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SCIENTIFIC LINGUISTICS, A NEVER-ENDING HISTORY

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Abstract

1866 was a turning point in scientific linguistics when the Linguistic Society of Paris banned all papers and presentations on the origin of language. De Saussure locked up the debate with two concepts, diachrony and synchrony. I intend to examine the emergence of the hypothesis of a single origin of human articulated languages, in Africa first, and then Black Africa. The phylogenic approach of biological studies has today spread to linguistics. Sally McBrearty rejected the idea of a Neolithic revolution. Consequently, Black Africa became a major field of archaeological research. Yuval Noah Harari stating the existence of a symbolic revolution around 70,000 years ago, rejected Black Africa along with the Americas, and the Denisovans. Asia has become a major archaeological field. Julien d'Huy implements phylogenetic arborescent technique to the study of myths. The oldest form of a myth is not the origin of it. In oral civlizations some literate individual had to tell the story behind representations for the people to understand, appreciate, and remember them. I will then consider structural linguistics (Noam Chomsky & Universal Grammar). UG has never been able to develop semantics within its own system (Generative Semantics & George Lakoff). Science is always a temporarily approximate vision of what it considers. First, what any science explores is constantly evolving following phylogenic dynamics that are contained in the very objects of such scientific studies. Second, any new knowledge appearing in the field concerned causes a complete restructuration of what we knew before.

Keywords: Phylogeny, origin, diachrony, Black Africa, migrations, language families;

1. INTRODUCTION

When you extensively read in the field of sciences, all sciences, both hard sciences that include a lot of technology, soft sciences, and humanities alike, you come across two antagonistic trends, and the third proper one is missing. On one hand, you have those who oppose scientific and technological change and progress, considering most of the time that any supposed improvement comes along with something even worse that brings humanity down towards its own perdition. On the other hand, you have those who consider science is the only way, and we have to follow its guidance 100%. The present COVID-19 pandemic and the vaccination that might be one way – though not the only way – to get to herd immunity as fast as possible, reveal a strong opposition to any vaccination at all by principle with arguments that

can be as extreme as “It’s tampering with God’s will,” or in secular terms “It’s tampering with nature.” The most common argument on this side of the divide is that we have not tested the vaccines for side-effects seriously, particularly on weak or aging people. True enough, the emergency in which these vaccines were produced prevented any extensive and serious testing for side effects with all types of people, particularly those who have some weakness due to age and disease. Yet on the other side of the divide, people can easily see that the death rate is maybe only 1% but the virus is spreading faster and faster and mutating into new strains that are spreading even faster. Vaccinating the population to reach herd immunity is probably the only way, or at least the most effective way, to contain the disease as fast as possible. That means the vaccinated people must be under serious control to make sure they do not have undesirable side-effects. But for some, vaccination is the only response possible and that is absolutely wrong. Social distance and barrier gestures are indispensable to slow down the spreading of the disease, and as long as the virus is not eradicated, if it ever will be, such barrier gestures and social distancing will have to remain in place.

What I say here to start my presentation is that the anti-vaccination side, as well as the pro-by-all-means-vaccination camp, are wrong, no matter what their arguments might be, scientifically or socially right or wrong. The coronavirus known as COVD-19 reveals that to face the crisis brought up by it, we need to find a middle way that states extreme positions are neither necessarily wrong nor unavoidably right, but they both are too short on the real situation. There is never in any way any final solution, any final point, any terminal destination beyond which a problem will be forever solved, a question will be forever answered. We have to retain from the anti-vaccination side the idea that nature’s (or God’s) intentions are at least difficult to know but they have to be respected: we must not lose our natural human essence by turning ourselves into robotic or even nanorobotic machines. We also have to retain from the pro-at-all-cost-vaccination camp the simple idea that vaccinating is going to be a great accelerator towards herd immunity first and full containment second, provided the side-effects are not worse than the original disease, though we have to be vigilant on this point. But we would be wrong not to see that containment will never be secure enough to go back to some “normal” social functioning if we do not keep and even institutionalize the famous barrier gestures, knowing that these barrier gestures will be difficult to respect in some situations in the world, in some countries even, and in some social classes in our societies. And social distancing will have to be kept, though we have to make sure that it does not destroy any social life or social contacts, turning humans into some kind of spiders locked up in an entirely closed densely populated if not overpopulated space, and we know the result for spiders, and we can imagine the result for humans: suicides and a survival (paper?) race of every moment.

I can now turn to the particular science I am going to examine under that light, linguistics. It is both a physical and social science, hard (when dealing with sounds, morphology, and syntax), soft (when dealing with semes and semantics), and social (when dealing with communication in social or cultural contexts) science. But let me be clear from the start. Noam Chomsky did not find the recipe of Universal Grammar in the Thora. Ferdinand de Saussure and Gustave Guillaume did not find their diachronic and phylogenic approaches in the New Testament of the Bible. Panini did not find his grammar of Sanskrit in Hinduist or Buddhist sacred texts since Hinduism was in the process of developing and Buddhism was not yet transcribed into Pali first or Sanskrit second.[1] Linguistics does not come from any sacred text and it is not dealing with a raw material that evades scientific investigation. Like all other sciences, linguistics is never finished, fully achieved, or completed at any time of its history including today and tomorrow. It is, like all sciences, a non-finished attempt to understand and explain the functioning of the ever-changing perceptible objective substance it tries to explore. Let’s enter modern linguistics starting in 1866 in Paris.

2. THE MYTH OF UNIVERSAL GRAMMAR

In Linguistics we have a long history of grammarians or linguists who have declared their cogitations on one particular language or a group of languages were the final state of knowledge on this or these languages. In this field of science, the only possible discussions come as a confrontation between several schools that are reciprocally excluding one another. The first linguist of note to use mathematics,

[1] Pāṇini, Sanskrit philologist and grammarian in ancient India. Pāṇini is the "first descriptive linguist", or even “the father of linguistics.” Era: floruit 4th century BCE; floruit 400–350 BCE; 6th–5th century BCE

hence what is considered as undebatable science (but is it really? We all know the debate about Euclidean geometry.[2] In the real universe, straight lines don't exist. They are always concave or convex and flat planes do not exist either, hence parallel lines do not exist since straight lines do not exist.), was Zellig Harris.[3] He used statistics to determine the end of a word, not in writing but in language in general, hence in oral speech. He had observed that the phoneme that comes after the last phoneme of a word is widely open as for choice, whereas within a word the choice is a lot more limited. This indicates the cuts between words, hence the units of a particular discourse. The units can be defined either as semantic or as syntactic. Zellig Harris was working at first on Semitic languages and he used mathematics to generalize what he discovered. In his own retrospective survey (published as Harris, *The background of transformational and metalanguage analysis*, 2002b, original English text of Harris, 1990), he said: "it was possible to describe the entire program from the outset". Nevertheless, working out its consequences and demonstrating its results required many years of painstaking work, with tests in many languages. This idea of linguistics being an entire program, meaning it has a beginning and an end, and that the end is the end, hence perfect knowledge, not to say the truth, is the perfect vanity of some rationalistic structuralists who constantly keep in mind the fact they are targeting this absolute truth, this final knowledge terminating the search itself, and that we will only have to check the results in new languages. It does not mean Zellig Harris or Noam Chomsky were of that type, but it is the general idea that comes out of the publications of these linguists, particularly their followers who might want to prove more than they should, students often try to outdo their professors.

But before considering Noam Chomsky, it is important to qualify Zellig Harris a little bit more.

