

“Behold in the plains, and caves, and caverns of my memory, innumerable and innumerably full of innumerable kinds of things, either as images, as all bodies; or by actual presence, as the arts; or by certain notions and impressions, as the affections of the mind, which, even when the mind doth not feel, the memory retaineth, while yet whatsoever is in the memory is also in the mind—over all these do I run, I fly; I dive on this side and that, as far as I can, and there is no end.”

Augustine of Hippo 1553–1550 BP¹

WRITING HISTORY: AN IMAGINARY MNEMONIC GAME CHANGER

Maarten Vanden Eynde, 71 AP (After Present)

After Present or **AP** is the name of the era that comes after January 1, 1950, which marks the end of BP or Before Present, also known as “Before Physics.”

Alas, we forgot when we started to remember ...

The capacity to remember, to recall memories, was a clear competitive and, evolutionary speaking, preferable advantage since it augments the chances of survival significantly. Pivotal information, like what was edible and what not, when certain animals migrated and from where, geographic locations of drinking water, and knowing sun and moon cycles, was extremely valuable and needed to be remembered, communicated, and passed on to safeguard a community of early-human hunter gatherers. Exchanging knowledge in order to work together, plan ahead or express emotions depended strongly on a variety of sounds, which humans were able to produce by evolutionary altering their larynx. An expanding linguistic toolbox increased communication and demanded a “technological fix” to make up for limited internal storage capabilities.

This text is an attempt to understand the evolution of methods and tools that humans applied to augment their memory and knowledge in general by inventing language, mathematics, and graphic writing. Next to imagination and site-specific fieldwork, countless historic sources were used to trace back the oldest remnants of these inventions and connects them to potential future developments that suggest a re-internalization of

“Gesture, Light, Memory” is composed of *Dream Drawing* by Geir Harald Samuelsen 2021 and *Sleep Drawing* by William Olsson/Elin T. Sørensen 2005

¹ Yates, 16 AP, p. 61

memory improvements after a centuries long attempt to externalize them. Rather than analyzing specific objects, places or time periods in depth, a wide variety of interlinked events, inventions, and locales are taken into account because history is not an amalgam of independent moments and momentums. It behaves rather as a rhizome or chain of interconnected activities that influence its course. Only by following the ripples that occur when a stone hits the water, going as wide as one possibly can in all directions, it is possible to come full circle, and understand evolutions in deep time. What follows is an invitation to virtually travel through time and space, and by absorbing a myriad of references along the way to create a speculative narrative that might help unearth the mysteries of human knowledge production and preservation through memory and repetition.

Externalizing Memory

The earliest known example of what one might call a “memory device,” i.e., something external to a human body that was used as aid to store information, is a small piece of ochre from around 75.000 BP or Before Present with a very distinct crosshatched drawing engraved on it that was found in the Blombos Cave in South Africa. It dates from before the so-called second migration wave “out of Africa” (between 70.000 and 50.000 BP), when anatomically modern humans, or *Homo sapiens*, colonized the whole world and replaced *Homo erectus* and *Homo neanderthalensis* who arrived in Eurasia much earlier in human history (between 230.000 and 270.000 BP).² The symbolic meaning or practical use of that particular memory device got lost along the way, but the recurring presence of similar graphic signs throughout the rest of the world invites us to assume that it was part of a graphic writing system the function of which was important and meaning of which was known to many, in different times. It is not certain whether it is a visual representation of verbal communication or a simple reminder of how to make a calendar, it does however most certainly represent a reliable form of information storage and transfer.

Before Present or **BP** is an alternative time scale, mainly used in archaeology and geology and increasingly in other sciences that wants to abandon the baseline denotation of a year 0 referencing a particular religious figure (AD = anno Domini, BC = Before Christ, or BCE = Before Common Era) as is used in Julian and Gregorian calendars. This new year 0 is 1950 in the BP time scale and is instigated by the artificial alteration of the proportion of carbon isotopes in the atmosphere by nuclear weapons testing, making carbon dating after that time increasingly challenging. The BP time scale will be used throughout the entire text.

Colonized is meant here as the action or process of settling amongst and establishing control over the indigenous people of an area.

The presence of considerable amounts of pebbles or shells sometimes decorated and/or perforated, in and near caves, including Blombos, that contained memory devices (both in the form of portable objects like rocks or bones and as graphic writing symbols drawn or scratched inside caves), opens the possibility to imagine that there is a correlation

between them. Counting, before the invention of numbers, was made possible by placing and moving pebbles or shells around and by following the resulting mathematical logic. This numerical language eventually led to writing. A grid or structure that accompanies the pebbles, either drawn on a rock surface or in sand, expands the possibilities to use and “read” the outcome. Looking at a graphic line drawing without the pebbles would be like looking at a Scrabble game board without the letters. It would not make much sense. Pythagorean philosophers for instance, also represented numbers graphically around 2490 BP by using dots, also known as psiphi (pebbles), to represent numbers in triangles, squares, rectangles, and pentagons. The famous Salamis Tablet, a precursor of countless Abacus variations that were used until way into the After Present (AP), dates from around 2250 BP and allowed for astronomical calculations, using just a few lines and a few pebbles.

