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Signs as artifacts: an examination of the Piette collection.

Draft. Critical feedback is welcome

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An examination of artifacts from the archaeological record can yield interesting inferences concerning the cognitive competencies and the culture of their makers. This can be complemented by replicating these artifacts and uncovering the “chaînes opératoires” they presuppose as well as the plausible socio-political structures they imply. This paper will focus on the geometrical or abstract signs (engraved or painted) which are found on many artifacts (made of stone, antlers, bones, or ivory) from the Upper Paleolithic and Mesolithic, and which form a “technological package” embodying a system of elusive ideas and behavioral patterns. The starting point for this research will be the 500 page volume of photographs of artifacts from the Collection Piette that was published in 1964 by the Musée des Antiquités Nationales (Saint-Germain-en-Laye, France). All the objects published in this volume bear some abstract signs which are found either in combination with identifiable representations of animals or displayed by themselves in a variety of configurations. While they are undecipherable in the absence of sufficient information concerning their contextual meaning and use, their formal properties (geometrical and topological morphology and syntax) can be the object of an analysis from which a general cognitive landscape can be inferred. This paper will specify some of these cognitive and cultural inferences, and Edouard Piette’s (1827-1906) tentative interpretation of these signs as early forms of script will be critically examined in the conclusion.

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An inquiry into the archaeology of writing beyond the limits currently assigned by the mainstream archaeological disciplines is justified on several grounds:

- (i) For purely taphonomic reasons it is impossible to assert that the archaeological record is closed.
- (ii) According to evolutionary logic, all cultural innovations are based on modifications of previous forms, and it is impossible to identify absolute beginnings both from morphological and functional point of views.
- (iii) The archaeological record offers data which are sufficiently ambiguous in the present state of knowledge to consider the plausibility that they may be early forms of script.

In previous works (e.g., Bouissac 1993, 1997, 2006, 2007, 2008) I have developed the case for approaching the available data with an open mind and not excluding a priori that they might provide evidence of prehistoric forms of writing. Writing is meant here to refer to marks whose morphology encodes speech units and their conceptual correlates. The nature of such units may depend on the kind of segmentation cognitively available to the populations using them to represent verbal information.

As a part of my general argument, this paper endeavors to reassess in view of current developments the hypothesis proposed by Edouard Piette at the end of the 19<sup>th</sup> century concerning the numerous “abstract” engravings and paintings of the Upper Paleolithic and Mesolithic.

### The Piette collection.

#### (i) Background and problems

Edouard Piette (1827-1906) was a lawyer and a judge who had a strong interest in palaeolithic archaeology at a time when the study of prehistory was emerging as a scientific endeavor in the context of evolutionism. He had acquired a background in geology and stratigraphy, and conducted excavations in search of evidence concerning the material and symbolic cultures of ancient populations. Between 1871 and 1889 he accumulated a considerable collection of stone tools and other artifacts, some of which he displayed as a part of the International Exhibitions of 1889 and 1900. He published his discoveries and discussed their interpretations in specialized scientific journals such as *Etudes d'ethnographie préhistorique* and the *Bulletins de la Société d'Anthropologie de Paris*. His approach was controversial because he contended that there was a cultural continuity between the Palaeolithic and the Neolithic at a time when the dominant theory claimed that there had been a long gap between the two during which Western Europe was not inhabited. His excavations at Mas-d'Azil (1887-1889), in Southern France, produced irrefutable evidence in support of his claim, notably concerning what he called the Epipalaeolithic or Early-Mesolithic period (ca. 11-9 Ka). He focused his attention on the assemblages he found at Mas-d'Azil to which he referred as the Azilian culture. But his bold contention that the Magdalenian and Azilian engravings and paintings were evidence of proto-writing was met with hostility. Later on, when archaeological methods were established on more scientific grounds, Piette work fell in disrepute because most of his excavations were done by local laborers he commissioned and directed by correspondence from Northern France, and whom he entrusted with the task of selecting the artifacts and reporting their stratigraphic origin. The local supervisors he successively appointed were notoriously unreliable and theft and vandalism occurred on sites that were unprotected. His theoretical views on the evolution of art which were posthumously published were also considered problematic.