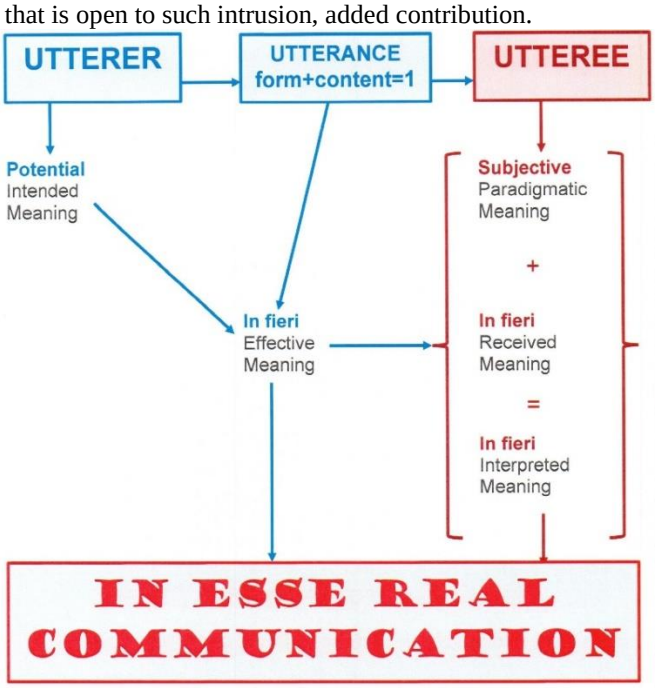
> "Harris worked a subject deeply before bringing it to publication. The appearance of discrete "stages" reflects how long it took to work the data of language into confirmations worthy of presentation.
>
> "For example, in the course of his investigations as a Semitist, he laid the foundations for the distributional methodology (Stage 2), summarized in *Methods in Structural Linguistics* (1946/1951), which seems suddenly to have sprung into view in a series of papers beginning with the (1940) review of Gray's Foundations of Language. Similarly, transformations and the correlation of linguistic form to linguistic information were evident from the beginning (Harris, "The background of transformational and metalanguage analysis," 1990/2002). When Leigh Lisker became his student in 1939, he was already teaching transformational analysis and discourse analysis (Stage 3), including the work on Hidatsa (*Hidatsa Texts*, 1939c), more than a decade before it was first published (1952).
>
> "Harrisian distributionalism is usually represented as a prime exemplar of the alleged striving of 'Bloomfieldians' to eliminate meaning from linguistics. In fact, it explicates Leonard Bloomfield's affirmation that the form of an utterance and the meaning that it conveys are two aspects of the same thing. It has a deep connection with the search for configuration and pattern in language data exemplified by Edward Sapir, who regarded Harris as his intellectual heir. Harris was more open than most of his contemporaries to developments in the Prague school and elsewhere in Europe, such as the work of Roman Jakobson who he assisted in getting established in the U.S.

[2] Euclid's five postulates : 1. A straight line segment can be drawn joining any two points. 2. Any straight-line segment can be extended indefinitely into a straight line. 3. Given any straight lines segment, a circle can be drawn having the segment as radius and one endpoint as center. 4. All Right Angles are congruent. 5. If two lines are drawn which intersect a third in such a way that the sum of the inner angles on one side is less than two Right Angles, then the two lines inevitably must intersect each other on that side if extended far enough. This postulate is equivalent to what is known as the Parallel Postulate.

[3] The work of Zellig Harris in language, grammar, and information, and in the methodology of linguistics, is remarkable for its consistency and integrity over a span of almost 60 years, culminating in an elegant and comprehensive theory of language and information. I consider two books as fundamental to understand the logic of his work. 1951, Methods in Structural Linguistics. 1968, Mathematical Structures of Language. After https://zelligharris.org/description.html

> "The work on linguistic information that is made most explicit in Stage 5 is thus the formative theme underlying all of Harris's work from the beginning. The correlation of form and information is the motivation for distributionalism, discourse analysis, transformational analysis, and the identification of elementary transformations (*Transformations in linguistic structure*, 1964; *The two structures of grammar* 1969). The analysis of elementary sentence-differences led directly to Operator Grammar (Stage 4), the "least grammar" (*Language and Information*, 1988:57) with which we may characterize the informational capacities of language. Carrying this forward into sublanguage analysis discloses the information "in" or "carried by" a given utterance. The form of an utterance, taken within the patterning of the language, is itself the "semantic representation" of the information "in" the utterance, as distinct from additional kinds of meaning brought to it by the recipient."[4]

This long quotation insists on the fact the semantic dimension of language is essential because language is communication, and this semantic content is connected directly to the form of the utterances or discourse. At the same time, he knows the recipient of the discourse will add some meaning from his or her own mental awareness of what the discourse is dealing with. That's a major difference with Noam Chomsky who totally reduces the discourses he analyzes to what the utterer formally – meaning by the form the utterance carries – projected into it, which is limited in understanding by the tremendously dangerous objective that he, Chomsky, deals with the standard language of the average person in an average discursive situation. Harris knew there is nothing average in communication and it always depends on the utterer and the utteree. Both add to the plain structure of the utterance a whole paradigmatic flow of information that actually determines the meaning for both the utterer and the utteree. This is a lot more interesting than it may look. The concept of utteree is far from being admitted by all linguists as fundamental in any kind of communication. Think of Gustave Guillaume for example who speaks of "effet de sens" which means "effective meaning produced by the real form of the utterance as produced by the utterer." If you want to introduce the utteree, you have to understand that the meaning for him will be what meaning he captured in the effective meaning intended by the utterer hybridized with what he/she, the utteree, is projecting into this form. The form of the utterance contains an effective meaning from the utterer that is captured partially or not by the utteree who anyway projects his/her own meaning into the form that is open to such intrusion, added contribution.



[4] The Work of Zellig Harris, https://zelligharris.org/description.html

Zellig Harris was the research director of Noam Chomsky[5] who worked in priority on English and generalized what he found out to all languages. I use the verb "find out" because for these structuralist linguists everything they presented was a discovery. Chomsky targeted an abstract model of language seen as one human ability more than numerous particular virtual material tools to communicate. They both created the field of what was called at first transformational grammar and was extended into Universal Grammar[6] later on by Noam Chomsky himself, which Harris did not do when more studies from more linguists considered more languages. There is absolutely no phylogenetic approach in this linguistics. They reject, at least totally neglect, any diachronic approach, any historical approach. A language for them is a fully stable set of rules and lexical items, even at times seen as unchangeable. If they change something it's because they made a mistake first, or they did not consider all the cases they should have considered. It is not the method or the program that is wrong. It is the linguist who is mistaken. Noam Chomsky is totally unable to capture the simple observable fact that languages, any languages, change all the time. But his emphasis on linguistic competence for a whole community defined as homogeneously speaking one language makes him insensitive to linguistic creativity (poetry, literature, even simple political discourse, the discourse of politicians, religious and ritualistic discourses, etc.) and to real living communicational oral language. He worked on and with a normative vision of each language he considered (when he himself got out of standard English) or his followers considered. And that came from the very start. Noam Chomsky's *Syntactic Structures* (1957)[7] introduced a bias in his approach by choosing to build the grammar of a language from, and only from grammatical sentences actually uttered and utterable in the said language. The term grammatical is of course difficult and it is opposed to ungrammatical but also nonsensical. To be accepted a sentence has to be both grammatical and sensical, meaningful. The structure comes first, and the meaning comes second.

> "**2.3** Second, the notion "grammatical" cannot be identified with "meaningful" or "significant" in any semantic sense. Sentences (1) and (2) are equally nonsensical, but any speaker of English will recognize that only the former is grammatical.
> (1) Colorless green ideas sleep furiously.
> (2) Furiously sleep ideas green colorless.
> […]
> Such examples suggest that any search for a semantically based definition of "grammaticalness" will be futile."[8]

The use of the future ("will be futile") in the rejection of any semantic approach is exactly what I mean when calling such approaches the absolute reference to a norm. Chomsky here establishes a norm that rejects any alternative to what he may say or think, and "generative semantics" is not yet in the picture. The condemnation of future attempts to consider things differently is just rejected before it has come into existence. He aborts the alternative theory even before it has been conceived, impregnated into some kind of fetal life. We have the same closure of any discussion possible, any alternative imaginable, with Chomsky's declaration, once and for all, that language is the result of a "black box" in the brain of any human being and that black box is innate and it precisely contains Universal Grammar. Hence Universal Grammar is genetic.