The number of lines and cross points on the memory device that was found in Blombos can be turned into a solar and lunar calendar without too much effort, as the Swiss polymath Franz Gnaedinger proposed. Also, the *Lebombo bone* and the *Ishango bone* are credited as calculating or counting devices that in combination with pebbles and shells create tremendous mathematical and data storing possibilities. Similar bones and collections of pebbles that were also engraved, sometimes with graphic lines, sometimes with representations of animals, are found in Israel, Lebanon and throughout the Levant. If the bones are indeed tally-sticks, “then the use of signs to communicate factual information followed the use of symbols in ritual,” according to French-American archaeologist Denise Schmandt-Besserat,³ who contributed significantly to the understanding of tokens in the larger evolution of writing. The division of scripts, understood here as distinctive writing systems of interrelated symbols used to encode and transmit meaning, is not a strict one, as different scripts were and still are used simultaneously. “Systems of graphic inscription, such as ideograms or pictographs, coexist with written systems, are linked with spoken language and ideas, and function much as writing does: to record, archive and transmit knowledge and information.”⁴

Frans Gnaedinger was an author, linguist, and mathematician specialized in Egypt and the evolution of language and writing.

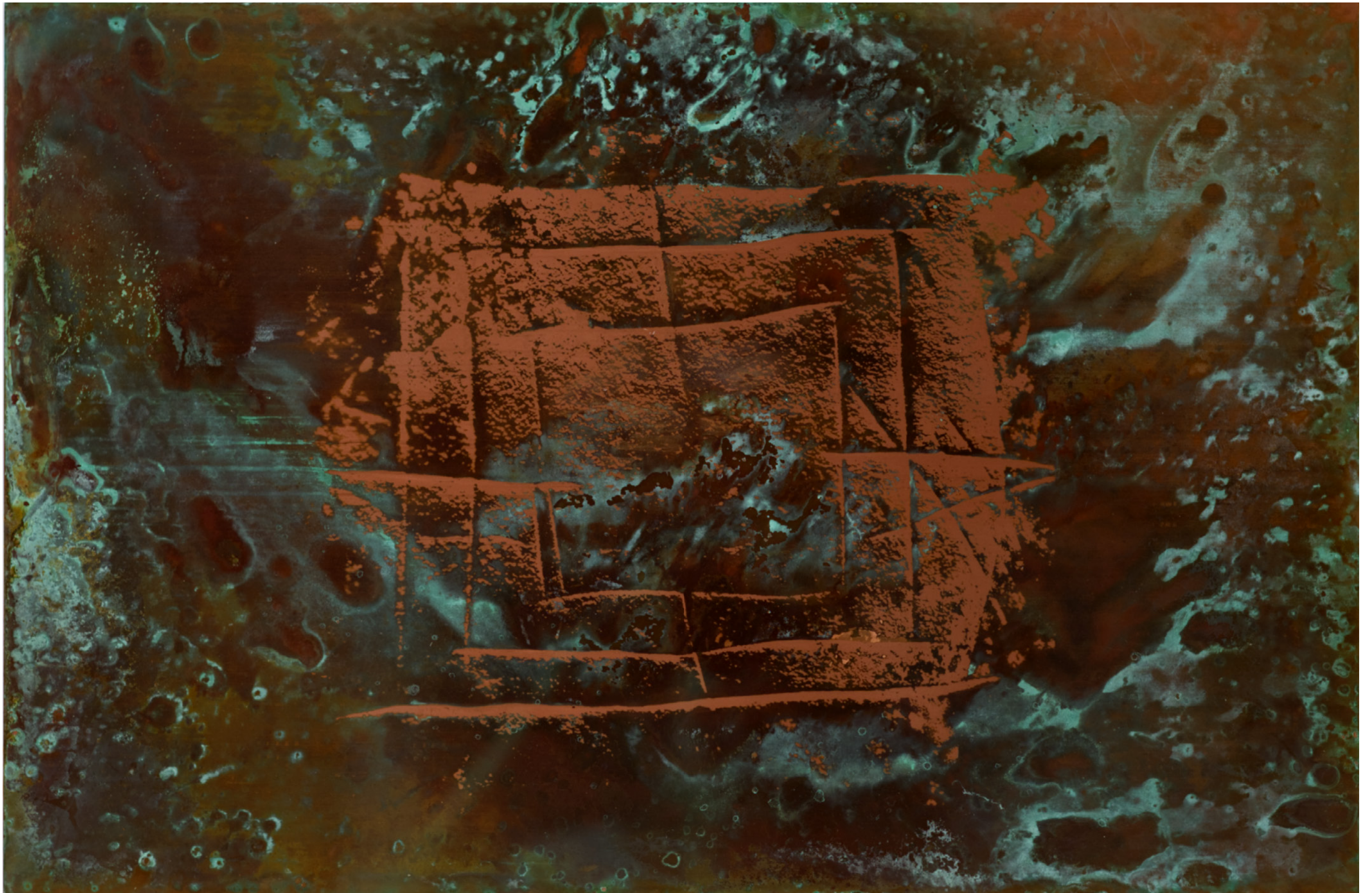
A baboon fibula from around 44,000 BP with 29 incised markings that was discovered in the Lebombo Mountains located between South Africa and Swaziland, that according to David Darling can be seen as Lunar calendar (Darling, 54 AP). A baboon fibula from around 20.000 BP with a set of mathematically sequenced incised markings that was discovered near the Semliki River in the Democratic Republic of the Congo. The amounts of incisions and the spaces in between have been interpreted both as a lunar calendar and proof of mathematical understanding of decimals and prime numbers. It includes a sharp piece of quartz affixed to one end which could be used for engravings.

