

# DIGITAL MEMORY & STORAGE

or

**"How to use the Land art, genetics and reverse bio-engineering to save our collective memory in the digital age"**

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*Forêt binaire – Mai 2013*

My work has focused for many years on digital issues and the "loss" of individual and collective memory resulting from the intensive use of new technologies. I start from the observation that since the advent of computers and the Internet, our cultural and artistic heritage has become massively digitized, thus exposing itself to a real danger of extinction due to the fragility and obsolescence of computer backup systems. I thus produced various devices to create "passages" between the binary world - the computer language consisting of 0 and 1 - and the real world aiming to "fix" these binary representations of visual and physical way in order to make lasting backups:

**The Hard Paper Disk** presented at the Centre Pompidou, Paris in 2013 is a book that contains the entire binary code of the film "La Jetée" from Chris Marker and which through a reversion system, allows the re-creation of the entire film in case of the disappearance of its digital version.

**Humanpédia** the project presented to the Jeu de Paume in April 2013 uses the human network as a backup in case of Wikipedia website disappearance : [www.humanpedia.fr](http://www.humanpedia.fr)

**The standard Kilo byte** exposed in May-June 2013 at De Roussan gallery in Paris proposes the creation of measuring instruments related to a new standard connecting the binary world and the physical world:

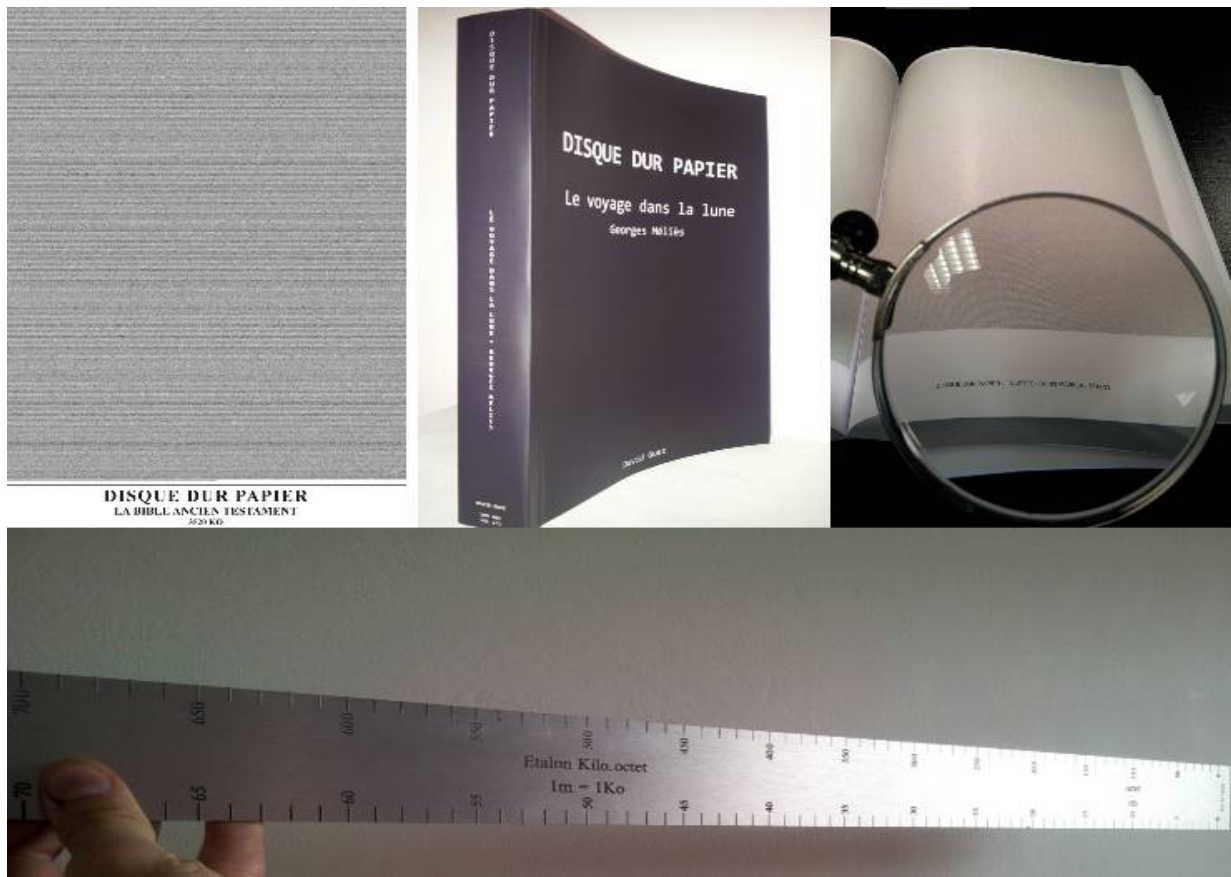
1 Kilo. byte = 1 Meter = 1 Kilogram = 1 Hour.