> "Chomsky proposed that each of us has a **Language Acquisition Device (LAD)** – what he sometimes called a "little black box" – that starts functioning when we are still infants. By the time

[5] Noam Chomsky, (1928-) an American linguist, philosopher, cognitive scientist, historian, social critic, and political activist. Sometimes called "the father of modern linguistics."
[6] Universal grammar, in modern linguistics, is the theory of the genetic component of the language faculty, usually credited to Noam Chomsky. The basic postulate of UG is that a certain set of structural rules are innate to humans, independent of sensory experience.
[7] Noam Chomsky, *Syntactic Structures*, Mouton, The Hague, 1957.
[8] Noam Chomsky, *Syntactic Structures*, Mouton, The Hague, 1957, p.15.

> we are five or six, that device has enabled us to vacuum from our immediate environment a native language based on **universal grammar**. Put another way, all languages are fundamentally the same, irrespective of the cultures we live in [or the general architecture of the languages of the world that can be seen from four different architectural points of view: root languages, isolating languages, agglutinative languages, and synthetic-analytical languages. My comment.]. They are the function of a large number of words (arbitrary symbols whose meaning is set by convention) and a limited number of grammatical rules that are somehow structured into our brains and minds."[9]

After such a ukase, there is no possible discussion and elaboration on the development of language in children, on the acquisition of a foreign language, on bilingual and multilingual children, on the impact of any, each, and all languages on the way a speaker may think or see the world. Carol Chomsky, Noam Chomsky's wife, tried in the late 1960s to devise a pedagogy of language from her husband's universal grammar theory. Carol Chomsky's best-known book in this field is *The Acquisition of Syntax in Children From 5 to 10* (1969). The book investigated how children develop an understanding of **the underlying grammatical structure** of their native language, as well as how they use this skill **to interpret sentences** of increasing complexity as they get older. The word "understanding" is too strong and we should speak of "apprehending" because even someone who has not received any education and hence has no understanding that would imply that he can explain why the sentence is built this or that way, is perfectly able to speak his native language accurately. Despite earlier scientific beliefs that children complete their acquisition of syntax by the age of five, Carol Chomsky's research showed that children continue to develop the skills needed to understand complex constructions beyond that age. This idea is just trying to open doors that had not been closed at the time (1969) for a very long time, showing she did not consider two essential researchers in the field who essentially worked between 1925 and 1965. Vygotsky[10] would of course oppose such an approach, both Noam Chomsky's black box and Carol Chomsky's purely pragmatic observation about the acquisition of linguistic competence in one or more languages by children. But even Piaget[11] would find it difficult to accept both approaches, at least in his research after the Second World War. If learning any simple fact like the conservation of a volume of water when you shift it from one glass to another that has a different shape, which leads to the acquisition of comparatives, is an observable process in all children at a certain age, it is because it is not innate, even if we may think that visually capturing the said liquid as an entity is the result of the mental ability of any human to discriminate one item from another because of one difference or particular element. Conceptualization is a constructed ability that precisely associates the language developed by the mind through experience to the mental capability of the brain, and the senses that nurture the brain with sensations, to discriminate between these sensations and analyze them into perceptions that are registered, at first in the brain, in some kind of brain machine language if not code, and to which later on words will be attached enabling these mentally controlled words to conceptualize these sensations and the objects attached to them. And conceptualization is a long process that Vygotsky envisaged up to 18 or 20 years of

[9] Peter McKenzie-Brown, "Noam Chomsky's Black Box," Sunday, August 20, 2006, https://languageinstinct.blogspot.com/2006/08/noam-chomskys-black-box.html#:~:text=Chomsky%20proposed%20that%20each%20of,language%20based%20on%20universal%20grammar.

[10] Lev Vygotsky was a seminal Russian psychologist who is best known for his sociocultural theory. He believed that social interaction plays a critical role in children's learning. Through such social interactions, children go through a continuous process of learning. Vygotsky noted that culture profoundly influences this process. Imitation, guided learning, and collaborative learning all play a critical part in his theory.

[11] Jean Piaget, (born August 9, 1896, Neuchâtel, Switzerland—died September 16, 1980, Geneva), Swiss psychologist who was the first to make a systematic study of the acquisition of understanding in children. He is thought by many to have been the major figure in 20th-century developmental psychology, though he recognized in the 1960s he could have come to different conclusions if he had known Lev Vygotsky when he was younger.

age for the most abstract concepts, and we could say that today with the need to learn new things, new techniques, new technologies every day and all along in our lives, this conceptualization is never ended, never terminated, never fully achieved in Life. Check older people over 60 or 65 who have just gotten their first computer, tablet, or smartphone and how they learn how to use these machines.

These structuralist linguists of universal language understand language as if it were a machine, which it is not, even if it is a complex set of tools that people, once they have acquired or developed these linguistic tools, can use freely to express what they want to express, what they have the impulse to express, etc. But when I have rejected this mechanical way of thinking language as an innate universal grammar, it is obvious I have to suggest an alternative, and this alternative has to be phylogenetic: it develops and thus has a genesis, which does not mean it is genetic, from its inner dynamic and within the outside circumstances of the child's environment.

Of course, the newborn is not a tabula rasa. It reaches life with all it has auditorily accumulated from the 24th week of its fetal life onward in its memory: all the vocalic and consonantal clusters of sounds that have had any repetitive presence in the environment of its mother. The first thing it is going to do as soon as it is born is that it will recognize these clusters in real life, hence attach them to some items, objects, persons around it. Before birth, it memorized repetitive clusters, and after birth, it attaches these clusters to references, hence the brain machine code its brain had used before birth to remember the clusters after discriminating them from one another, which was possible because they were repetitive, becomes language. That is the beginning of the construction of the language the child, because now he/she is a child, will acquire and develop, and beyond this first collecting of referentially meaningful clusters, the child starts to mentally walk on the road to conceptualization.

What is innate because something is innate? The ability to discriminate sensorial items in the continuous flow of sensory impacts. The not yet born is just like any other animal: sensations, discrimination, brain machine code for memorization. But the human newborn starts building his/her mind and in his/her mind a language that gives to his/her simple animal discrimination power and memory a completely different dimension: language which develops from "scratch," would you say? Not really. But if you state a universal grammar is innate there is no development anymore, only a process of activation. There is no real free thought, only a more or less open adaptation to some outside stimulus. And that's exactly what the rationalistic structuralists in linguistics have produced, at first in the USA, and then they exported it to the whole world as part of the American cultural domination thanks to Hollywood, the Marshall Plan, and chewing gum. Since 1945 we have been trying to free ourselves from this leash and reopen the scientific field. There is no truth, there are only points of view, and a point of view has any value if it enables more points of view to develop. The pragmatic technological way of thinking that American scientists too often develop is the end of science, the end of progress. It states the full and total truth, and for them, it is the final truth, and it is the technical satisfaction of human needs. And today we are living through a crisis that makes this pragmatic technological vision absurd because the answer to the COVID-19 pandemic is not technological, even with as many vaccines we could invent. It is a whole change in our human way of life. Emerging from this American pragmatic technological vision, the next stage is Ray Kurzweil's[12] hyper-technological answer, the Singularity, when Artificial Intelligent machines will be more intelligent than human beings when the human body will be controlled by thousands of nanobots in our veins, organs including the brain, and muscles to make us able to live in a time when machines are more intelligent than human beings. And these nanorobotic human beings will have better behave otherwise the machines that control all these nanobots will cut them off, implying your death in a few minutes at best, and with no pangs of conscience from the machines.

[12] Ray Kurzweil is one of the world's leading inventors, thinkers, and futurists, with a thirty-year track record of accurate predictions. Called "the restless genius" by The Wall Street Journal and "the ultimate thinking machine" by Forbes magazine, Kurzweil was selected as one of the top entrepreneurs by Inc. magazine, which described him as the "rightful heir to Thomas Edison." PBS selected him as one of the "sixteen revolutionaries who made America." Ray has written several national best-selling books, including *The Singularity Is Near* (2005) and *How To Create A Mind* (2012). He is Co-Founder and Chancellor of Singularity University and a Director of Engineering at Google heading up a team developing machine intelligence and natural language understanding.