Artwork on the next pages
Game Changer I
Maarten Vanden Eynde 71 AP
Photo by Marjolijn Dijkman

2 Liu et al., 56 AP, pp. 130-137

3 Schmandt-Besserat, 69 AP, p. 7

4 Nooter et al., 57 AP, p. 14



Still today, according to Afro-Cuban curator and art historian Barbaro Martinez-Ruiz, many of the same communication methods are in use among the descendants of the Kongo people near the old capital M’Banza Kongo (also known as São Salvador in Portuguese from 380 BP to 25 AP, currently located in the north-western Zaire Province of Angola), and similar positions in society as keepers of knowledge are found around the world. “In addition to religious figures, there are social and political counter-parts who are responsible for administering the use of graphic writing in a secular setting. One such position, which Fu-Kiau describes as a ‘scribe,’ someone whose role it is to archive information inside the traditional government (mbôngi). This person is called Na-Makolo or Makolo and is charged with keeping for the community records of government decisions, agreements (mandaka) with other traditional governments, such as economic contracts and political alliances, and other important events. The Makolo does this by braiding a cord and tying knots onto this rope (n’sing’a makolo) or simply by cutting marks (makènko) into a piece of wood made for the purpose. The Makolo also has the related obligation of decoding the message symbolized by each mark or knot on his ropes.”⁵ The semantic roots of the verb to analyze, still includes a reference to the use of ropes: analysis = to untangle (from ana- “up, throughout” and lysis “a loosening.”)

Both the cutting of marks in a piece of wood or bone and the tying and untying of knots on a rope, are fleeting snapshots of an exchange of information and due to their limited durability do not last long in the passing of time. Most material culture from both Neanderthals and humans, is organic and perishable and rarely makes it into the archaeological record. This predicament has been described by the British archaeologist Linda Hurcombe as “the missing majority.”⁶ It can also be described as the dark matter of human material history, and the actions, emotions, or rituals that accompany their use, as dark energy. One can only surmise their existence by looking at the traces they leave behind in time and space.

Dark energy in analogy with the new model of the universe from 40 AP, where the amount of visible matter (the Earth, the Moon, the Sun and all the planets, stars, asteroids, comets, and gasses) is less than 5% of the universe, 68% is dark energy, and 27% is dark matter.

The use of strings for instance, to collect and safeguard perforated mollusk shells, is deduced after use-wear analysis of Glycymeris shells and allows us to “conclude that between 160.000 BP and 120.000 BP there was a shift from collecting complete valves to perforated ones, which reflects both the desire and the technological ability to suspend shell beads on strings to be displayed on the human body.”⁷ The oldest actual fiber fragment that was part of a cord was found in Abri du Maras in France and dates from the Paleolithic Age, subsequently indicating Neanderthals’ ability to manufacture cordage, and “it hints at a much larger fiber technology,”⁸ because, “the production of cordage necessitates an understanding of mathematical concepts and general numeracy. Cordage production entails context-sensitive operational memory to keep track of each operation. As the structure becomes more complex (multiple cords twisted to form a rope, ropes interlaced to form knots), it demonstrates an ‘infinite use of finite means’ and requires a cognitive complexity similar to that required by human language.”⁹ American anthropologist Bruce L. Hardy, one of the leading researchers in the study, concludes in a newspaper article: “I can’t have a sentence without words, and I can’t have words without the individual sounds that carry meaning. So, I can’t have a rope or a cord or a bag or

a net without the other steps along the way. You can’t start with the end product. It’s a scaffolding process that scales up.”¹⁰ Next to innumerable practical uses of cordage, this evolutionary process eventually also led to complex communication and memory systems like *Arokò*, used by the Yoruba people of the western part of Nigeria, and *Quipu*, which is used by the Inca people in the region of Andean South America.

Arokò is a messaging system combining different items like cowries and seeds on a string that each have their own meaning, depending on the combination and the order in which they are arranged.

Quipu are recording devices, both for mathematical calculations and for information storage, fashioned from strings that contain variable sequences of knots and obtain a different meaning by the changing use of colors, fiber, and twisting direction of the cord.

Song lines are part of the belief system of The First Nations people of Australia and help navigate both the physical land that was crossed by their ancestors and the complex historical events that are part of their culture. Traditional Aboriginal people regard all land as sacred, and the songs must be continually sung to keep the land, and thus the memory, “alive.”

