution (MoE) play a role in Cultural Evolution, but, to indicate how they are derived from observing the Darwinian processes of imperfect and

differential reproduction controlling the life cycle of all organisms, from bacteria to human societies, we need to sketch the overall architecture of the framework.

The source of imperfection in the reproduction of the genome from one generation to the next is the same in all cases, consisting, for sexually reproducing organisms, in the random mutations, errors of reproduction and recombinations that happen to the genome during its replication. But parental investment in offspring development, a factor greatly affecting the process of differential reproduction, varies systematically with organisms having progressively more extended phenotypes. Our framework identifies seven successive and nested elaborations of this process.

The Basic MoE characterizes the millions of species whose members' individualistic survival strategy stops at reproduction and ignores their offsprings. With the Reptilian MoE, emerging 300 Million years ago, the parent phenotype started contributing in an organic way, through the amniote egg, to the organic growth of the next generation genome. The Archaic Mammalian MoE, emerging 200 Mya, increased that organic contribution through viviparity, and added parental behavioral protection and care of the offsprings. The Progressive Mammalian MoE, emerging some 30 Mya, is characterized by a further level of parental behavioral intervention in the expression of the behavioral repertory of the next generation's phenotype, in other words, by teaching.

Much of what makes us what we are, from our metabolism, body plan, immune system, limbic-brainstem mediated emotions, territoriality and gregariousness has been laid down successively under these MoE. But our *societies* are also, or rather mainly, the products of the workings of three additional MoE.

The "Sociocultural" MoE emerged when the life-history and social behavior of a species made possible an extension to the parent-offspring life cycle setup consisting in a multi-generational "Social Memory" shared by a group. The content of Social Memory, though still embodied in individual phenotypes and depending on their direct interactions for its transmission, is sustained by a social group as a whole, and not by an individual phenotype alone. The Social Memory of a group can therefore outlive each of its individual carriers, preserving through the generations the group's communicative social rituals, and insuring the perpetuation of the group-specific epigenetic process that nurtures the continuously interpreting minds of infants and then juveniles into adults socialized in the specific ways of their group. Only in the last decade has it been discovered that not only *Homo sapiens* but also Chimpanzees, Bonobos, Orangutans (van Shaik et al. 2003), Dolphins, Orcas and Elephants display to various extent group-specific behavioral repertoires that are actively transmitted across generations, and thus belong to the select "Nurturing Mammals" club.

If achieving the long life, large brains and social complexity required to sustain a Social Memory has been within reach of a few species, the next extension to the life cycle set-up appears till now to have been achieved only by one. Tool use and even tool modification is attested among Chimpanzees (apparently Bonobos live in such nourishing environment that they do not need the help of tools to feed themselves), Elephants and even Dolphins and Orcas. But only the *Hominids* have incorporated tool manufacture in their behavioral repertoire. This appears archaeologically 2.5 Million years ago with the lithic industries, which provided the Hominid phenotype with a power-enhancing and durable "Extrasomatic Extension" transmittable across generations. The incorporation of

this extension to the life-cycle setup introduced the "Extrasomatically Enhanced Sociocultural" MoE, under which the Hominids' potential ability to interact with their environment is greatly increased, while parental behavioral interventions in the organic and behavioral growth of the offspring is augmented and intensified.

After more than five million years of coevolving under the Socio-cultural MoE, during the last half of which the Extrasomatic Extension played its enhancing role, humans started to intentionally manufacture artifacts carrying specific references to social memories shared by a group, i.e., symbolic messages. The symbol-bearing inorganically-supported artifacts that first appear some 250,000 years ago constitute the emerging "Exosomatic Memory,"[3] whose semi-autonomy from individual human phenotypes—the artifacts still need to be "read" or activated in, or by, an individual—progressively relaxed the social and chronological contiguity conditions required for the transmission of messages between their makers and their readers, simultaneously increasing the load-bearing capacity of Social Memory. This distinct new extension to the Hominid life-cycle setup characterizes the "Tinkering" MoE, and can be tracked, from excruciatingly slow beginnings to its present explosive, inflationary growth.