But there is more to say about this universal grammar, and an alternative that opens up future research instead of closing it with some theoretical pragmatically oriented conception declared at once universal and final. It is, in a way, a man-made apocalypse that leaves us the slaves of the Intelligent machines an elite of technicians and engineers are inventing to turn us into nanorobots, into flesh and bone androids, into what is, all together and in the end, a figment in the mind of some technical inventors made real into a dystopic accumulation of closing arguments, meaning arguments that close any further research.

But is there something universal? And I will say yes there is: the human communicational situation.

3. THE HUMAN COMMUNICATIONAL SITUATION

I have vastly published on the subject of both the emergence of Homo Sapiens thanks to a large systematic ritualization of the menstrual cycle and the impregnation-pregnancy-delivery cycle of women in a time when expanding and migrating meant for women the bringing of three individuals to a full 29-year long life. That meant, with a 50% death rate in delivery, infancy, and early childhood and 25% more not reaching the full 29-year life expectancy, women who were fertile from 13 to 29, hence 16 years had to consider childbearing as the only way for the community to survive and expand. That gave them the responsibility of going through 10 to 12 pregnancies, being pregnant every 18 months, and from 13 onward being practically simultaneously pregnant, breastfeeding a second baby, and carrying a third infant on her back or hip. That meant that for a community of 20 women there were twenty births every 18-month cycle, hence there were a potential 20 children under the age of three permanently around, minus of course, 50% infantile and early childhood deaths, meaning a permanent 10 living children under the age of 3 plus 10 more aged 3 to 6 and ten more age 6 to 9. 20 women had thirty living children to take care of permanently, plus or minus let's say 5. A new-born and then infant was breastfed at least twelve months knowing that between one delivery and the next only 18 months will elapse, and the last 9 of these 18 months corresponded to the second pregnancy bringing the second delivery. We all know that for mammals the procreative cycle makes the mothers produce milk continuously, which means one mother can easily take care of two breastfed babies regularly.

The proof of all that is found in Marshack's research on the various stone, horn, or wood artifacts found in European caves and carrying all sorts of small marks. Marshack did a pretty good job at deciphering these marks and finding out they were built on the pattern of a cycle. Being a male archaeologist in a time when it was not kosher to speak of women in Paleolithic times, he followed the bias of his period and analyzed these cyclical artifacts as representing the cycles of the moon. Why on earth most of these artifacts were only two or three lunar or solar months long and very few going beyond but never beyond nine months? If you observe the cycles of the moon, you must have an objective, and as for the moon, you can only either be satisfied with the four (or three) phases of this moon cycle that have a strong, influence on many natural elements like tides in maritime areas, animal behaviors, and even plant growth. But this is the same every moon cycle with at most some variations when the season cycle, meaning the sun captured by the cyclical movement of the earth around it, gets in conjunction with the moon cycles in equinoxes periods for example. But the moon cycle is visible any time the sky is clear at night (mostly), which makes such observation something you can know and transmit orally. No further observation is needed with notes taken on a mobile piece of rock or horn. The second interest of the observation of the moon cycle would be to calculate the eclipses of the moon or the sun. But then these ecliptical cycles are a lot longer than the maximum nine months. So, the artifacts Marshack studied were just not pertinent as for the moon cycle since they had practically no application in the real world. On the other hand, to read these artifacts as the observation of the menstrual cycle or the pregnancy cycle of women is a lot more interesting, especially the first case of the menstrual cycle. Since pregnancy is essential for the survival and expansion of the community it has to be calculated and hence ritualized to be sure the three or four days of the fertility of women will be precisely identified for each woman in each menstrual cycle so that the fertilization and impregnation of women will be effective as often as possible.

We have to avoid the bias of most male archaeologists or male mythologists or other male specialists of the study of prehistory. We have to avoid the modern biases that are literally enslaving our minds when looking at the past, and consequently, we are not able to step out of what is "normal" today.

The direct consequence of this bias is that we cannot understand nor even envisage what the real situation was from 300,000 to 19,000 BCE, the emergence of Homo Sapiens up to the peak of the Ice Age. A radical change not entirely captured by though present in Marshack's work occurred sometime in the middle of the Magdalenian period with a shift from one type of representation of women to another. This moment is when agriculture and herding were developed along with the beginning of new crafts like pot-making and basket weaving. We have to speak of the way Homo Sapiens lived before the peak of the Ice Age. What may today be seen by women and society as real enslavement was in those very distant times the extremely valuable position that women could occupy in their communities: providing survival to the community, the means to expand, the fair raising of children under some kind of collective responsibility and security thanks to the collective rearing of children by women, of course by women, because they breastfed the children, and then the great responsibility to teach children how to speak, communicate, do all sorts of things and become adults at the age of 13. The age of 12, the age of reason, was captured as the limit of childhood and the beginning of adult age up to the end of the 19th century at best, the beginning of the 20th century at worst in the western world (it was quite different in the colonialized world and under slavery in some countries where slavery lasted up to 1865, at least.). Schooling only became compulsory in France up to the age of 13, for example, in 1936. After that age, there was only one choice, to go on to secondary schools for the children of the families who could afford not so much the cost of such education but the loss of an income, on one hand, and on the other hand, the possibility for the child to get his first salary and thus to contribute till he or she married to the welfare of his or her working-class family. Before 1936 in France schooling was finished after five years of primary education, at best, at the age of 11-12, and these compulsory five years of education were only introduced in 1881 with Jules Ferry's laws on compulsory, free and secular education.

This tremendously fundamental position of women in Paleolithic times and even long before required a special division of labor that dedicated women to this fundamental activity. With some organization, one-third or maybe even one-half of women, on a rotating basis, could leave the children, particularly breastfeeding infants, to the care of the other half or two-thirds of women while those who were thus liberated for a time, till their turn to look after the children came, could do other things like gathering what could be gathered, cooking what had to be cooked, hence they were responsible for fire, and take care of the caves and other communal places, decorating them, etc., knowing these caves were highly spiritual places where most rituals were probably performed. They had a spiritual function in this society, in these communities. That goes along the newly developed knowledge on facts like the representations of women in the caves or on mobile artifacts, and the simple spiritual duties of decorating the caves for such functions, and probably developing the necessary language for all rituals, both words, and some chanting, if we accept the idea Steven Mithen suggested for Neanderthals,[13] but that can be easily expanded to Hominins starting with Homo Erectus, and thus inherited from Homo Erectus via Homo Ergaster by Homo Sapiens. Musical communication, particularly with the other side of the rock surface, with spirits, is basically a heritage from earlier development and a way to transcend plain ordinary communication and thus reach the spiritual realm. We can state such spiritual communication based on the belief in a spiritual world, meaning a world where the spirits of dead people – or the spirits of animals, or plain mythical spirits – can be, as soon as, or at the latest when Hominins started burying at least some of their dead.

The main rituals had to do with pregnancy, childbearing, and child-raising, the third cycle of women, and we can notice it is not binary. All these women's cycles are ternary. The menstrual cycle is ternary and does look like the moon cycle in some ways. The period (end and beginning of a cycle),

[13] Steven Mithen, *The Singing Neanderthals, The Origins of Music, Language, Mind, and Body*, Harvard University Press; 2005
Professor Steve Mithen, Steven's research interests cover from the origin of Homo at c. 2 million years ago to the origin and spread of farming, and the use of heritage for sustainable development, individual and community wellbeing: 1. Late Pleistocene and Early Holocene Hunter-Gatherers and Farmers. 2. Cultural heritage for sustainable development and community archaeology. 3. Evolution of the Human Mind, Language and Music. https://www.reading.ac.uk/archaeology/about/staff/s-j-mithen.aspx

before the fertile phase, the fertile phase (very short), after the fertile phase just like the end-beginning of a moon cycle (no moon), waxing moon, full moon (very short), waning moon. The cut in four quarters for the moon is totally artificial. For Shakespeare, the changing and inconstant moon[14] only had three phases. Then impregnation-pregnancy-delivery, and finally pregnancy-child-bearing-child-raising. No surprise then that all, or quite many if not all, pagan gods are ternary in a way or another: that's the survival of the older times before agriculture. No surprise either that the concept of the triple goddess is so present in some very old pagan religions and mythologies, even though the mythologies we inherit from the past have all been produced or rewritten after agriculture and herding. Even Leroy-Gourhan[15] knew about it. Though he divided all the cave paintings of long ago into male and female elements he knew and said that there was always, on the side of these two, a third element in the various painted panels. Along that line, I am surprised that the representation of women in Paleolithic times was not studied with the intensity it deserves, apart from the mention of the Gravettian Venuses generally depicted as fat or full in the flesh, or whatever remark that was derogatory in a way or another. Today we have to go beyond these biases and finally recognize that Paleolithic times were based on a division of labor that did not give one sex or the other any special authority, but that gave both sexes responsibilities that were not the same but both sides were essential for the survival and expansion of the communities. So essential that Neanderthals disappeared without integrating Homo Sapiens genes in their own genes, whereas Homo Sapiens survived and prospered integrating some Neanderthals genes, meaning integrating the mothers of the hybrid children along with the children. If that had not happened, we would not have any Neanderthals genes. Our Neanderthals genes are the evidence there was copulation and impregnation between Homo Sapiens and Neanderthals, and at the same time, integration of the hybridized and hybridizing individuals in Homo Sapiens communities. Neanderthals women were integrated into Homo Sapiens communities, be it only to take care of their children.