Remembering and Forgetting Rituals

The only way to avoid oblivion and disappearance into the dark matter side of history is endless repetition, recreation, and retelling, because forgetting is the destruction of memory, according to German philosopher and sociologist Theodor W. Adorno. But “since societies don’t remember themselves, humans invented institutions for the transmission of knowledge. Ritual is one and it works by means of repetition. Ritual is itself remembered,”¹¹ proclaimed German anthropologist Stephan Feuchtwang. “Rituals are prescribed and are therefore a deliberately learned discipline. They can vary in intensity and degree, be more or less clearly called out as a memory, and the feelings and emotions can be induced by pain, by anticipation, relief, and release, or by pleasure. But whatever the variation, ritual performance is a corporeal experience, not just an image. Ritual creates a memory, and when it is repeated, it is reinforced.”¹² That is why rhythmic music, games, chanting, and song lines are such good educational tools and excellent memory aids. They also reinforce and reaffirm physical and emotional memory, relating both to souvenirs from an exhilarating experience, and to lived or inherited trauma. Songs and visual images are stored in the frontal cortex and are as a result often the last stronghold of memory for people suffering from Alzheimer. Putting on music or specific sounds can trigger a temporary revival of Alzheimer patients who seem to be back “in the moment” and recollect the entire score or emotional sensation attached to it.

5 Fu-Kiau, 35 AP; Martinez-Ruiz, 62 AP, p. 119

6 Hurcombe, 64 AP, p. 1

7 Bar-Yosef Mayer et al., 70 AP, p. 1

8 Hardy et al., 70 AP, p. 5

9 Hardy et al., 70 AP, p. 7

10 Roberts, 70 AP, quoting Hardy, 70 AP

11 Feuchtwang, 60 AP, pp. 287–289

12 Feuchtwang, 60 AP, pp. 283–284

In Fontainebleau more than 2000 different sites have been discovered so far, dating from the Mesolithic to the late Paleolithic era (between 10,000 and 20,000 BP) in an area of more than 1000 m².

The creation of song lines and the repetition of scratched geometric patterns on rocks and inside caves, of which Fontainebleau in France is one of the most spectacular examples because of their overabundance spread out over such a vast area, are two distinct ways to merge memory and landscape, or the lyrical and the literal.

“Histories are written into landscapes through ritual and myth,” says Feuchtwang, “but history as written from archaeological and documentary evidence functions in a quite different mode from mythical temporality, just as the landscape of events and histories of them are quite different in mode from a ritual landscape, which is cosmological or cosmogonic, that is, of a world and its origins and of humanity in it.”¹³ In order to understand the mythical and societal temporality of such ancient memory devices one should implement a “fundamentally pluridisciplinary global and comparative archaeology,” as Cameroonian archaeologist Augustin F. C. Holl would call for.

Sadly, at the beginning of the After Present, the cultural and social sciences were underdeveloped in Europe, according to the American anthropologist John M. Janzen, or, rather, they were developed in a direction opposite to that which would have allowed them to see the meaning of a cosmogeny as a set of cultural axioms.¹⁴ A centuries long effort to separate ancient animistic belief systems from western and euro-centric scientific belief systems caused a serious disconnect and rupture in the understanding of human history and evolution. Starting in ancient Greece, a purposeful extinction attempt of pagan knowledge and wisdom was set in motion. It also marked the end of the so-called Ars Notoria, the magical art of memory. Attributed to Apollonius or Solomon, but with clear connections all the way back to the beginning of graphic writing systems, Ars Notoria combined figures and diagrams with shorthand notae (the Latin word for marks) already in 2900 BP. A few hundred years later Marcus Tullius Tiro, known as the “father of stenography” introduced the Tironian notes (notae Tironianae) as an elaborate shorthand technology that contained more than 4000 characters. He was an enslaved servant and private secretary of Cicero, arguably the “father of the Roman Empire” and writer of more than three-quarters of all surviving Latin literature. By the time of the Carolingian dynasty, between 1200 and 1300 BP, the notae vocabulary reached an amount of 14.000 characters, but it quickly disappeared thereafter as it became associated with magic and witchcraft and was severely suppressed and condemned. It only resurfaced after 800 BP by the recurring efforts of Thomas Becket, archbishop of Canterbury, who rekindled interest, but it was never able to gain similar momentum as it had before. Thomas Becket was murdered in Canterbury Cathedral in 780 BP and today only a few notae survive, like et (∩ meaning “and”) in Ireland and Scotland.¹⁵

All this valuable knowledge of symbols, diagrams, and other memory techniques were collected, popularized, and distributed by the Italian philosopher, mathematician, cosmological theorist, and Hermetic occultist Giordano Bruno around 380 BP. He had to flee several times from the Roman Inquisition, first to Geneva and after that via France to England, during which he was protected by the royal family and King Henry III himself because of his extraordinary memory skills and knowledge. Eventually he was caught by the Inquisition, convicted for heresy, and burned on the stake upside down in 350 BP. And ever since that moment most of this historic knowledge related to memory and remembering was seen in Western Europe as occult, superstition, and part of black magic.