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To illustrate the potential of this framework to highlight and organize cognitively-relevant archaeological data we have used it to construct seven "snapshots" covering the period from 40,000 to 4,000 years B.C. To express the fact that Social Memory, Extrasomatic Extension and Exosomatic Memory do not exist in a vacuum, but are maintained by independent and self-sustaining populations, their nested boxes are enclosed in a field labeled as World-System (Chase-Dunn and Hall 1997: 27-40) and World-View.[4] The World-System is specified by the geographical area over which it existed, the time period of the particular "snap-shot" and the estimated size of population it involved. The qualifier of World-View, the overall cognitive potential of such a group of humans, aims at avoiding confusion with identity-conscious social units of the historical periods (Clark 2002: 54).

These figures are woefully incomplete sketches, lacking examples and references—for reasons of space and the limitations of their compiler. Yet they might have some heuristic value, as hopefully shown by the following remarks about the phenomena of accumulation and emergence in Cultural evolution they elicited.

- Having entered together into the archaeo-continent of Globowania 100,000 years ago (Gamble 2001), different lineages of World-Systems reached the Neolithic stage within just a few thousand years, in Syria-Palestine, China, the Andes and New Guinea, in remarkable synchrony. This cannot have occurred only because of similar responses to environmental pressures, and must have involved similar mechanisms and rates of cultural accumulation. The World-Systems spread over the planet must be seen as members of a class of systems with common cultural accumulation mechanisms contingent on ecological constraints. It is only between analogous neighboring systems that a continued mixing of ideas and genes (Kramer et al. 2001) could have happened.

- The correlation between the growth of Social Memory (SM) and the size of the social group that sustains it raises two questions. First, how much of the extremely low rate of cultural accumulation during the Palaeolithic should be accounted for by the "boom

and bust" pattern of population reproduction that prevailed then? Near-zero long-term population growth rates have resulted from periods of relatively rapid local population growth punctuated by infrequent population crashes (Boone 2002). Such crashes are also likely to have wiped out most of the groups' SM. So we have to think of cultural accumulation, at least till the Upper Palaeolithic, as slowly accreting over cycles of accumulation and losses. Secondly, what accretion there was probably resulted from artifacts preserved between growth and decline cycles serving as ratchets, that is, from the compounding effects on SM of the Extrasomatic Extension (EE) and Exosomatic Memory (EM). At least, these two ideas have to be entertained alongside that of repetitive, distinct and separate waves diffusing ideas and/or population (Saragusti and Goren-Inbar 2001).

- A comparison of the artifacts of EE in 40,000 and 14,000 B.C. points to a clear increase in the complexity of the "savoir faire" required for their production. Fine-grained description of such a trajectory could shed light on the development of the linguistic aspect of SM. For instance, the development and transmission of string technology (leading to the production of nets and snares and the "Wide Spectrum Revolution") must have been correlated with an increase in verbal transmission, possibly leading to the emergence of "Language of Initiates" (Givón 1979). In return, this development in communication might have facilitated the social sharing and accumulation of "connaissances" and therefore the cumulative development of bone-working, grinding and other expert "savoir faire."

- A comparison of the development of EM similarly reveals the elaboration of rituals and codes in interpersonal relation and in artistic production. A beautiful example is provided by the development of friezes, from the 72,000 years old simple regular notches of Umm el-Tlel (Boëda et al. in press) to the Natufian friezes found in the same area. This process of elaboration of the symmetry code expressed in friezes (Jablan 1995) might well hint at what must have been the likewise progressive, cyclical and slowly ratcheting elaboration of the Grammatical Code, the last emerging component of the Linguistic Communicative Code System (Givón 1998).

- Even though these figures refer to only a subset of the cognitive components of SM, they help us perceive that these components had been differentially enhanced through accumulation of EE and EM at different periods. Using the "Multiple Intelligence" taxonomy, it could be argued that, beside Linguistic, the Logico-Mathematical, Musical and Spatial Intelligences would have been ratcheted by external memory storage during the Upper Palaeolithic, but that the Bodily-Kinesthetic, Personal-Interpersonal, Naturalist and Existential Intelligences would not. These last will be affected by later growth of EM.

- The dynamic of why it is the Natufian and not a previous episode of settlement that played such a decisive role in ushering the Neolithic "Revolution" has yet to be elucidated (Cauvin 1997: 41). Remembering that this "Revolution" was not consciously planned, we suggest that, like the agricultural toolkit had to have been developed for other purposes so it would be available to be adapted or specialized for incipient agricultural uses, the cognitive communicative skills needed to smooth social interactions among large groups of permanently coexisting humans had to have been previously developed for other purposes so that they could be adapted during the Natufian to sustain the settlements' permanence. We further suggest that it is the particular elaboration of the linguistic system we alluded to above, namely the development of "language of initiates," that was,

spandrel-like, exapted for the social initiations, rituals and formulae needed to allow many groups of hunter-gatherers to permanently coexist in close proximity.