[14] "O, swear not by the moon, th' inconstant moon, / That monthly changes in her circle orb, / Lest that thy love prove likewise variable." William Shakespeare, *Romeo and Juliet*, Act 2 Scene 2

[15] Philippe Soulier, André Leroi-Gourhan (25 August 1911 - 19 February 1986), https://doi.org/10.4000/histoire-cnrs.554, https://journals.openedition.org/histoire-cnrs/554. A short biography of André Leroi-Gourhan is here presented, beginning in 1927, at the moment of his student years, until his retirement in 1982. It rests on a systematic analysis of his publications and on his personal and professional archives, collected and studied for the first time in 2001 when the author was temporally engaged by the CNRS. Going beyond the pure biography of events, such as those already presented in numerous posthumous tributes, from 1986 to 1988, this article is instead a short examination of the connections and the continuities present in his work. It evokes A. Leroi-Gourhan's research and teaching across the many disciplines he pursued : orientalism, philology, ethnology, history of art and religions, early technology, zoology, human geography, and prehistoric archeology. The article traces the main outlines of the four major periods of his professional activity, with the goal of underlining the coherence that unites them, and also the accidents of circumstances : his education and the period of orientalism (1927-1944), the time of his doctoral studies and of ethnology (1944-1955), the early period of prehistory (1952-1965), and his second foray into prehistory (1965-1986). The first period is marked above all by physical anthropology, learning from Marcel Mauss, the study about expositions in the Musée de l'Homme under the direction of Georges Henri Rivière, oriental languages with Paul Boyer and Marcel Granet, not to forget his formative sojourn in Japan from 1937 to 1939. The second period is that of the PhD in art and sciences, to make it possible for A. Leroi-Gourhan to teach the two approaches to ethnology as he conceived them, closely interweaving technological man and biological man. After 1952, his orientation toward prehistory is definitively affirmed, whether he conceived as proofs to support his ideas about technology in ethnology, or the interpretation of Western prehistoric art. This new orientation can be perceived equally in the organization of his fieldwork expeditions and the centers where he formed researchers. In effect, from 1944 to 1986, and complementary to his own research, his activity as laboratory director would be determinant, for himself as well as for his teaching. The last part of his life, after 1965, is marked by progressive illness, but also by his participation in the direction of public research and cultural institutions, and, after 1969, by courses given at the Collège de France.

When this is said, children for at least two or three years are entirely dependent on their mothers for food, care, and love. The children, as soon as they're born have to communicate to tell the mother or in this collective system the mothers that they have a need requiring to be satisfied. This is the communicational situation, and it has hardly changed since 300,000 years ago, except maybe it has become even more important and invasive. This communicational situation implies there is a communicating tool somewhere that can be used by children, and that, after and beyond crying, is language. No matter what language is spoken around the child, the situation is always the same with only one difference I can think of that will produce ergativeness and agentiveness which is a continuum that all communicational situations contain between two extremes with various stations in-between. The language around the child will favor one or the other end of this continuum or some intermediary solution in-between. A lot of work has to be done along this line. So far, ergativeness is seen by many as a particular case that does not require any psycholinguistic investigation. It is a special case just like agentiveness, and that is enough for most people and they do not question the psycholinguistic side of both sides of these two functional orientations. I just wonder if some linguists do not consider ergativeness as an aberration that will in due time disappear. Some identify it as a passive vision since translating most of these sentences in agentive languages requires shifting to the passive. But it is not. We have to start on another line and consider universals as linguistic entities, particularly when these are abstract conceptualized functions, are most of the time misguided because they negate the diversity of languages, they want, in a very good western tradition, negate diversity to homogenize their object of study. This is a deep mental way of thinking, a bias most of the time implicit and thus all the more feeling natural, that wants to make differences nonsignificant.[16]

But human situations, social circumstances can be universal as for the dimensions that are biologically determined, physiologically specified, and situationally diversified. The human species is an animal species like all others and their biology and physiology determine their needs, and these needs determine the social situation that must be able to answer them, satisfy them. The most important situation of this type is the communicational situation of a newborn baby of the human species. What is this universal specifically human communicational situation? And think here of the collective creches where a set of several women or men at times are going to take care of all those children entrusted to them as soon as they are three months old. Are we reinventing the old Paleolithic raising situation for newborns and infants? And then think of kindergartens starting at the age of two or three.

[16] Nicholas Evans, Stephen C. Levinson, "The myth of language universals: Language diversity and its importance for cognitive science," in *Behavioral And Brain Sciences* (2009) 32, 429–492, doi: 10.1017/S0140525X0999094X. **Abstract:** Talk of linguistic universals has given cognitive scientists the impression that languages are all built to a common pattern. In fact, there are vanishingly few universals of language in the direct sense that all languages exhibit them. Instead, diversity can be found at almost every level of linguistic organization. This fundamentally changes the object of enquiry from a cognitive science perspective. This target article summarizes decades of cross-linguistic work by typologists and descriptive linguists, showing just how few and un-profound the universal characteristics of language are, once we honestly confront the diversity offered to us by the world's 6,000 to 8,000 languages. After surveying the various uses of "universal," we illustrate the ways languages vary radically in sound, meaning, and syntactic organization, and then we examine in more detail the core grammatical machinery of recursion, constituency, and grammatical relations. Although there are significant recurrent patterns in organization, these are better explained as stable engineering solutions satisfying multiple design constraints, reflecting both cultural-historical factors and the constraints of human cognition. Linguistic diversity then becomes the crucial datum for cognitive science: we are the only species with a communication system that is fundamentally variable at all levels. Recognizing the true extent of structural diversity in human language opens up exciting new research directions for cognitive scientists, offering thousands of different natural experiments given by different languages, with new opportunities for dialogue with biological paradigms concerned with change and diversity, and confronting us with the extraordinary plasticity of the highest human skills.
https://www.eva.mpg.de/documents/Cambridge/Tomasello_Universal_BehBrainSci_2009_1554182.pdf,

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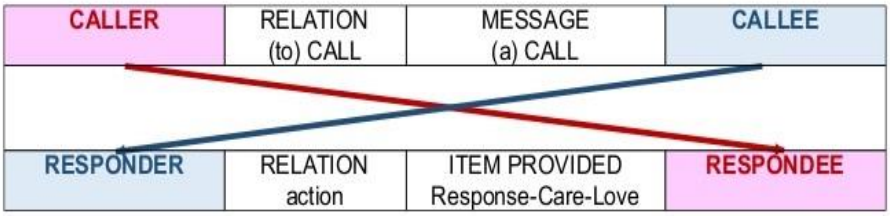

This communicational situation is universal, and it was just the same 300,000 years ago, or even before for other hominins, as it is with us because the main tool for this communication was the developing oral competence that became linguistic with the later Hominins, and all the more so if we consider the level of dependence of the newborn and the length of this phase of dependence. The difference with Homo Sapiens is that, from two or three hundred calls the previous hominins had, and Homo Sapiens inherited what Homo Ergaster had, of course, this Homo Sapiens integrated or was integrating some mutations that are selected for his/her long-distance fast bipedal running status that had a side-effect that opened up Homo Sapiens's possibility to expand the rotation of vowels and consonants from a limited number of vowels or consonants to a far richer number of vowels and consonants. Homo Sapiens jumped in a few decades or maybe a couple of centuries into a potential "lexicon" of two or three thousand items. When one can do a lot, one develops new capabilities. The mind of Homo Sapiens could develop because of the possibility to attach all these new "lexical" items to referent objects or actions or sensations, and these rotating items suddenly jumped from the status of calls to the status of lexicon. Some of those items could refer to purely spatial items, hence simple objects. Some of these items could refer to temporal (time-connected) items that imply a movement in space or a change in inner status with thus a double movement in space (there1- here-There2) or inner status (State1-change- State2) If you span the second onto the first the concept of space that can be seen, measured, walked, run or physically experienced, is the matrix for the concept of time that is derived from the simple experience of duration. We can experience duration, but we have to conceptualize time, just as we can experience distance but we have to conceptualize space. It was easier for space because they could walk from here to there, but they could not walk from before to after. You can only remember before and imagine after.