¹³ Feuchtwang, 60 AP, p. 289

¹⁴ Janzen, 19 AP, p. 5

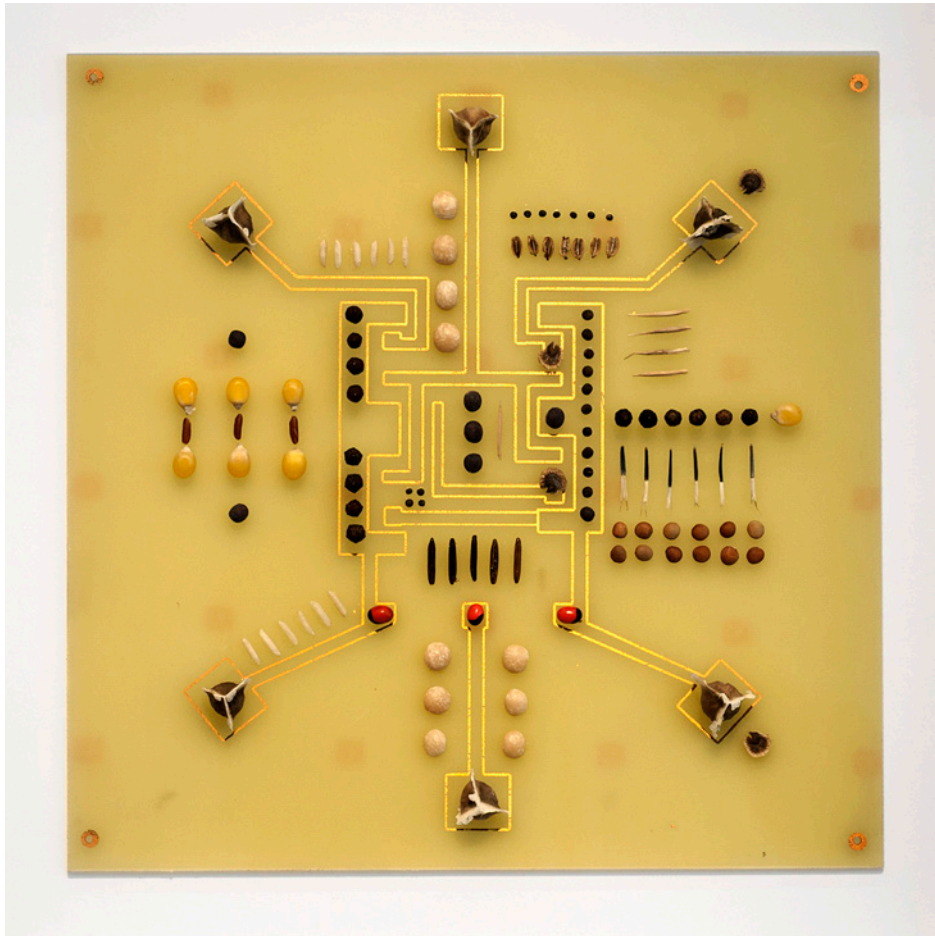
¹⁵ Yates, 16 AP, pp. 56–57



Coquibus, Milly-la-Forêt 71 AP



Abris de Prinvaux, Boigneville 71 AP
Photos by Maarten Vanden Eynde



Immortality Drive I
Maarten Vanden Eynde 68-69 AP
Photo by Philippe De Gobert

A new wave of erasure and forceful forgetting took place around the world during the European colonization, starting at 458 BP, and together with the violent spreading of Catholicism came the destruction of vast amounts of valuable indigenous knowledge. Human history was rigorously rewritten, placing Western culture and science at the heart of human evolution. Fictional concepts like “prehistory” or “pre-literary history” were introduced during the European Age of Enlightenment (the first use of the word prehistory in English occurred in the Foreign Quarterly Review in 114 BP!).¹⁶ It was initially introduced by antiquarians who used the word “primitive” to describe societies that existed before “written records.” The subsequent invention of the geologic time scale for pre-human time periods and the three-age system for human “prehistory” (Stone Age, Bronze Age, Iron Age), kickstarted the further semiotic and linguistic specialization and separation of interconnected technological inventions and anthropological evolutions, resulting in a fragmented and biased understanding of human cultural heritage.

In 36 AP, the Canadian geneticist, science broadcaster, and environmental activist David Suzuki linked the success of science “limiting its field of vision to a narrow sphere” with its failure, never being able “to provide a worldview - by its very methodology, it is incapable of it. By looking at nature in bits and pieces, our understanding of it can only be fragmentary, for nature is not the sum of its isolated parts.”¹⁷ This artificial and fallacious view on human history and evolution through a western scientific

telescope, has a lasting effect on the apprehension of deep history,¹⁸ and correcting this historical (wrong) turn has been a frustratingly slow but necessary endeavor ever since. Breaking the mirror in which one only sees oneself is instrumental for the creation of a kaleidoscopic worldview that reflects the multilayered and inherently subjective representation of the world.