- The resulting sustained high brain population densities in turn activated the potential for extreme rationalization and sophisticated forms of abstract thought with which our species had long been endowed (Patterson 1998), with dramatic consequences for the ratcheting of cultural accumulation.
- In a first stage, settled villagers seem to have aggregated under the intoxicating attraction of the open-ended new social realm of possibilities that were fortuitously accumulating through discovery and/or borrowing, giving rise to what has been called the "Ritual Economy" of the Pre-Pottery Neolithic (Kuijt 2000a). This phenomenon is illustrated by their luxuriant use of new material and technologies, such as plaster (Balter 2001). But, within a few millennia, the compounding rate of artifacts accumulation in EE and EM was such that a ritual-based social organization, which was adequate to maintain and reproduce rituals tasks, such as planting, harvesting, storing and distributing grain, or even adjudicating conflicts, could not cope anymore.
- To manage the diversifying economy, specializing technologies and multiplying exchange systems whole new social networks had to emerge, and it is in the production and reproduction of these networks that from then on people were socialized. The cognitive correlate of this socio-economic shift has been described as utilitarian ratiocinations taking over non-utilitarian ones (Patterson 1998), or as transition from a Mythic to a Theoretic stage (Donald 1993).

It is exciting to sense that the trajectories that led from the Jerf el-Ahmar's bard—who inspired the earliest "pictographes"—to the consummate art of Demosthenes and from agriculture conducted as a communal social ritual to Mago's Treatise on Agriculture, or that the elements that made possible the autocatalytic growth of Exosomatic Memory from pictographs, to tokens, to picto-ideographic, syllabic and alphabetic writing with ever-increasing ease of reproduction, through the emergence of "Language Professionals," formal schools, the separation of the knower from the known and the replacement of knowledge by empathy by knowledge by analysis, are all there in the Near East archaeological database for us to study.

Hopefully this budding attempt at picturing both humans and their societies in their co-evolving processes of cognitive, social and cultural elaboration will be found worth pruning and cultivating.

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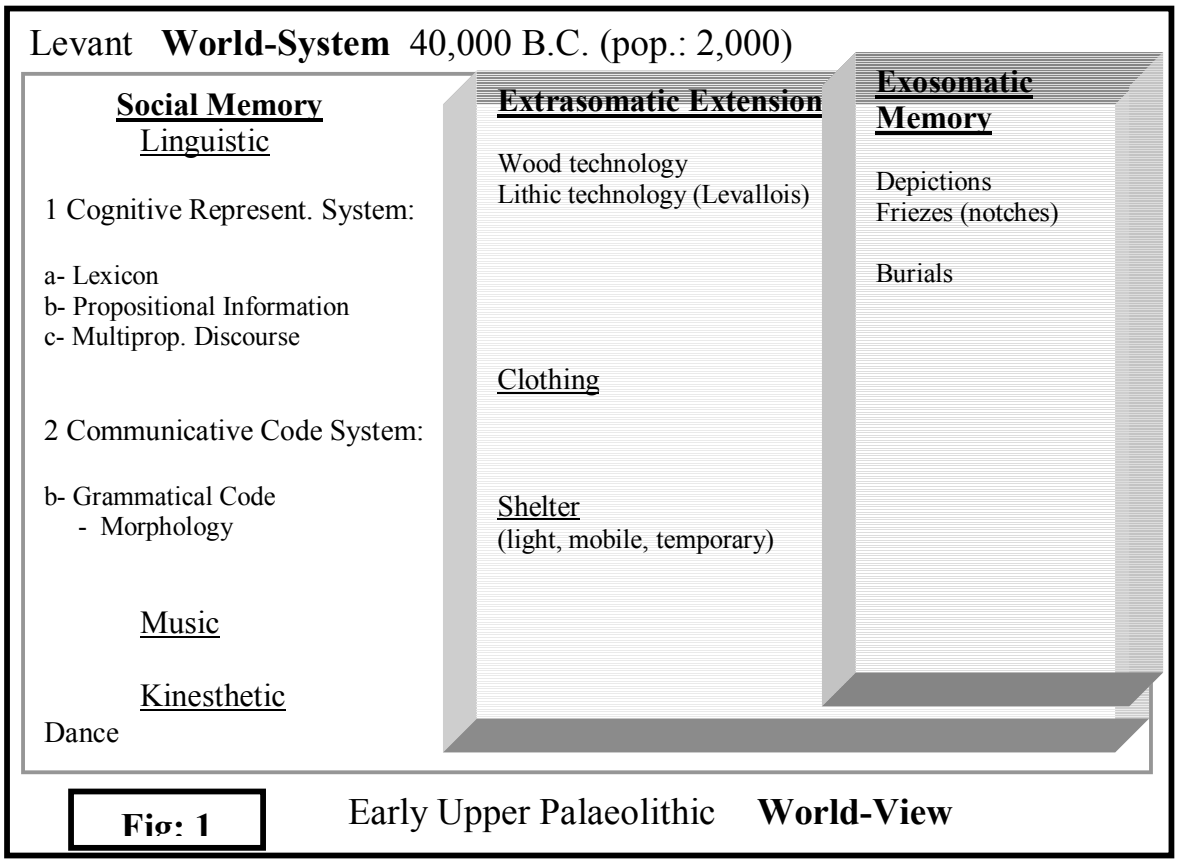