In this research file document, I develop the idea of extending these backups within integrated nature using the elements and terrestrial phenomena (tree, stone, water, wind, light, sing of birds, genetics ...) as materials and forces makes these binary representations. On this basis, I would find ways to fit into the space of the landscape as a result of 0 and 1 corresponding to the coding of existing artistic works. I also want to find ways to make these more sustainable as possible inscriptions. For example, I will work on using the tree or the stone as a storage unit of a binary or octal element: a tree representing a sequence of 1 or a 0, a sequence of trees - a segment of forest - represent all 0's and 1 encoding an artwork. According to my calculations, a square 100mx100m

forest - about 20,000 trees - could represent the binary code of a file of several kilo.octets - the digital equivalent of an image, text or a sound work. I also will work with genetics : The "Mendel01" project will meanwhile to genetically modify a bean pod to create a dark pea representing 1 and a clear pea encode 0, thus forming a binary bean whose code is multipliable to infinity.

My current research work focuses on the following points:

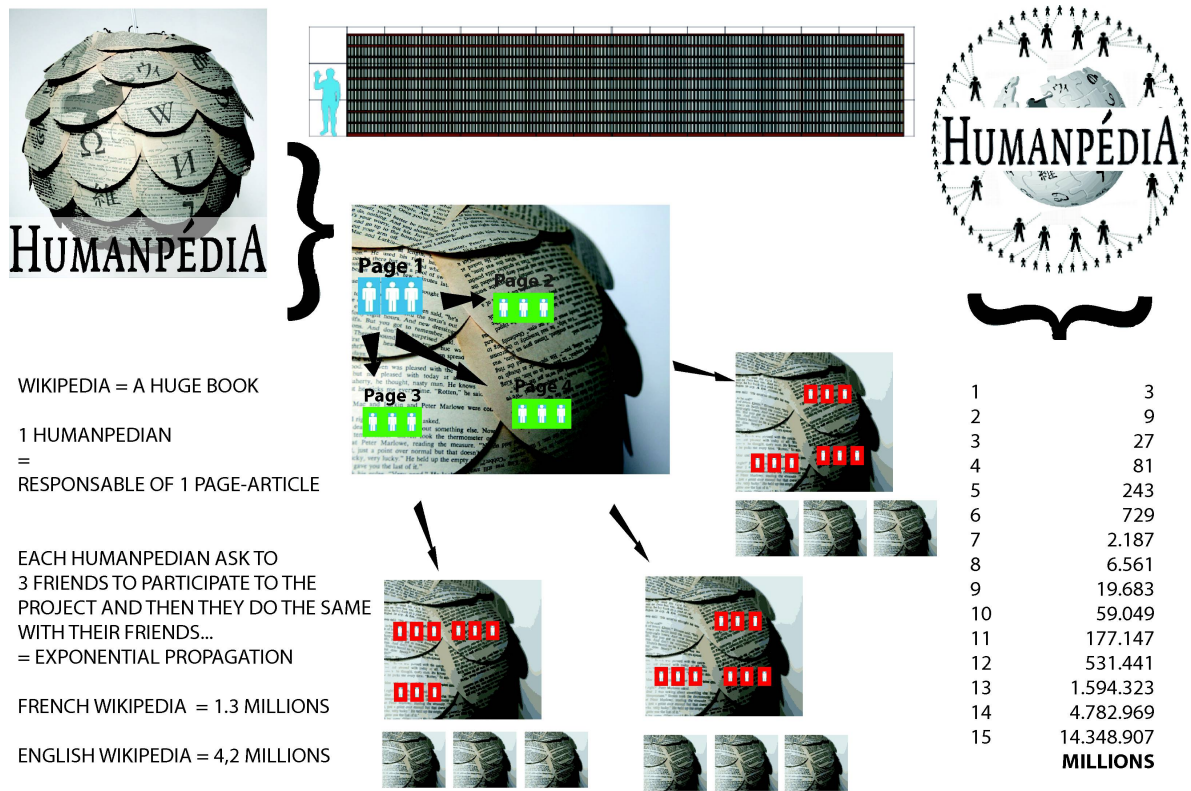
- > A research on the different component elements of nature to create plastic and visual devices connected on the manifesto.
- > Research on different aesthetic forms to develop around the concept of binary: hollow / solid, light / shadow, signs, buildings, deformations , genetics, animals learning... and how to build them.
- > Research on ways to make "sustainable" works: fixing, sealing, counting, changes in biological processes, genetic ...
- > Research on systems that can find the original work from its binary decoding: video capture, aerial view, mechanisms of flows related to natural cycles (light, temperature, seasons ...).



Hard disk Paper

[www.guez.org/disquedurpapier/](http://www.guez.org/disquedurpapier/)

# HUMANPEDIA PROJECT



[www.humanpedia.fr](http://www.humanpedia.fr)

## **ELEMENTS**

- Forest and trees
- Conversion table
- Totem tree/binary sculpture
- Binary stele
- Solar stele
- AMSTRONG project
- Binary strings
- Genetic
- MENDEL01 project
- Coding and reverse engineering
- Manifest



## BINARY TREES

Use the tree as a storage medium of binary matrices: a tree will support a series of 0 and 1, a set of trees - a segment of forest - all represent 0 and 1 encoding the file (video, sound, image) of an artistic work.