All this is entirely contained in the communicational situation. The CALLEE has to move from where he/she is to where the CALLER is (from right to left), and in the same way, the CALLER has to move to where the CALLEE is (left to right), for both to become respectively the RESPONDER and the RESPONDEE. The RESPONDEE can remember his experiential need and then enjoy his satisfied need that is going to last in the experiential future. It is also quite clear that this communication can give greater importance to the "-EE" character over the "-ER" character, hence on the theme and goal over the source and agent. Then we are moving towards ergative communication. If the emphasis is set the other way, on the "-ER" side rather than on the "-EE" side we are moving towards an agentive communication.[17] I have just mentioned Source-Agent and Goal-Theme. Here are the four (five with plain static Location) basic case functions that can be modulated but that basically remain these four functions, and they are universal in such a communicational situation and experiential long before becoming syntactic or linguistic. All that is contained in the communicational situation and it is this matrix that was the matrix of the syntax of the language that was being devised, invented, developed by Homo Sapiens 300,000 years ago for two simple reasons:

1- Homo Sapiens started then to have the means to develop this oral communication.

2- Homo Sapiens had the need to develop this oral communication for his/her own survival.

[17] Note I do not use the traditional surface terms used by Universal grammarians like "transitive," "intransitive," "direct object," "indirect object," or "transitivity." I use the couple of words "ergativeness" and "agentiveness." Because I refer to functional roles in the syntactic and semantic structure of language, not on the surface of the utterance. I work with the following basic functions: **agent** (the item that performs the action), **theme** (the item that bears the effect of the action), **source** (point of origin in time or space), **goal** (end point in time or space), and **location** (simple spatial or temporal positional item). Note one item can carry two functions like agent-source and theme-goal.

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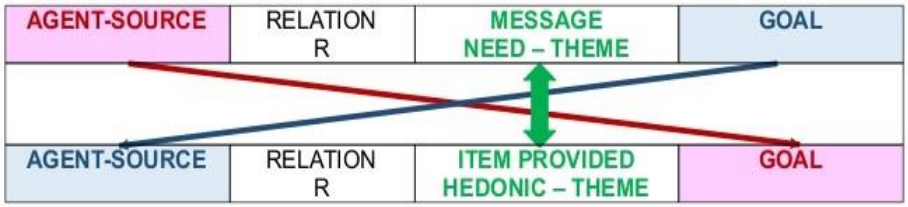

And this oral communication gives Homo Sapiens such a tremendous advantage that within a few centuries or one millennium the first articulation was fully developed with the communicational syntax behind trying to find ways to express itself in communication: body language, intonation, emphasis, the order of items and eventually the beginning of morphology with inflections on the basic lexicon items that are roots. This is, only at first, the use of the rotation of vowels essentially to modulate the meaning or the function of the word with simple inflections (changing the vowel of the word like in "sing, sang, sung") and then all sorts of morphological addenda to produce functional values of the word (like in "eat, ate, eaten, eating" and the two endings of the last two items are themselves carrying meaning and they can be conceptualized, generalized, systematized and they become formative elements), or derived expanded values of it with word association or composition (like "eater," "eatery," "eatable," "overeat," "anteater"). Root languages are the first to go beyond the first articulation, hence, to start working on the second. Check some basic root languages like Arabic or Hebrew, and you can see how the morphological modifications of the roots produce functionalized items to be used in discourse and thus modified either semantically or syntactically. That was the embryo of human articulated language. The basic condition for this emergence was the various mutations brought by long-distance fast bipedal running: better breathing, a very low larynx, the transformation of the respiratory and articulatory apparatuses necessary for this running and that became ancillary and transformational for oral communication. Why don't most linguists see or consider that? The answer is simple. It was forbidden by the Paris School of Linguistics and anyway, all linguists took then and still take language as something that does not need to be explained in its genesis. It is bad enough to deal with it in children, but we can always forget about such simple physiological elements, not to mention the psycho-physiological elements, and concentrate on the acquisition of grammar. It is not for most linguists important to know why grammar is what it is, how this grammar was developed, not in any one language, but in language at the very start of its emergence, and it is still true today. As long as the physiology of Homo Sapiens does not change, as long as articulatory, respiratory, long dependence of children, and a few other physiological elements will remain the same, then the same dynamic will produce the same oral communication. If "same" bothers you, just use "similar." Today's transformation is not in language itself, nor in oral communication per se. The change is in the technology of communication, both oral and non-oral. Zoom does not change oral communication, and certainly not language. It only enables everyone connected to this particular communicational situation processor to orally and visually communicate with all others though they can be several thousand kilometers apart.

It is not grammar that is universal, but it is the communicational situation that is universal, and it produced a whole set of languages within the phylogeny of language during the emergence of Homo Sapiens, and the three phylogenic articulations were (and still are) the basis of three vast families of languages: consonantal-root languages, isolating-stem languages and agglutinative/synthetic-analytical-frond languages. It is a fact that the first family of root languages developed out of Black Africa because the people concerned left Black Africa to conquer and occupy the Nile valley, Northern Africa, and Saharan Africa, with some archaeologically proved presence of Homo Sapiens remains in Morocco going back 300,000 years. The migrations out of Black Africa to go to other continents started with the isolating languages that are second articulation languages and started moving from Djibouti, the Horn of Africa to the Southern Arabian corridor, to Hormuz strait and then the whole of Asia where they met the Denisovans. That was somewhere around 120,000 years ago and stem-languages. Then came the third-articulation migration of frond-languages sometime around 70,000 years ago with agglutinative languages that followed the same route as the previous migration but settled first in the Middle East and from there via Anatolia and through the Caucasus to the whole of Europe, and at the same time around the Caspian

Sea in Central Asia, to the Urals and northern Europe and Finland, and simultaneously to Siberia. They probably met the Denisovans and they definitely met the isolating people speaking isolating languages of the vast Tibeto-Chinese family and some other languages that evolved on the periphery of this main conglomerate. And the second wave of this migration followed the same route but stayed on the Iranian Plateau up to after the peak of the Ice Age and the Magdalenian. The great change that occurred in the world between 15,000 and 3,000 BCE, the development of agriculture and herding will shift paleolithic communities based on territory and on the division of labor I have described to the Magdalenian agricultural and herding societies that were based on the control, hence possession, of the land worked by the first farmworkers in the world, and all over the world. This happened all around the globe with different domesticated plants and animals and different social organizations, but one change was particularly important: the division of labor became a lot less interesting for women, and men took over the far more balanced Paleolithic society. The Paleolithic situation I described above only survived as a recollection, hence as myths and it is also the time when all sorts of strictly organized religions developed from diffuse supernatural awareness. The debate on the subject of mythologies, religions, mythical beliefs, and even tales shows that we are far from even dreaming of an end to this scientific quest. Science only exists in the quest for knowledge, and I would say that God only exists in the human quest for him, her, or them.