Fig: 1 Early Upper Palaeolithic **World-View**

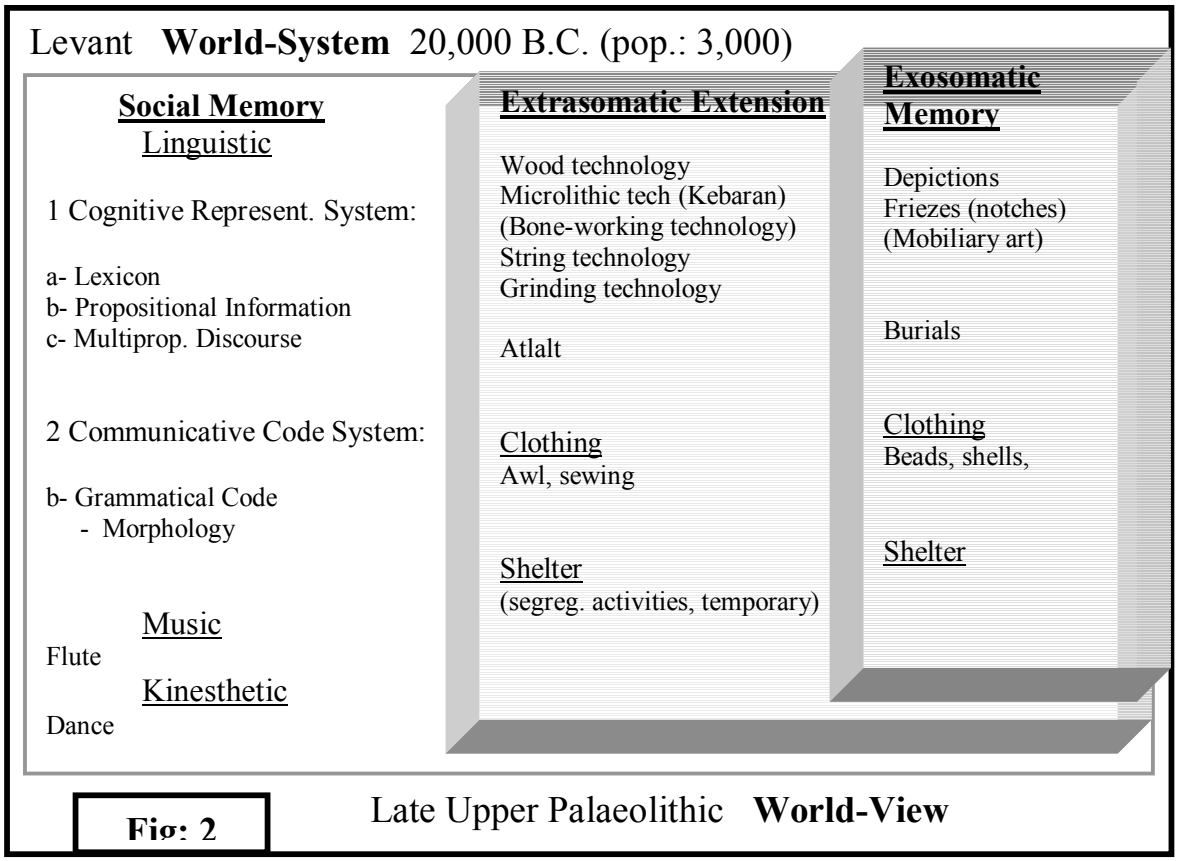


Fig: 2 Late Upper Palaeolithic **World-View**

Levant **World-System** 14,000 B.C. (pop.: 4,000)