#### (ii) The published data

However, the importance of his collection of prehistoric mobiliary art which was donated by Piette to the Musée des Antiquités Nationales was recognized. But the arbitrary reclassification and mindless mingling of items that first took place at the museum when the crates were delivered greatly upset Piette as his correspondence with the curator, Solomon Reinach, bears witness. We should keep in mind that Piette's own structuring of the material data was often ignored in favor of museological constraints such as available space or display value. A great deal of information was thus irretrievably lost. This is all the more

regrettable as it had always been Piette's intention to enable researchers to use his collection once he would be unable to pursue his own research. Following his instructions, the eventual organization of the collection was entrusted by the museum's curator to Abbé Breuil whom Piette had befriended toward the end of his life. Over several decades, punctuated by years of inactivity due the two world wars, and under three successive curators, Breuil classified the items according to his own vision of prehistoric cultural evolution, "rationalized" Piette's vision in view of the epistemological landscape that had been transformed by new discoveries, and "normalized" Piette's terminology that was found inconsistent. It is therefore important to keep in mind that the Piette's collection, after having been "disorganized" by careless handling, and "reorganized" according to other principles, can be now perceived only through the prism of Breuil's ideas as he himself implies in the 1961 preface he wrote for the catalogue of this collection which he started editing in 1957 in collaboration with Marthe Cholot. Breuil died before the 479 page volume appeared in 1964. Cholot wrote a short biography of Piette (19-36) that provides information concerning almost exclusively the gathering and donation of the collection.

In his introduction to the book, André Varaignac, then curator of the museum, documents the conditions in which this catalogue was produced. It should be pointed out that it covers only a part of the collection. Varaignac explains that only the items that were covered by a sizeable number of marks were selected and that the angle under which they were photographed had to be chosen carefully. It transpires from the text of this introduction that the criteria were purely esthetic, and that the goal was to present the various types of "decoration" exemplifying the skill of the prehistoric artists which the author characterizes as "geometric art". More importantly, the volume includes only a very small sample of the painted pebbles which had been the focus of Piette's attention and the basis of his most challenging hypothesis, a hypothesis that Varaignac dismisses while recognizing that these intriguing painted patterns must have had some symbolic values.

(iii) Piette's hypothesis

One of the first formal presentations of this hypothesis can be found in the minutes of the 666<sup>th</sup> session of the Société d'Anthropologie de Paris that was held on July 1st 1897. The president, M. Capitan, opens the meeting by reporting on news received by the association (deaths, reading of obituaries, announcements of competitions). The second item on the agenda is a correction concerning the previous session (June 17) in which doubts had been expressed about the authenticity of Latin letters that had been reportedly found engraved on megaliths in Brittany by M. Letourneau. This leads Piette to develop his point of view on the origin of the alphabet. He insists that in order to locate the origin of Greek and Italic alphabets tracing them back to the ancient Egyptian and Phoenician civilizations was not sufficient. We have to trace their origins, he claims, to the prehistoric age, well beyond the bronze and Neolithic periods. Indeed, most of the patterns that are the basis of the alphabet can be found drawn and engraved in the archaeological record of the Azilian culture. He notes that some of these

characters such as crosses, spirals, circles with central dots, etc., can even be found much earlier. For him, they could represent objects, words, numerals, perhaps even full sentences. But he considers that these very early forms could not plausibly be considered as a syllabic alphabet. He articulates nevertheless the hypothetical process that probably led to the creation of syllabic alphabets much earlier than they are usually believed to have been used. Assuming that objects had names (which, he believed, were first monosyllabic then polysyllabic) the graphic signs represented both schematized objects and sounds, hence the origin of syllabic scripts which was later simplified into various syllabic and alphabetical systems. As writing evolved to meet new demands, graphic signs were selected from previous signs repertoires and were recycled into new systems in which they functionally survived in combined and simplified forms.

Piette based his reasoning on the evidence provided by Azilian pebbles on which are painted all the characters that will later selectively survive in most of the Mediterranean scripts. For him, a compelling evidence of the existence of Azilian writing is the fact that when several signs appear on a single pebble they are aligned. The similarities that have been observed between the Etruscan and Runic characters come from the fact that they probably came from the same source. In other documents, (e.g., Cholot 1964: 57, 169) Piette underlines the similarities between the patterns engraved on Magdalenien and Azilian bones and antlers, and specific Egyptian hieroglyphs and Cretan pictographs and pre-phoenician script which had been published by Arthur Evans ( ). However, he always insists that he notes the striking topological identity of some characters without assuming that they represent identical sounds or concepts.

As the session unfolds, Piette's views are then questioned by another member of the Société d'Anthropologie, M. Félix Regnault, who opposes the likelihood of simultaneous emergence of natural geometric scribbling among unrelated populations to the idea of descent with modifications through the transmission, imitation, and retooling of previous graphic artifacts.