# CONVERSION TABLE

This table shows some examples of uses of natural elements equivalence Kilo.Byte unit: Thus, a forest plot of one hectare could save 2.5 KB if each tree is burned with only a bit (1 or 0), 160 KB if each tree is engraved with a 8x8-bit matrix (64 zeros and ones).

So, The forest of Orleans in France = 50 000 hectares = 50000 x 160 K.B = 8 000 000 K.B = 8 Giga Byte.

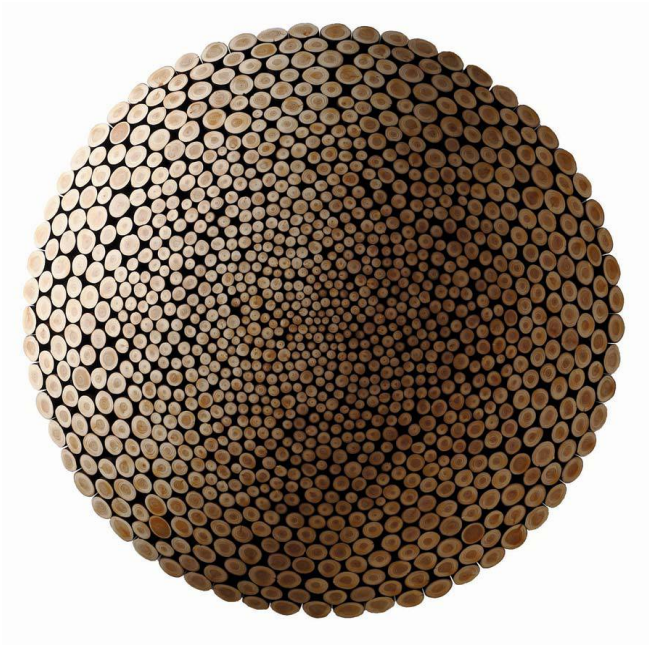
Amazonia Forest (1 tree/1 bit) = 50.000 Tera.Byte

Binary trees									
	square (m)	surface (m2)	size trees (in m)	distance between trees (m)	Total Number trees	bytes	Kilo.Bytes	M.B	G.B
1km 10km 100km	100	10000	0	0,5	20000	2500	2,5		
	1000	1000000	0	0,5	2000000	250000	250		
	10000	100000000	0	0,5	200000000	25000000	25000	25	
	1000000	1000000000000	0	0,5	2000000000000	250000000000	250000000	250000	250
Octals trees									
1km 10km 100km	100	10000	0	0,5	20000	20000	20		
	1000	1000000	0	0,5	2000000	2000000	2000	2	0,002
	10000	100000000	0	0,5	200000000	200000000	200000	200	
	1000000	1000000000000	0	0,5	2000000000000	2000000000000	2000000000	2000000	2000
Binary stones									
	square (cm)	surface (cm2)	size stone (cm)	distance between stones (cm)	Total number stones	Bytes	K.B		
	100	10000	3	0	3333,3333333333	416,666666667	0,416666667		
	100	10000	1	0	10000	1250	1,25		
	cube (cm)								
	100	1000000	3	0	333333,333333333	41666,6666667	41,66666667		
	100	1000000	1	0	1000000	125000	125		
Binary Plants									
	square (cm)	surface (cm2)	size plant (cm)	distance between plants (cm)	Total Plants	Bytes	K.B		
	100	10000	1	0,25	8000	1000	1		
	10000	100000000	2	1	33333333	4166667	4166,66667		
Binary magnets									
	Number magnets	size magnet(cm)	size cube (cm)	distance between magnets	Total magnets	Bytes	K.B	M.B	G.B
	10	0,3	3	0	1000	125	0,125	0,000125	0,000000125
	100	0,3	30	0	1000000	125000	125	0,125	0,000125
	1000	0,3	300	0	1000000000	125000000	125000	125	0,125
Binary magnets x6									
	10	0,3	3	0	1000	750	0,75	0,00075	0,00000075
	100	0,3	30	0	1000000	750000	750	0,75	0,00075
	1000	0,3	300	0	1000000000	750000000	750000	750	0,75



## BINARY TOTEMS

Use all of a dead tree trunk to carve a sequence of 0 and 1.  
These trees are seen as binary totems.



*Works of Lee Jae-Hyo*



The pile of logs installed in the field or in the inhabitants are seen as forming a personal hard drive together.



# BINARY STELE

The binary stele is a monolith of stone on which is engraved the binary content of a media file corresponding to a national or artistic memory.







Associated with the stele, a smartphone application allows for multimedia interface between the binary code registered on the hard stone and the original file. Thus, moving his smartphone as a magic wand to the series of 0 and 1, the visitors can hear or see in real time audiovisual content engraved.

The first granite stone made contains the mp3 recording of grunt Bear Brown from Pyrenees, species in extinction in France and worldwide.