To be fair I should quote George Lakoff[18] and his Generative Semantics, doing exactly what Chomsky had declared scientifically vain. I should also quote Sebastian Konstantinovič Šaumjan[19] in his research before he left the USSR for the USA where he was recuperated by Universal Grammar and was reduced to some semantic interpretative model for Universal Grammar. And I should insist on Gustave Guillaume[20] who was the first to reintroduce the psyche into language and linguistics with his psychomechanics of language. Those three linguists are proof that linguistics will never be a unified and finished science. To pretend it is finished, it has achieved its objective, it has reached the final truth is, in fact, a way to terminate the various theories that pretend such an incredible idea. I will regret that Julien d'Huy in his first book and latest publication (chapter 6 particularly) lets himself slide into the fake debate about the original matriarchy. Paleolithic women deserve better treatment than being reduced to Amazons and sexual tyrants against men. That is totally unrealistic, and to speak against it the way Julien d'Huy does may be interpreted as being sexist in a way and certainly not scientific. We have enough data today to propose a new interpretation of Paleolithic women at least 30,000 years before the Peak of the Ice Age. I guess archaeology may produce some strange opinions. Julien d'Huy's book deserves tremendous attention. He proves all along by his often-prudent even at times over-prudent reconstructions based on a strict phylogenetic method that It all started, not simply in Africa, but in Black Africa, that women played an extremely important role in the old Paleolithic societies that he only studies myths outside the whole of Africa, missing the myths in North Africa and even Saharan Africa, hence Afro-Asiatic or Semitic myths. He states that this role of women was vastly spiritual, and yet he does not specify how and he lets himself fall into some rather hostile anti-women's-lib declarations. His use of the term "shaman" ("chamane" in French is less man-oriented though it is masculine) which is extremely negative because at no time he specifies that this agent of spirituality does not have to be a man, as it is generally understood even in hunting-gathering societies still in existence on the planet. The classics of Shamanism are speaking and

[18] Gorge Lakoff, (1971), "On generative semantics," in D.D. Steinberg and L.A. Jakobovits (Eds), *Semantics: an interdisciplinary reader in philosophy, linguistics and psychology*, Cambridge University Press, 232-96

[19] S.K. Šaumjan, Principles of Structural Linguistics, Mouton, The Hague, 1971

[20] Gustave Guillaume, Roch Valin & Walter Hirtle editors, Leçons de linguistique de Gustave Guillaume 1958-1959 & 1959-1960, Les Presses de l'Université Laval, Québec, Klincksieck, Paris, 1995.

Jacques Coulardeau, "Gustave Guillaume, De la Glossogénie à la Phylogénie du Langage, Des Trois Aires aux Trois Articulations," 2015,
https://www.academia.edu/11696415/GUSTAVE_GUILLAUME_DE_LA_GLOSSOG%C3%89NIE_%C3%80_LA_PHYLOG%C3%89NIE_DU_LANGAGE_DES_TROIS_AIRES_AUX_TROIS_ARTICULATIONS

working within a general understanding that shamans are men. But It is today easy to get out of this "natural understanding" which is unrealistic. David Lewis-Williams[21] studies African societies of hunter-gatherers but in the 20th century and he does not take into account, first that they do practice some agriculture and even have domesticated animals, so they are Magdalenian in a way, and he should wonder how deep the influence of the modern world is on them and has been since they started being under the influence, even at a distance, of the European colonizers. In the same way, Jean Clottes[22] follows David Lewis-Williams, though he worked a lot on French cave art, and yet he should know better and ask the question of the sex of the "shamans" he posits in Paleolithic times among the Turkic-speaking Homo Sapiens known as the Old Europeans (75% of modern European DNA). And he should know what researchers and archaeologists like Genevieve Von Petzinger[23] have published on the subject and how a

[21] Professor Emeritus Lewis-Williams focused his research efforts on the areas of rock art, cultural heritage, and the rights of the San people of southern Africa. He developed methods for the interpretation of sophisticated San rock art, a significant part of South Africa's heritage. He is recognised as the father of rock-art archaeology the world over, and his work remains the most seminal in all endeavors to contribute to the understanding of rock art within archaeology. He conducted his research in the Drakensberg, studying rock paintings. The interpretation of the rock paintings elsewhere was, as a result, based on the methodology he developed. He has a profound command of the now-almost extinct /Xam language spoken by the San people and was invited by former President Thabo Mbeki to translate the South African national motto into the /Xam San language. He later extended his research to the Palaeolithic cave art of western Europe, and his book The Mind in the Cave has been widely acclaimed. He worked with French archaeologist Jean Clottes and developed the theory of shamanism in hunter-gatherer societies.

[22] Jean Clottes, "From « Art for Art's Sake » to Shamanism: Interpretation of Prehistoric Art," https://doi.org/10.4000/histoire-cnrs.553, https://journals.openedition.org/histoire-cnrs/553

SUMMARY – Interpreting fossil art – as Paleolithic art is – is an obviously difficult endeavor because the ultimate meaning of the works is unreachable. This is why a few specialists were tempted by pessimism and recommended to abandon all research on meaning. However, it is still possible to reach a certain degree of understanding, an interpretative framework rather than a global interpretation. This can be done by using three types of arguments from the art itself, its archaeological context and from comparisons with some recent traditional societies that used to practice rock art.

Since the second half of the XIXth century, several explanations were put forth, for portable as well as for wall art. The first one was the Art for Art's sake theory. Engravings and carvings would have had no aim but to adorn weapons and tools, for the fun of it. It was abandoned because it could not explain the works of art deep inside the caves, out of sight far from habitation sites.

Totemism briefly tempted some prehistorians and influenced many. It implies a narrow privileged relationship between a human group and a particular animal or vegetable species that will characterize the group and be venerated by it.

Sympathetic magic was more successful. It was the prevalent theory for half a century. It is based upon a straight relationship between the image and its subject: by acting upon the image one can act upon the animal it represents. Magical practices would have had three main purposes: to help with the hunting and fertility of useful animals and to destroy the dangerous noxious ones.

The second half of the XXth century was that of structuralism. Animals and geometric signs had a particular symbolic meaning, and they were put all through the caves in relation to each other as well as in relation to topographic peculiarities.

More recently, cave art was interpreted within the framework of a shamanic type of religion. Its authors would have gone underground to explore the supernatural world and to get into touch with the spirits that lived there. Taking advantage of the work previously done, this hypothesis is the one that currently explains best the data to-day known for portable and cave art in the Upper Paleolithic.

[23] Genevieve von Petzinger, *The First Signs: Unlocking the Mysteries of the World's Oldest Symbols*, Atria, New York, 2016. Genevieve von Petzinger is a PhD student under the supervision of April Nowell in the department of Anthropology. Her main area of interest is European Upper Paleolithic (Ice Age) rock art, in particular the geometric imagery, and how this practice could be used to identify

vast majority of handprints in caves all over the world are women's hands. The point is that Julien d'Huy states routes for some myths, or themes in those myths that he calls mythemes, that are not specified enough in time and space. The first exit migration from Africa is not the first exit migration from Black Africa, and like that, he misses the Afro-Asiatic or Semitic northern section of the African continent from Suez to Morocco to which the Arabian Peninsula and the Middle East were added in later periods. He speaks, for many myths, of a route along the southern border of the Asian Continent, to Southeast Asia then Melanesia, then Australia, and then he jumps to South America, but only speaks of Siberia and Alaska via the Bering Straights when he specifies the migration to America, most of the time northern and extreme northern America, though he states three migrations to the Americas. We need more specifications on these migrations and how myths that reached Australia jumped to South America. It is sure that we still have a lot of work to do before even approaching a satisfying completed but definitely unfinished phase in our linguistic questioning of the origin and phylogenetic development of language.

A last remark on Gustave Guillaume's "three areas" theory.

The essential lessons on the topic were delivered by Gustave Guillaume in 1958-1960. They were edited and published in 1995 by Roch Valin and Walter Hirtle[24]. What are the three areas?