Piette (1905) published eight years later a detailed article entitled “Les écritures de l'âge glyptique” [writing systems in the glyptic age] in *L'Anthropologie* which featured his mémoire: Etudes d'ethnographie préhistorique. Here, he presents evidence of what he considers to be compelling examples of inscriptions in the hypothetical language spoken by the populations which produced them. These examples are reproduced here as figures 1, 2, and 3. Further inquiries concerning Magdalenian “inscribed” items have revealed a basic repertory of 25 distinct marks which are rendered in a variety of individual styles (Cholot 1964: ). The question of pre-Sumerian and pre-Egyptian scripts has been hotly debated. Mainstream archaeologists have taken for granted for a long time that a writing system is unthinkable before a certain threshold of social and economic complexity has been crossed. Whenever plausible evidence has been presented, the data have been dismissed on principle or by claiming that they had been forged. The Glouzel affair bear witness to the political dimension of the issue of when and where anatomically modern humans started giving graphic forms to their languages. Some ideologues have indeed a vested interest in promoting a

definite answer to these questions. But Piette's approach was not generated by ideology. It is made clear in his writings that his hypothesis emerged from the archaeological record he was discovering. He certainly was not looking for evidence of Mesolithic scripts when he started his excavations but could not find any better explanations for the sort of ordered marks he observed. Another reason for taking seriously his hypothesis is that others archaeologists were coming independently to the same conclusion. The British Egyptologist William Flinders Petrie to whose work Piette refers in the last pages of his 1905 article was developing a similar hypothesis based on excavations in a different cultural area and following a different method (Petrie 1912). Many others have pointed to data that they construed as possible proto-writings that were used in a vast geographical expand around the Mediterranean Sea. There were, however, reasons that compelled their intuitions to remain speculative and prevented them from giving an operational dimension to their hypotheses. Among these reasons was the fact that the archaeological record was still quantitatively and qualitatively limited and somewhat anecdotal. Another factor was the lack of systematic organization of the data as well the relative uncertainty of the dating. But even if the sampling of significant items was fairly small, its parsing had to be done within the constraints of human working memory and perception, and the sheer number and diversity of the relevant items were overwhelming for the typically individual researcher who had access only to his own collection. Archaeology cannot progress without the support of other scientific disciplines. Contemporary advances make it now possible to address some archaeological questions more efficiently.

### The Piette hypothesis in the 21<sup>st</sup> century epistemological context.

There are several new developments in domains concerning the issues addressed here that provide interesting frames of reference for dealing with the archaeology of writing from a multidisciplinary perspective. These developments are more particularly relevant to assess anew the Piette hypothesis.

#### (i) Cognitive and evolutionary considerations

The possibility of early forms of writing cannot be assessed without taking into consideration the cognitive competence of anatomically modern humans. Writing in whatever guise presupposes a functional coordination between motor, visual, and linguistic skills, the latter involving a broader symbolic capacity. Establishing the presence of these competences is a prerequisite for making plausible the existence of writing and its reading correlate in an ancient population or a subset of this population. Rock art provides ample evidence of motor and visual coordination as well as semiotic competence through the painting and carving of artifacts we still can understand as representing natural objects displayed in particular configurations that challenge our drive toward interpretation.

However, we should not hold the text produced by the modern normalized literacy as the standard of writing. Contemporary text messaging shows that

combining icons, emoticons, and symbols such as numerals with the encoding of proper linguistic segment can indeed adequately convey verbal information through visual means [e.g., C U @ 2 4sure ]. Expediency is the golden rule of communicating by writing between agents who partake in the same culture or sub-culture.

Normalized codes are of course a functional imperative for complex societies. But many circumstances can make it highly adaptive for smaller social groups to record information that is encrypted visually rather than entrusted to memory alone although the latter is always a necessary component of any script convention.

The marks used in such systems are produced under specific motor and perceptual constraints which have been thoroughly investigated in the context of the contemporary cognitive neurosciences. Of particular relevance is the research conducted by Mark Changizi and his collaborators at the California Institute of Technology (e.g., Changizi and Shimojo 2004, 2005, 2006) on the shared characteristics of 115 writing systems, past and present, including for instance Chinese, Etruscan, Latin, and Runic. In all systems, a finite number of lines, loops, and other strokes combine to form individual configurations easy to perceive as individual distinct marks. On average these marks are comprised of three strokes, a feature that corresponds to the number of objects which as for one and two do not require counting, a phenomenon called subitizing, and can be held by humans in visual short-term memory. It has also been demonstrated that such systems are sustained by a remarkable level of redundancy since on average the distinctiveness of each character persists if one of the strokes is removed. The economy of such semiotic designs is rooted in perceptual and cognitive capabilities that predate by a huge order of magnitude the alleged dates assigned to the invention of writing.