# SOLAR STELE



*Parc du Grand Blottereau*

The idea is to carve a stone stele that can, depending on the sunlight projected on the ground a sequence of 0 and 1 corresponding to a given file. The stele is composed of a series of holes of different sizes (encoding the 1 and 0).

The cycles of nature and allow to have reactivate dormant works by heat, light or by wind.

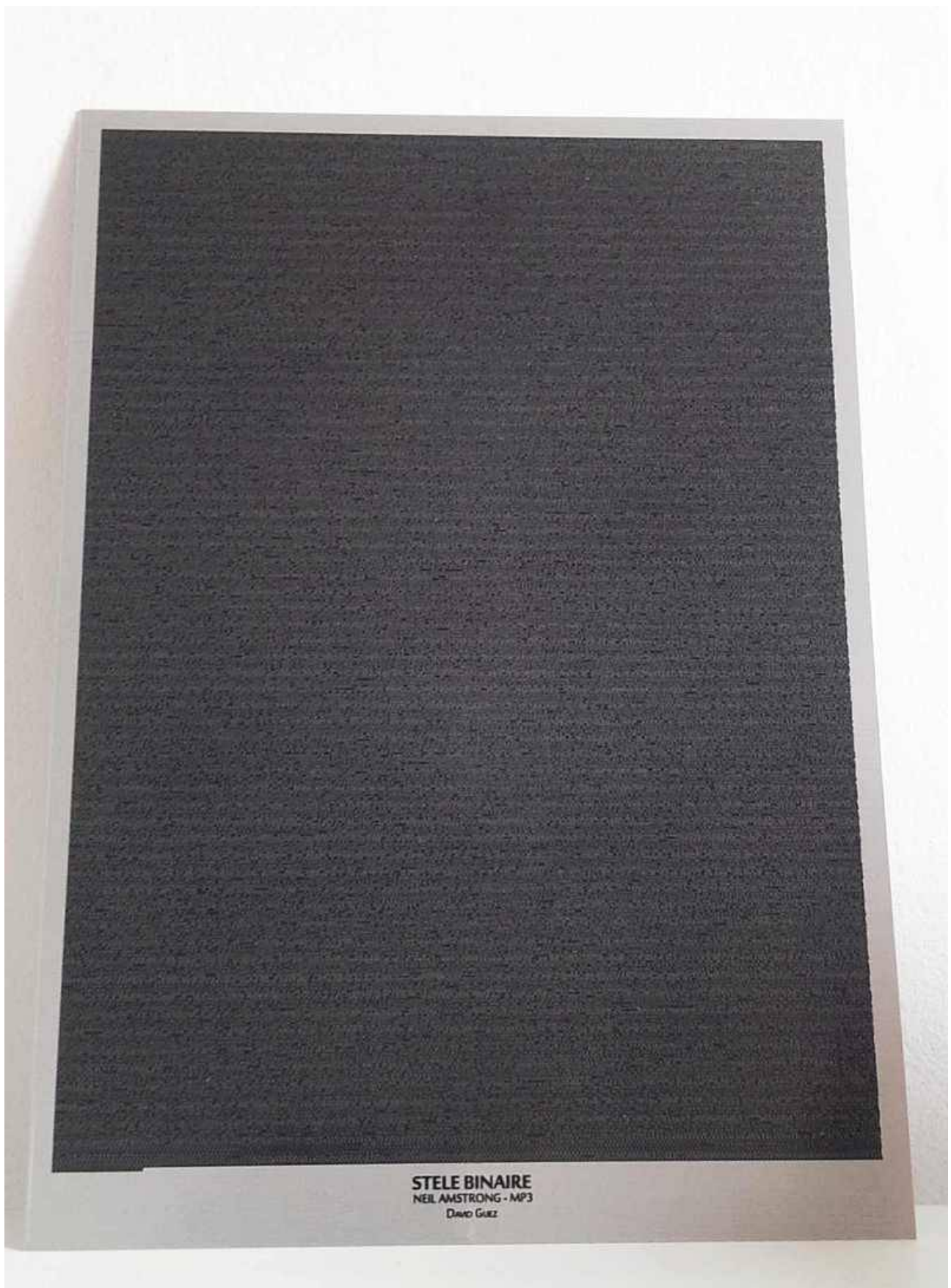


## **BINARY STELE IN ALUMINIUM - AMSTRONG**

The project is to store the sound sequence of the famous phrase hath spoken Neil Armstrong when he walked for the first time the soil of the moon: "That's one small step for [a] man, one giant leap for mankind"

Mp3 file corresponding to this sequence has a duration of 8 seconds and a memory size of 15 KB or 15360 bytes, or a total of 122,880 zeros and ones.

A first version was made on an aluminum plate A4 (21x29.7 cm).