Re-writing History

In the early days of the After Present, the necessary rewriting of history began to have considerable influence and slowly but surely the air was let out of the self-inflated Eurocentric air castle. “The viability of the traditional narratives of patriarchy, imperialism and colonialism were vigorously challenged and disproved by the sort of reassessment of history called for and developed by marginalized groups and societies. This sort of undermining of the truth and authority of history is exemplified by Edward Said’s landmark book *Orientalism*, which issued a clear challenge to the ways in which colonial history was constructed and biased.”¹⁹ As a result of the relentless work by countless scholars like Senegalese historian and anthropologist Cheikh Anta Diop, American philosopher Molefi Kete Asante, and Congolese linguist and historian Théophile Obenga we understand now how graphic writing systems and mathematical tools and knowledge led to the magnificent wonders of the Egyptian civilization, which in its turn instigated the further evolution of alphabetic writing and countless other technological and scientific developments throughout the rest of the world. The American linguist Konrad Tuchscherer summed it up nicely, a few decades later, when he said: “The Egyptian system drew from many highly codified African graphic systems,” including rock art, knotted cords, tallies, geometric pottery motifs, weaving designs and scarification, “which, even if not phonetic, were highly systematized and recorded as well as communicated information.”²⁰ This led the American linguist Christopher Ehret to conclude, with some acquired institutionalized surprise, that “over the long run of north-eastern African history, what emerges most strongly is the extent to which ancient Egypt’s culture grew from sub-Saharan roots.”²¹ This epic human evolution from counting to graphic writing systems resulted into Unicode, which was first proposed in 37 AP. The Unicode information technology standard for the consistent encoding, representation, and handling of text comprises at the moment of writing this text most of the world’s writing systems.

When writing about the history of writing, especially while using digital means, there is an inevitable feeling of disconnect. The manual experience (from manu = hand) feels distant and intangible when hammering away on the keyboard of a computer. At the other hand, what else is writing and the transmission of knowledge but a rhythmic repetition of signs and symbols with an agreed upon meaning? The core of any communication or counting device is based on a set of axioms that over time become theorems, from simple line drawings to binary code. Some of the oldest ideograms that can be traced back to the early days of human existence are still present today, like the iconic # or + symbols for instance, although their particular function and meaning changed over time. Graphic writing systems making use of a similar set of signs are found on all continents, as Canadian anthropologist Genevieve von Petzinger put forward, introducing a set of 32 recurring signs that can be interpreted as a rudimentary alphabet before letter were invented. Unicode now defines 143,859 characters covering 154 modern and historic scripts, as well as symbols, non-visual control and formatting codes, ideographs, hieroglyphs, sign language, emojis, and emoticons. It is a utopian attempt to preserve, at least digitally, and make available what still exists today and has not yet disappeared in the dark matter of the past.

¹⁸ Smail, 59 AP, p. 6

¹⁹ Gibbons, 57 AP, p. 4

²⁰ Tuchscherer, 57 AP, pp. 37-51

²¹ Ehret, 52 AP, p. 93

¹⁶ Matthew Daniel, 66 AP, p. 3

¹⁷ Suzuki, 36 AP, p. 11

But humans tend to forget, regardless of the many variations we have at our disposal to say we won't. The whole Western memory tradition, for example, is based on an unknown rhetoric teacher. Oh irony, the art of memory springs from a book by a forgotten author ... Brilliantly put forward by the English historian Frances Yates in her seminal book *The Art of Memory* (16 AP), referring to *Rhetorica ad Herennium* (from around 2030 BP). The book without a known author contains the first confirmed description of the mnemonic technique the method of loci and provides the first complete treatment of the memorization of speeches.

The German psychologist and pioneer in the experimental study of memory Hermann Ebbinghaus introduced already in 65 BP the notion of “the forgetting curve” that supports one of the most common memory failures: transience, which is the process of forgetting that occurs with the passage of time. The stronger the memory, induced on purpose or accidentally by a rememberable experience, the longer someone can recall it. Afterwards, unless a memory is kept alive through repetition, reviewing, or reciting for instance, a typical “the forgetting curve” graph shows that humans tend to halve their memory of newly learned knowledge in a matter of days or weeks.

So how do we make sure we do not forget again to remember? By bending the curve, over and over again. This can be achieved by making sure that knowledge or information is repeated inexhaustibly in the same way, like a student copying every move from a tutor. Or by allowing natural variations to take place because of personal and individual fluctuations of mood, timing, and character, like the different readings of *Lukasa memory boards* from DR Congo for instance. This last approach is more related to what Opaskwayak Cree scholar Shawn Wilson, who is specialized in indigenous research methodologies, would call “performative knowledge,” or learning by doing.

Because of the striking resemblance between old petroglyphs and outlines of contemporary boardgames, could it be that they were initially used to transmit information, to learn something? And that by the constant replaying (to both play and listen again) or recounting (to both tell and count again) a continuous repetition ritual was instigated and stimulated, or, learning by playing?