Social Memory

Linguistic

1 Cognitive Represent. System:

a- Lexicon
b- Propositional Information
c- Multiprop. Discourse

2 Communicative Code System:

b- Grammatical Code
- Morphology

Music

Flute

Kinesthetic

Dance

Extrasomatic Extension

Lithic tool kit
String technology
Bone technology
Atlalt
Bow
Grinding tools
(dogs)

Clothing
Awl, sewing

Shelter
"Round Houses"

Exosomatic Memory

Mobiliary art
Depictions
Friezes (notches)

Burials

Clothing
Beads, shells,

Shelter

Fig: 3 Kebaran **World-View**

Levant **WorldSystem** 11,000 B.C. (pop.: 5,000)

Social Memory

Linguistic

1 Cognitive Represent. System:

a- Lexicon
b- Propositional Information
c- Multiprop. Discourse

2 Communicative Code System:

b- Grammatical Code
- Morphology

Music

Flute, drums

Kinesthetic

Dance

Extrasomatic Extension

Lithic tool kit
String technology
Bone technology
Atlalt
Bow
Grinding tools
Stone vessels
Dogs

Clothing
Awl, sewing

Shelter
Houses
Storage

Exosomatic Memory

Mobiliary art
Depictions
Friezes

Anthropomorphic representations

Secondary burials

Clothing
Beads, shells,

Shelter
(domus)

Fig: 4 Natufian **World-View**

Levant **World-System** 9,500 B.C. (pop.: 20,000)

Social Memory

Linguistic

1 Cognitive Represent. System:

a- Lexicon
b- Propositional Information
c- Multiprop. Discourse
Myths / Epics

2 Communicative Code System:

b- Grammatical Code
- Morphology

Music
Flute, drums

Kinesthetic
Dance

Extrasomatic Extension

Lithic tool kit
Bone technology
String technology
Atlalt
Bow
Grinding tools
Stone vessels
Polished axes
Dogs
Pyrolithic

Clothing
Awl, sewing

Shelter
Houses, Public spaces
Lime, plaster,

Exosomatic Memory

Mobiliary art
Depictions
Friezes
Anthro. Rep (pottery)
Pictographs
(Tokens)
Skull cache burrials
Clothing
Beads, shells,
Decorations

Shelter
(domus)
Ritual Architecture

Fig: 5

Sultanian **World-View**

Levant+Steppe **World-System** 7,500 B.C. (pop.: 50K)

Social Memory

Linguistic

1 Cognitive Represent. System:

a- Lexicon
b- Propositional Information
c- Multiprop. Discourse
Myths / Epics
Metaphors

2 Communicative Code System:

b- Grammatical Code
- Differentiated Morphology

Music
Flute, drums

Kinesthetic
Dance

Extrasomatic Extension

Lithic tool kit
Bone technology
String technology
Atlalt
Bow
Grinding tools
Pyrolithic
Pottery
Dogs
Sheep and Goats