**BINARY STELE (A4, aluminium) - Neil Amstrong - MP3**

Others aluminium steles has been made





**STELE BINAIRE**

NEIL AMSTRONG ~ ONE SMALL STEP FOR A MAN, ONE GIANT LEAP FOR MANKIND ~ MP3  
David Guez

**STELE BINAIRE**

JOSEPH NICÉPHORE NIEPCE ~ PREMIÈRE PHOTOGRAPHIE/HÉLIOGRAPHIE ~ 1826  
David Guez

**STELE BINAIRE**

SIGNAL WOW ~ MP3  
David Guez

**STELE BINAIRE**

OURS BRUN DES PYRENEES ~ MP3  
David Guez

**STELE BINAIRE**

AU CLAIR DE LA LUNE ~ PREMIER ENREGISTREMENT SONORE 1860 ~ MP3  
David Guez

**STELE BINAIRE**

HAL9000 ~ I'M SORRY DAVE, I'M AFRAID I CAN'T DO THAT ~ MP3  
David Guez

**STELE BINAIRE**

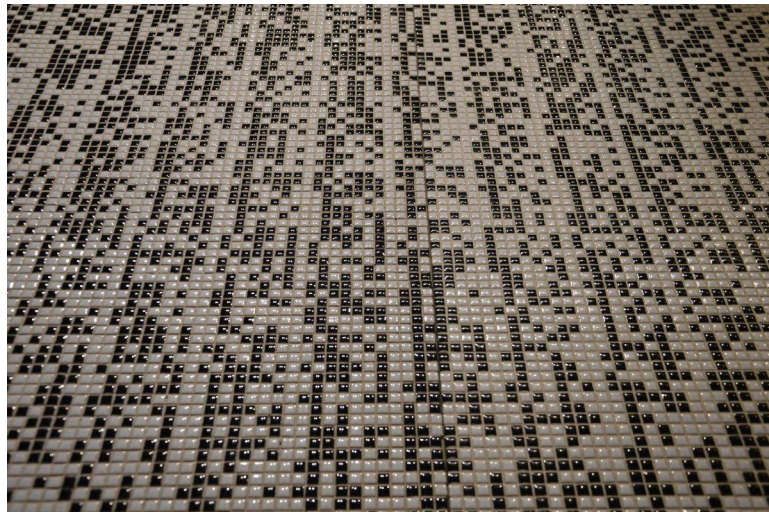
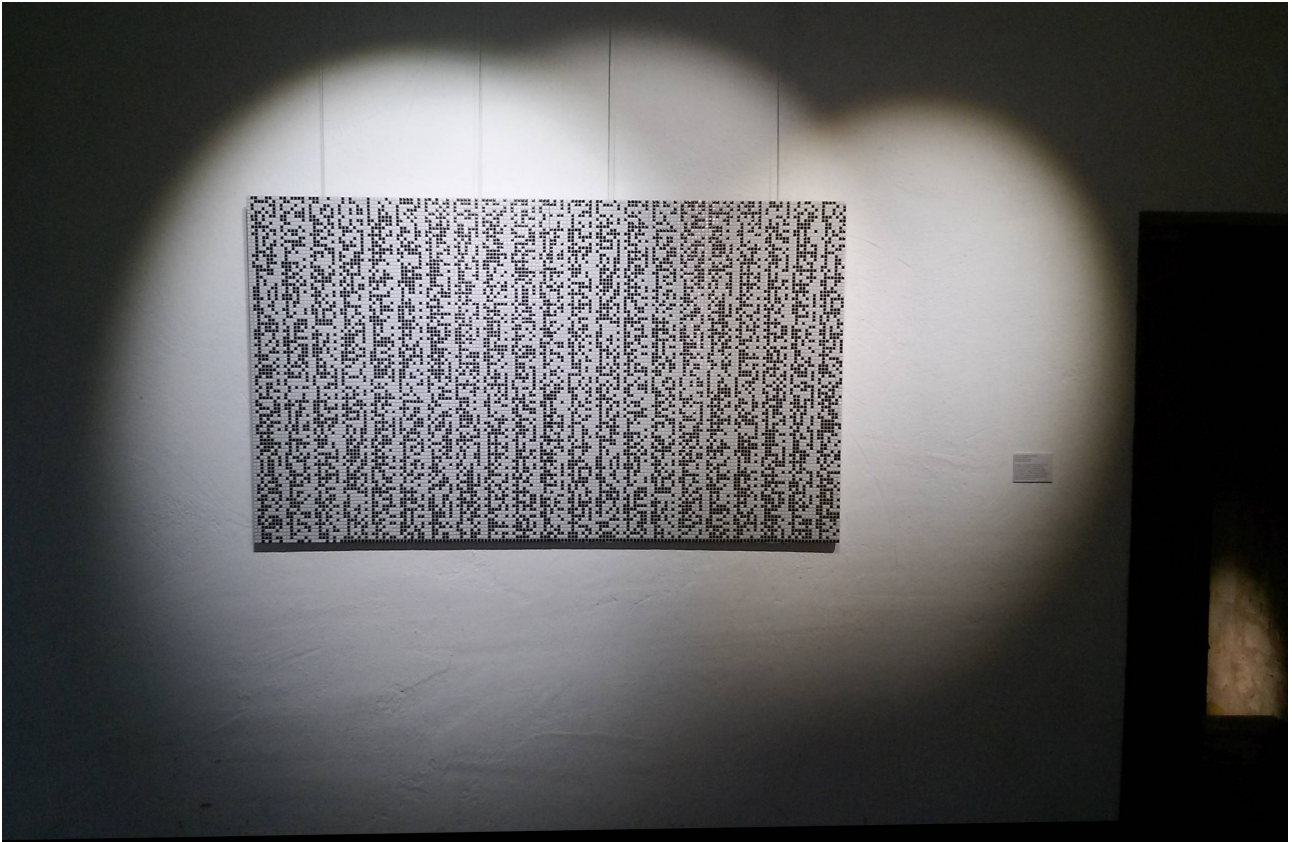
MUYBRIDGE ~ VOL D'OISEAU - SÉQUENCE VIDÉO ~ FLV  
David Guez