Furthermore, Changizi and his co-researchers have tested the hypothesis that the visual signs forming the basis of writing systems are congruent to patterns relevant to the adaptive perceptual sensitivity to the environment in which humans have evolved. In other words, the shapes of letters and other symbols are derived from common forms in nature. Typically, the object recognition technology developed in robotics makes use of basic geometrical patterns similar to Roman letter forms – which, as Changizi et al. have shown, are not unique to this alphabet. For instance, junctions are represented (and named) by L, T, Y, X, and the like. These shapes are the same as the ones through which the contours in our environment are structured with respect to survival values for primates. Robots endowed with artificial visual systems must behave in situations that simulate the real world in accordance with these geometrical cues. In as much as writing is made to be seen, this can be achieved only by tapping the most efficient perceptual resources of the brain that have evolved as adaptive strategies to process visual information economically. Thus, a repertory of 36 shapes using two or three contours that are observed in writing systems can be ranked according to the frequency of their occurrence in nature.

The result of this research, which is grounded on a massive body of evidence that has been gathered for several decades by the cognitive neurosciences, provides a conceptual, formal, and evolutionary frame of reference for assessing the intentionally produced marks found in the archaeological record, and for classifying them according to topological criteria. It also makes possible comparisons with other graphic systems including the scripts which are considered to be the earliest forms of

writing. Intuitively it shows a remarkable continuity of design and raises the possibility of a continuity of function.

(ii) Linguistic considerations

Continuity is what matters when dealing with data that may meet the criteria of a potential script. It is one thing to demonstrate that the formal organization of deliberately created marks satisfies the conditions that are expected, for instance, from a syllabic writing system: it is an entirely different thing to assign linguistic values to hypothetical signs. The purpose of this paper is not to make such a claim that would be irresponsible given the state of the art, but to examine the nature of the challenge and to explore ways of approaching it in view of current linguistic theories. On the surface, the documented languages of the world, past and present, are perceived as separate entities. This view is based on experience since languages are not transparent for each other and translation requires considerable effort with imperfect results. It is also based on theory since the mainstream approaches to language assume that the link between sound and sense is arbitrary. However, historical linguistics has devised methods that make it possible to demonstrate how some words and syntactic structures developed from previous forms over time and under some particular evolutionary constraints. This gave rise to the representation of language diversity as sets of historically related languages that can be metaphorically mapped as families. These genealogies, however, have been constructed as independent blocks. Attempts to relate the families with each other as members of more encompassing ancestor languages, or even to assign their ultimate origin to a “mother tongue”, are generally considered highly speculative, if not a mere delusion. In any case, the depth of the probe is limited to a relatively short temporal horizon by sheer lack of direct evidence. In addition, the genealogical metaphor creates a kind of tunnel vision that excludes a priori the lateral spreading of forms by contact rather than by descent.

We should, however, not confuse lack of evidence with absence of continuity. This is the argument that Piette was opposing to those prehistorians who, in his own time, were claiming that there was a gap in Europe between the Upper Palaeolithic and the Neolithic. For them, these two technologically defined periods were absolutely disconnected by a demographic and cultural vacuum. Piette was making the case for what he called the Mesolithic or Azilian as a bridge between the two, claiming that the archaeological record was still too scant for ontological pronouncements of this sort. The same argument may have also some validity with respect to linguistic evidence since the rate of language extinction is quite high under natural conditions.

What languages were spoken by the populations who produced the engraved antlers of the Magdalenian and the painted pebbles of Mas-d’Azil? Although there is a general agreement that prehistoric populations were communicating verbally, there is also a broad consensus that we have no way of knowing anything about such hypothetical languages. This certainty is based on the assumption that writing had not yet been invented, and even if it had been invented these languages are irretrievably lost. It is also determined by theory because the main European languages are believed to have been brought to Europe during the Neolithic era by successive waves

of invaders. The origin of primitive Indo-European is variously ascribed to horse riding tribes from central Europe (e.g., Gimbutas 1980) or Middle East farmers (e.g., Renfrew 1987). Indo-European languages are contrasted with probably more ancient ones such as Basque and Etruscan which are sometimes considered to be “autochthonous”, a designation that is more mythical than scientific given the fluidity of population movements from the vantage point of deep time. It should be noted however that all these theories are controversial. They offer various degrees of plausibility but no compelling evidence. This is why any other theory that emerges must be assessed on its own merit.