Lukasa were used until recently by members of the Mbudye association in the Kingdom of Luba as an archive for the topographical and chronological mapping of political histories and a means of remembering important people, places, and mythical migration routes.

The Game is On!

Games fit all the requirements of a perfect memory device, including repetition and ritual, the process of transition towards completion and adaptability depending on specifics of time and place, and even players. That is probably why they have been around for so long and in some cases still exist today, like the Morabaraba game, also known as Merels board games, or Nine/Twelve Men's Morris. Several thousands of examples, with some variations, have been found around the world, including in Valcamonica in Italy and in the before mentioned Fontainebleau area in France, dating the game to at least the Mesolithic era. The combination of several declining squares, with cross-sections both horizontal, vertical, and sometimes diagonal, allow for a multitude of mathematical calculations, making it a remarkably successful tool in mathematics education still today. But the game does more than that. South African mathematicians and educators Mogege David Mosimege and Nkopodi Nkopodi analyzed the effects of playing the game in an educational context and put forward that next to the experience “to learn the language and vocabulary of mathematics, develop mathematical skills, develop abil-

ity with mental mathematics” it is also a tool to help “devise problem-solving strategies” and that it “also leads to discovery of patterns, decision making, and logical reasoning.”²² The fact that most Morabaraba-like patterns from the Mesolithic era are not on a flat, horizontal surface and would therefore not allow for the game to be played on site as the pebbles would fall off the board, which was the conclusion after analyzing the largest survey of similar geometric grids around the world by the French archaeologist Christian Wagneur and other affiliated researchers of GERSAR, dismisses the more logical explanation that the geometric petroglyphs themselves were not necessarily overlapping with the physical place where the game was played. They might as well have an archival function, kept secret and hidden in a safe space, but accessible to use or educate others, when need be, like a blueprint or a hard copy. The portable memory devices like rocks, bones, shells and sticks with signs and patterns engraved or drawn on them, should be interpreted in the same way: as manuals for future use instead of the actual functional pattern itself.

The rock drawings in Valcamonica (Camonica Valley), with a staggering number of catalogued incisions, between 200,000 and 300,000, are located in the Province of Brescia, Italy, and constitute the largest collections of prehistoric petroglyphs in the world. *Group d'Etude, de Recherche et de Sauvegarde de l'Art Rupestre* (Group of Studies, Researches and Protection of Rock-Art GERSAR). Founded in 25 AP in France, the main purpose of the association is to study and make better known French rock art in general and more particularly rock art from Île-de-France, including Fontainebleau.

Sotho or Sesotho is a Southern Bantu language spoken primarily in Lesotho, South Africa and in Zimbabwe

The Phaistos Disc is made of fired clay and contains 241 tokens, comprising 45 distinct signs. It was found on the island of Crete and dates from the middle or late Minoan Bronze Age (between 5000 and 3000 BP), although even this is debated. Its use, meaning, and origin is one of the great unresolved mysteries in archaeological history.

Morabaraba means “to mill” or “to go round in a circle” in *Sotho*, which is similar to the game of Mehen, meaning the “coiled one,” which looks like a snake and guides the player step by step towards the end of the game. It resembles the mysterious *Phaistos disc*, which although so far impossible to read can be understood as part of a knowledge system for storing and communicating information, much like a computer or any other memory device. A similar game still exists today and is known as the Game of the Goose. Even if other and older discs that look like a Mehen game are found, this is the only one that includes signs and thus might explain what is happening along the way, or what one needs to do or remember while following all the squares towards the head or the tail of the snake.

22 Mosimege, Nkopodi, 59 AP, pp. 377–392



A Chain of Events (maquette)
Maarten Vanden Eynde 70-71 AP. Photo by the author

There are countless examples of so called Roman or Egyptian games, like Senet (meaning *passing*), Mancala (meaning *to move*), Hounds and Jackals (also known as 58 *holes*), as well as, Tab, Seega, Aseb and Latrunculi, that all use the combination of geometric grids made with lines or holes and pebbles to move around to “achieve something” or “arrive somewhere.” All of them are present throughout the sub-Saharan African continent, both in the form of petroglyphs and as contemporary games like Wari (Oh-Wah-Ree), Omweso, Bao, Gabatta, Ayo, and Kisolo.²³ It is thus safe to assume that they existed prior to the emergence of the Egyptian civilization and played an indispensable role in the development of human culture and consciousness.

Photographic Memory

Making use of images of places, or entire palaces, to store memories and allow easy access by “walking through” a landscape or “navigating” from room to room became known as the method of loci (the Latin word for place). It is still the preferred method to retain as much data as possible for most memory champions. The Greek philosopher Socrates assumed that there is “a block of wax in our souls” on which impressions can be left behind.²⁴ These impressions, however, change over time, and whenever a memory is recalled, the old image is written over by the new one, in an analogous way as photographic memories of a holiday (meant here as actual photographs) are replacing the memories of the experience itself. That is why the Greek polymath Aristotle concludes in *De Memoria Et Reminiscentia* that “memory belongs to the same part of the soul as the imagination; it is a collection of mental pictures from sense impressions but with a time element added, for the mental images of memory are not from perception of things present but of things past.”²⁵ We constantly create and recreate images of past experiences that become new and renewed experiences whenever we remember them. When forgetting (or disremembering) is such an inseparable part of remembering, can we do one without the other, or are we doomed to undergo them simultaneously all the time?