**STELE BINAIRE**

Einstein ~  $E = MC^2$  ~ MP3  
David Guez

# Mural mosaic

2mx1m – Chess Game

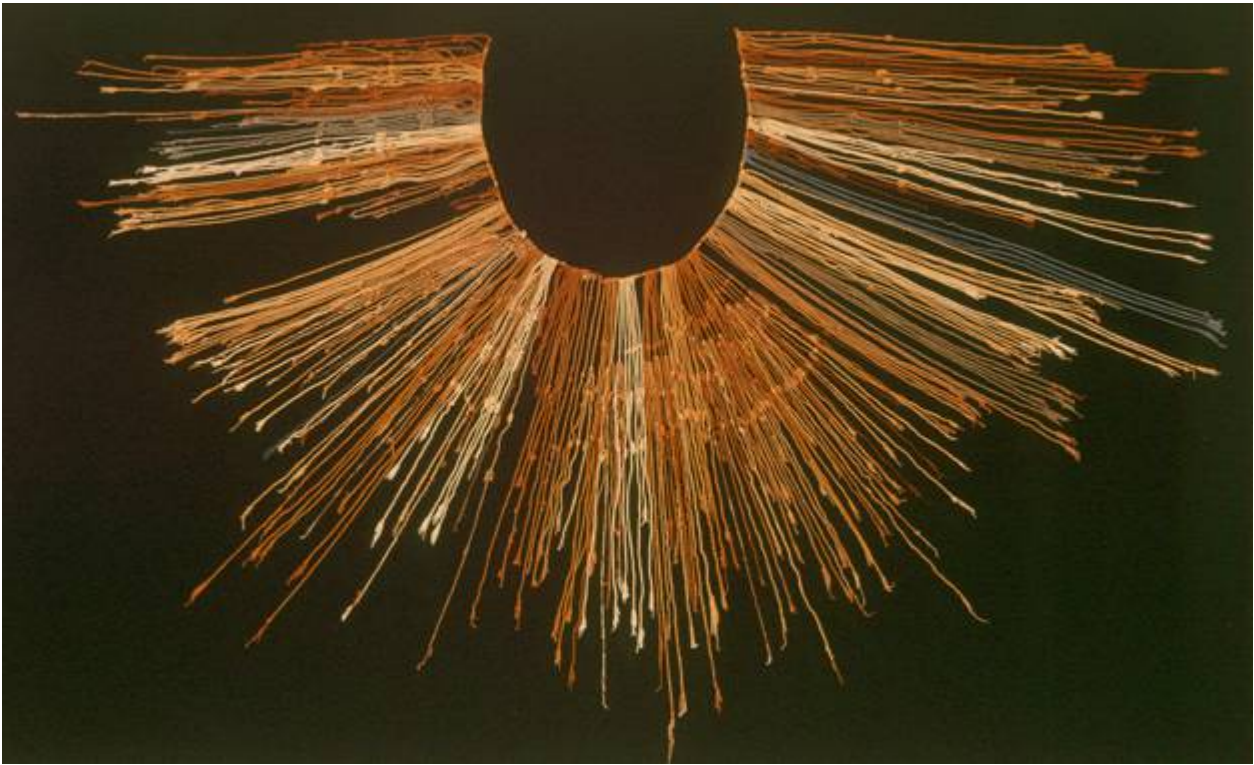




## BINARY CORDS

From ancient times, tools specially made for handling numbers are developed, which in the 15th century Quipus Incas.

The principle is to use organic materials for forming a set of strings, the arrangement of the nodes form a sequence of 0 or 1.



Exemple of Quinpu from Incas.



A coil of 500 meters 5cm x 5cm to contain  $500 * 100 = 50000$  bits = 6250 bytes = 6 KB!

A coil of 500 km long (1m coil diameter) contains 12 MB!