1- The primary area is identified on page 288 as concerning what he calls "Nostratic" languages though his understanding of this word was not what it has become. In this group, he apparently sets all agglutinative languages and isolating languages, in fact, all languages that are neither Hamito-Semitic nor Indo-European (we can understand that this last term covers all Indo-Aryan languages too). Concerning the agglutinative Basque language, he says: "Basque is, according to me, a living fossil of the architectural history of language that comes from the open and virtually non-closing primary area."[25] (Gustave Guillaume, 46) He is right in global terms but he does not attach this language to its real family: the agglutinative third-articulation frond language family (Turkic languages specifically).

2- The secondary area is identified on page 288 as concerning what he calls the Hamito-Semitic languages. This is not based on any reasoning about when they left the Black African nest and their migration first to Northern Africa and then out of Africa (not a migration but an extension), in a very limited way, though dramatically and partly depicted in the Old Testament of the Bible.

3- The ternary area is identified on page 288 as concerning what he calls the Indo-European languages. I guess the term Indo-Aryan was no longer politically correct after the Second World War and the Aryan reference of the Nazis.

His reasoning on the subject is best represented by the graph given on page 313 where he proposes a vision of the full glossogeny as he calls it. I prefer phylogeny because this term does not only concern language but any human creation, hence the phylogeny of language.

The most important element here is his formula below just after the graph:

"language = used "langue" + using discourse
using "parole" }

". . . It implies two systems:

i. the system that is used (that of "langue")
ii. and the system that is the user's (that of discourse)" (Gustave Guillaume, 313)

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cognitive and symbolic evolution in modern humans. Genevieve is also interested in the development of early graphic communication and in the potential of the abstract markings to track patterns of migration and cultural borrowing during this early chapter in human history. Her work was featured in New Scientist in 2010 and again in 2013 and her research will be the subject of a story on CBC's The National and Les Années Lumière in 2014. She has also appeared on the Discovery Channel's Daily Planet show and in 2013 was named a TED Senior Fellow. Genevieve's current project involves documenting the geometric signs at understudied rock art sites in France, Spain, and Portugal. https://www.uvic.ca/socialsciences/anthropology/people/graduate-students/profiles/von-petzingergenevieve.php

[24] Gustave Guillaume (1883-1960), *Leçons de linguistique de Gustave Guillaume 1958-1959 et 1959-1960*, Roch Valin & Walter Hirtle, eds., Les Presses de l'Université Laval, Québec, & Klincksieck, Paris, 1995

[25] All translations of Gustave Guillaume's text are mine.

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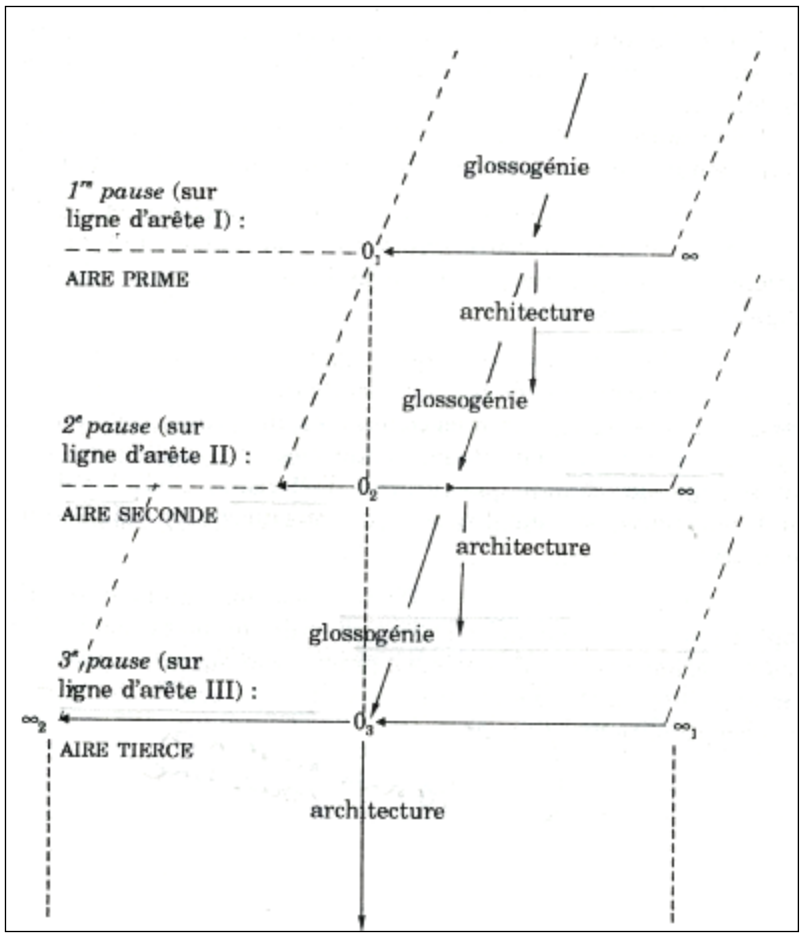

Full glossogeny (Gustave Guillaume,313)

My general project is to use the archaeological finds on the various migrations out of Black Africa to re-examine Gustave Guillaume's theory of the "three areas." I have already given the summary of these three vast migrations out of Black Africa. It is most difficult to make people who are attached to a theory understand that to terminate any evolution of this theory is to terminate the theory itself. A theory can only live if it can develop and it has to develop along with science in general. Gustave Guillaume was no archaeologist, no anthropologist, no ethnologist, no mythologist. To know what happened from 300,000 years ago to today in the phylogeny of language we have to listen to all these specialists and what they have discovered, knowing none of them are linguists and there a phylogenic linguist can bring a new way of looking at things that will necessarily open doors and windows, and the voyage up the never-ending ladder of knowledge can continue.

4. CONCLUSION

The starting point of this paper being the question of "the limits of science and human knowledge" and my own version of this question in the field of linguistics being the phylogenic history of language and linguistics from the emergence of human articulated language to what it has become today without us being able to predict what it will be tomorrow in Artificial Intelligence times, how can linguistics cope with its own limited ability at knowing more and more, and yet never all that could be known, that should be known, and this will never be the end of it.

Linguistics studies language in general, the ability of human beings to communicate with oral and written languages; and languages in particular, meaning the immense number of different languages and dialects and the possible gathering of them all in some vast families diverse both among themselves and

within each one of them. The task is so enormous that even machines will find it difficult to cope with thousands of languages.

Then Linguistics studies a raw material that is changing all the time according to its own rules and its own environment, covering thus the various uses of these languages and the fact that any language is always evolving, changing and the main dynamic of it is inside the languages themselves. Each language is evolving its own way. This means a linguist studies a language at a certain point in time. As soon as his study is finished, he can be sure the language he has studied has already changed and his study is already obsolete.

But there is a fourth dimension here and it is the fact that linguistics as a science, first of all, is not homogeneous since there are many schools, some call them chapels, often antagonistic or contradictory, always diverse, and lacking unity even on the simplest concepts. Second, even within one school things, ideas, principles, results, and equations are confronted to new elements that falsify them constantly and even worse with a phylogenetic evolution within the science itself, some concepts bringing new questions about themselves when confronted to other concepts and new ways of reasoning within this or that particular school of linguistics.

My conclusion then is that we will never reach anything that would be complete knowledge and could qualify as the truth. Once again in our post-modern time, there is no truth, there are only points of view. That idea was kind of disturbing still in 2005 with some Masters's graduate students in Sorbonne. Yet today, it has become so banal that we wonder what is going to happen when Artificial Intelligence frees our minds of all the ticky-tacky work a researcher is still doing today, no longer by hand, but by keyboard, screen, and internet interposed. One day tomorrow, a machine will do that. What language will I speak with that machine to control it and to guide it within the research line I would like it to follow? That will not be machine code, because I am not a machine and machine code is too narrow for human thinking. But that will not be any particular human language the way we know them today. It will be some advanced research multilingual dialect that will emerge and evolve in front of our own eyes and that we as well as the machines will understand. Imagine these researchers of today that cannot read an article in English or write a paper in German. Tomorrow will they be able to read, write, speak the three or four dominant languages in the field of research that we can think will be English, French, Chinese, Russian, and German, plus one or two more? At the level of the individual researcher, such a challenge will make us definitely more intelligent than any machine. And we will have to be if we want to use the machines' tremendous abilities-to-be soon.

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