The “continuity theory” that was developed principally over the last two decades (e.g., Thomas 1991, Alinei 2003) claims that Primitive Indo-European was not a relatively recent introduction which obliterated the previous languages spoken by prehistoric European populations. It contends that Primitive Indo-European was a language that had evolved from a more ancient European language, and is therefore relatively autochthonous. The theory marshals evidence mostly coming from toponyms. The rationale for the exploitation of this source of information is that any portion of space that has been inhabited has received a name that is often a reference to a characteristic aspect of the landscape. This name differentiates this place from other nearby landmarks as it can be assumed that referring to various locations within the range of a tribe and beyond is eminently adaptive for communicating about spatial resources and orientations. Successive layers of inhabitants have piled up names upon names to designate relevant portions of space but place names have been shown to be extremely conservative in spite of the necessary transformations they underwent when crossing from one language to another, or when cultural revolution like, for instance the Roman colonization or the Christianization that followed, attempt to eradicate some toponyms. However such “linguisticides” cannot entirely cover the fine-grained verbal representations of space that is held as an essential semiotic resource by local populations. Place names which have escaped eradication are phonetic and semantic palimpsests because they are not usually arbitrary but refer to vital elements of the niche or landscape: river, ford, spring, rock, cliff, lake, and the like. These words can be extraordinarily resilient since they are most often adopted by invaders. The same remark can apply to the names of plants and animals which have continuously inhabited the same ecological area even across climatic variations. It is therefore not totally ludicrous to search for the few phonemic patterns that may have survived from Palaeolithic times to the present as long as population continuity is assumed. A long tradition of historical linguistics offers the means of inferring interesting knowledge from the cues provided by scant evidence. But, until the advent of the information sciences and their technologies, this remained a matter of individual intuition leading to speculative conclusions.

### (iii) Data and algorithms

The conditions and possibilities of research have been radically changed since the time of Piette even though the digital technologies that are now available are yet to be fully exploited by archaeologists. During the last six decades, computers have made it possible to store and read huge amount of information and the Internet achieved the merging of an exponential number of databases that can be searched. By applying



appropriate algorithms to the data thus made accessible, hypotheses can be tested and new patterns can be discovered. What could not be embraced in a single attentive vision because of its sheer dimension and diversity can now be probed in minute quantifiable details. In a recent article provocatively entitled “The end of theory” ([www.edge.org](http://www.edge.org)), Chris Anderson, the Editor-in-Chief of WIRED, welcomes the Petabytes Age that succeeded kilobytes, megabytes, and terabytes eras, each adding an order of magnitude to the quantity of information and the degree of computing power. Anderson claims that the correlations that can emerge from the data themselves make theory obsolete. This assertion is of course debatable but provides a promising context for addressing anew the problems with which Piette struggled.

What kind of research can be completed with a catalogue such as the one of the Piette collection that was described above? There is an absolute limit to the number of graphic patterns that can be displayed with their contexts side by side in such a way that they can be compared. Perusing this catalogue, which reproduces only items that have been selected following some vague esthetic criteria can only allow to formulate some phenomenological impressions such as the ones Piette used to conceive the possibility that these patterns may be related so as to form a semiotic system, plausibly a script. What kind of knowledge could emerge from an exhaustive database of all the Magdalenian mobiliary rock art record? What kind of result would be produced by coupling with such a database the databases of other known and unknown script systems? This would be the only manner in which a hypothesis such as the one expressed by Piette could be tested. All what Piette could do in his own time in view of his rich experience was to chose a few suggestive examples and lie them down side by side, and refer their forms to other forms he had seen in other catalogues. Even helped by printed and drawn records, or collections of items accumulated in display cases and storage boxes, human working memory cannot handle information beyond a certain threshold.

When it comes to deciding whether a corpus of graphic patterns is or not a script, only parsing a large quantity of items that have been calibrated so as to be comparable can provide an answer. For this, the dimension of the corpus is determining. This is why the Phaistos Disc is still a puzzle. As Andrew Robinson, the author of *The Story of Writing* states: “To make further progress on the Phaistos Disc we must hunt for more example around the shores of the Eastern Mediterranean” (2008:991).

But there is another threshold that must be crossed: the assumption that human populations that lived thirty thousand years ago were socially, cognitively and linguistically unsophisticated. Over the last century it has consistently come as a surprise whenever evidence of such sophistication is discovered, although it is usually first denied as mere speculation or forgery. Even more recent human achievements are found astounding, such as the discovery that the Antikythera Mechanism (second century B.C.) was a machine that made it possible to figure out the relationships between astronomical cycles to deduce the relative positions of the Sun and the Moon and forecast eclipses, and was setting the timing of the Olympic Games through highly sophisticated expertise in astronomy (Freeth et al. 2008). It is legitimate to ask how far back in time we should assume such a lack of sophistication that would make communicating and computing through artifactual signs impossible.

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