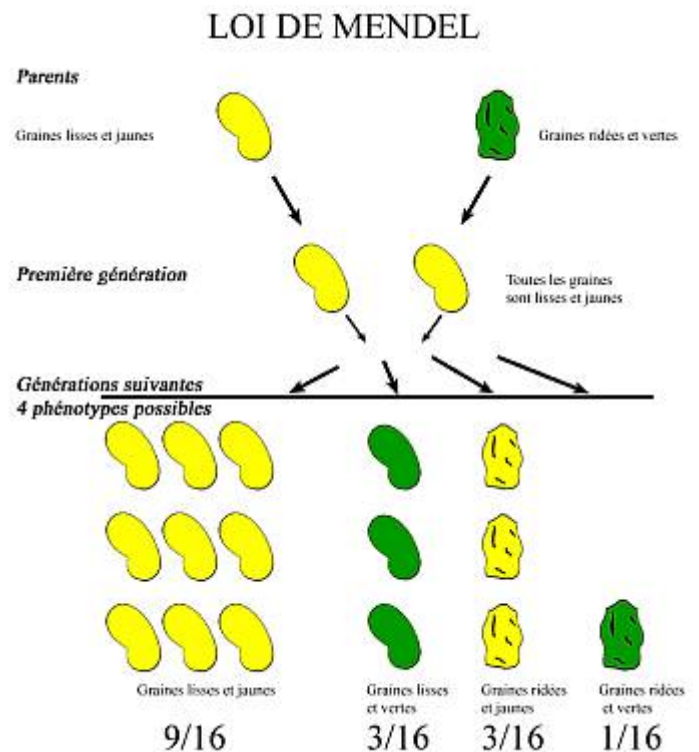


# GENETICS & BINARY STORAGE

The project is to genetically modify some elements of nature so that they produce bodies of which one aspect (shape, color, layout) can be a reproducible binary sequence.

## MENDEL01 PROJECT

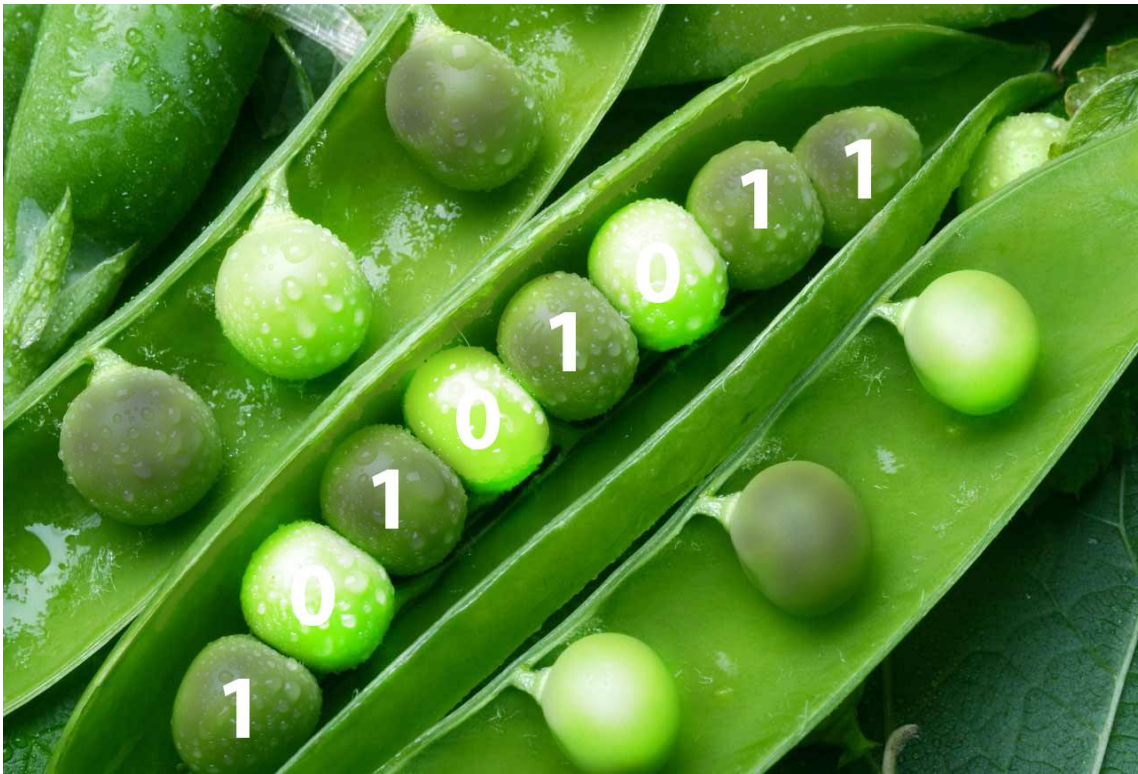
In tribute to Johann Gregor Mendel, a monk in the monastery of Brno recognized as the founding father of genetics, MENDEL01 project will be to genetically modify a bean pod for making peas constitutes the representation of a byte .



Then, we can imagine seeds that produce bean pods representing an ascii letter, and so, a field of pods representing a poem of shakespeare.



POD 1	00000001 - letter A
POD 2	00000010 - letter B
POD 3	00000011 - letter C
POD 4	00000100 - letter D
POD 5	00000101 - letter F
...	



**Example bean pod peas which have been genetically modified (light / dark dots) to form the byte 10101011**



## VARIATION: USE OF CORN



## CODING AND REVERSE ENGINEERING



### From Binary code to Nature

The project is to learn a binary sequence of an existing file to an animal adapting to a 0 and 1 vocals or phonemes of the language. Once the sequence is learned by the animal, it enters its field of communication: it forwards so 'natural' to his descendants.