Clothing
Awl, sewing
Weaving

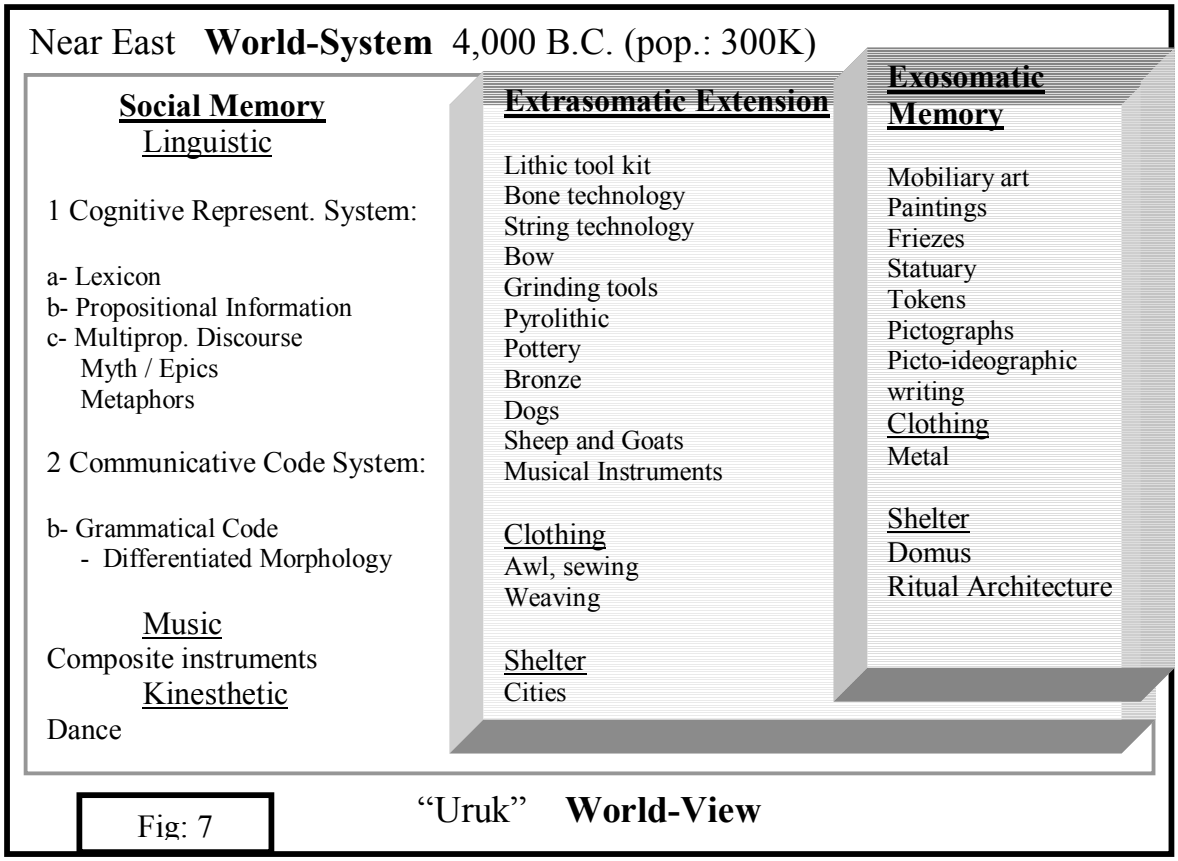
Shelter
Square Houses, Temples
plaster, bricks, masonry

Exosomatic Memory

Mobiliary art
Depictions
Friezes
Anthro. Rep
Statuary
Skull plastering burials
Tokens
Pictographs
Clothing
Polished stone bracelets
Shelter
Domus
Ritual Architecture
Sanctuaries

Fig: 6

Big Arrowheads Industry **World-View**


Near East World-System 4,000 B.C. (pop.: 300K)
Social Memory
Linguistic
1 Cognitive Represent. System:
a- Lexicon
b- Propositional Information
c- Multiprop. Discourse
Myth / Epics
Metaphors
2 Communicative Code System:
b- Grammatical Code
- Differentiated Morphology
Music
Composite instruments
Kinesthetic
Dance
Extrasomatic Extension
Lithic tool kit
Bone technology
String technology
Bow
Grinding tools
Pyrolithic
Pottery
Bronze
Dogs
Sheep and Goats
Musical Instruments
Clothing
Awl, sewing
Weaving
Shelter
Cities
Exosomatic Memory
Mobiliary art
Paintings
Friezes
Statuary
Tokens
Pictographs
Picto-ideographic writing
Clothing
Metal
Shelter
Domus
Ritual Architecture
Fig: 7
"Uruk" World-View

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[1] Price is noteworthy in that it indicates a trend by devoting a special heading to "Ideological Change and the Neolithic" next to and not subsumed under "Causality and the Neolithic."
[2] It does not seem that the tripartite division between infrastructure, structure and superstructure advanced by "Cultural Materialism" (Harris, 1993) is being explored by N.E. Archaeologists.
[3] Preferable to "Artificial Memory Systems" (d'Errico, 1998).
[4] World-View was preferred to Habitus, with its emphasis on independent systems of socially acquired dispositions (Bourdieu et Passeron 1970), or Culture, in the archaeological usage of the term, for its easy association with World-System.