There is a difference, however, between images that function as earmarks of memories that are inspired by empirical experiences or events, and images that are imagined to remember something by. The first one is referred to as natural memory whereas the latter is called artificial or mnemonic memory. Art critic and curator Joan Gibbons concludes that “the development of artificial memory was highly dependent on techniques of visualization, such as the location of a piece of knowledge in an imagined, clearly defined locus (often a building) or the attachment of data or ideas to striking (and therefore more memorable) images. Because of this emphasis on imaging or the formation of impressions, memory became closely related to imagination.” And as a result, “the way that memory is valued, then, has shifted enormously from the idea of it being a storehouse of data which, given the right techniques, is recoverable in an ordered manner to the notion that it is a key to our emotional understanding of ourselves and the world.”²⁶

The individual functionality of different memory aids has been extensively researched and written about by the Australian anthropologist and memory champion Lynne Kelly, who tested in practice all mnemonic memory devices that were known in 66 AP. Although they are all different in nature and some seemed to work better for specific kinds of knowledge, they are all absorbed into the brain tissue of contemporary humans as fresh rain on a dried-out lake. These ways of learning and remembering are clearly an integral part of human cultural DNA and, being passed on generation after generation, could they be embedded or inscribed genetically in the human mitochondrial Genome? After the discovery a few decades ago that planaria worms could “learn” something by eating another planaria worm who “learned” something just before, the idea emanated from this observation that “memory might be encoded in a chemical structure such as

the amino acid sequence of a protein.”²⁷ Is this the next step to internalize information, on top of the existing physical and emotional memory?

The introduction of digital memory of computers, allowing to store both words and images, particularly in combination with the Internet, further declined the need to internalize memory. As long as computer hard drives are made of inorganic material, knowledge will be largely externalized and not leave lasting impressions like those “which a signet ring makes on a block of wax,” paraphrasing the Roman rhetorician Quintilian.²⁸ In the beginning of the After Present, before transistors proved to be reliable sources of data storage, humans began to experiment with the replication of biological computers through biomimicry and implicated living cells—micro-organisms—in computations for the first time.²⁹ In 52 AP, American data scientist Pak Chung Wong encoded the famous Disney song “It’s a Small World (After All)” on a DNA string and was able to retrieve it and read it completely, but only once. The encoded information became less and less accurate with every new “reading.”³⁰ The analogy with memories that are changing whenever they are called back is striking to say the least, but this glitch only caused a temporary delay. “The microorganisms that survive heavy radiation exposure, high temperatures, and other extreme conditions are among the perfect protectors for the otherwise fragile DNA strands that preserve encoded information. Finally, living organisms, including weeds and cockroaches, that have lived on Earth for hundreds of millions of years, represent excellent candidates for protecting critical information for future generations.”³¹ One gram of DNA can store 455 trillion gigabytes,³² which means that every bit of information that was ever produced would fit in a shoebox. The already existing “unkillable” eternal living bacteria *Deinococcus Radiodurens*, or *Turritopsis Dohrnii*, aka the Immortal Jellyfish, are excellent candidates to carry, pass on, and thus preserve human history for us, if asked politely of course.³³

Today, in 71 AP, the technological evolution of storing data in DNA is so advanced that it is not a question anymore if biological computers will replace conventional silicon-based computers, but *when*. This magical milestone might allow for the re-internalization of memory devices for the first time in human history, epigenetically merging with our limited brain. It would mark the end of our need for external memory devices like computers and smartphones altogether. Although, it is just a thought. Nothing is written in stone, *yet*.

23 Eglash, 49 AP, pp. 101–108

24 Yates, 16 AP, p. 50

25 Yates, 16 AP, p. 47

26 Gibbons, 57 AP, p. 4

27 Campenot, 66 AP, p. 352

28 Yates, 16 AP, p. 50

29 Suzuki, 36 AP, p. 36

30 Farrier, 70 AP, p. 274

31 Wong et al. 53 AP, p. 98

32 Farrier, 70 AP, p. 274

33 Farrier, 70 AP, pp. 273, 278

Aristotle (2300 BP). *De Memoria et Reminiscentia* translated, as one of the *Parva Naturalia*, by Walter Stanley Hett, Loeb Classical Library No. 288, 15 BP.

Barbaro Martinez-Ruiz (62 AP). *Kongo Graphic Writing and Other Narratives of the Sign*. Temple University Press, p. 240.

Siobhan Roberts (70 AP) quoting Bruce L. Hardy in “Early String Ties Us to Neanderthals.” The New York Times, published online April 9, 70 AP: <https://www.nytimes.com/2020/04/09/science/neanderthals-fiber-string-math.html>, accessed May 1, 70 AP.

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