For example, We can make them learn by heart a song to the lark whose content is an extrapolation bit / sound file the image of the paint of de vinci « Mona Lisa »: the file will be saved within the song and



transmitted by singing by the animal to its environment and its progeny.

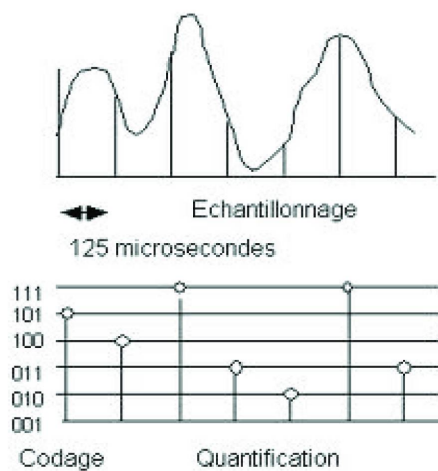
### **From nature to Binary code : binary retro coding**

In contrast, this project is to use the language of an existing animal and a sequence of language to create passages associated to binary code.

For example, decide that the song of the lark to charm his partner becomes the binary sequence encoding the file image of the Mona Lisa.

It is, thereafter, take the corresponding binary matrix that song and translate it into an image coding of the Mona Lisa: The procedure is then to make a retro binary coding.

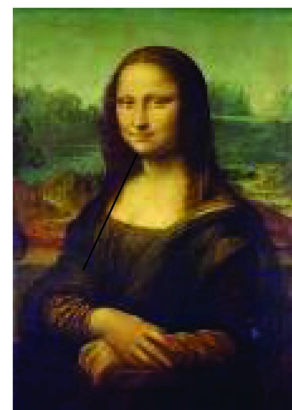
Indeed, we can consider that the existing encoding formats images (jpeg, tif, psd ...) are related to compression algorithms that determine a type of binary matrix. The principle is based on the "existing natural" to define a new graphic format. Thus, the love song of the lark becomes, for example, the reference coding of the Mona Lisa which then will flow all encoded images with this algorithm.



notation musicale du chant du Pouillot fitis :

notation schématique du chant du Pouillot fitis :

0	0	0	0	1	1	0	0
1	1	0	0	1	1	0	0
1	1	0	0	1	0	0	0
0	0	1	1	0	0	0	0
0	0	0	0	0	0	1	1
1	1	0	0	0	1	1	1
1	0	1	0	0	1	0	1
1	1	1	0	0	1	1	1



**Representation of the process of reverse coding: It captures the precise singing of an animal, it is translated into bits to form a binary matrix which we decide that this is the code representing the image of the Mona Lisa.**

# MANIFESTO

**Conference and performance – labos d'aubervilliers, france – nov 2013.**

## INTRODUCTION

The following text aims to extend an artistic work that I developed over many years around the notions of time and memory and which axis specifically on issues related to the fragility of new media and supports their programmed obsolescence and their responsibilities in the entropy of our collective memory and our individual stories.

The ambition of this manifesto is to open ideas of strategic storage of these data , including data and all artistic works little or no so reproducible cases of disappearance .

The ambition of this manifesto is to develop artistic and intellectual interfaces for connecting a sustainable way digital elements to physical elements.

The aim is to embody binary world into the real world to create striking and saving passages between.

We will endeavor to show that the Land Art, because it is the ultimate medium between the earthly world and its concepts (shape, space, time, registration , track ... ) may become a candidate for this masterful issues involved.

It is however not the only one and we will use all other practices that art can offer, whatever the medium used : we can also thereby expanding entry through the Land Art in processes that include visible and invisible masses , crowds and connected brains and more generally , all forms network that bind us and connect us to the earthly world . However, we remain fixed on devices that create obvious way passages between the digital world and the analog or biological world and more generally any organized form recordable in the real space .

The combination of words and Land Art Digital has arisen in our eyes as the best summary of our approach, knowing that our purpose is not to appear as Land Art in the virtual rather, conversely, invent methods of registration and vitrification in virtual reality. These terms together and allow you to set an image combining these two worlds by offering the double meaning of their initial 3 "LAN" which means "Network" , which must be taken in its broad definition : Space container elements connected between them .



# MANIFESTO

The advent of the computer and binary code projected civilization in a race to the flattening of reality.

Means flattening the actual act of digitizing voluntary and involuntary , massive and local .

Digitizing means an act of transforming information ( filed since the beginning of time on various data carriers : stone, paper , skin, plants, string ... ) in a universal code included , coded and decoded by the MACHINE UNIVERSAL (MU) and stored by the same MU: binary code : zeros and ones - THE ZEROONES - aligned in computers and records of the MU that transform the REAL WORLD in WORLD zeroone .

Digitizing Means any message information organized by humans, animals or nature that is passed in time to another man , animal or nature , any pulse with a sense or structuring a sense, the opposite of noise and of chaos. We will include this and also sub- atomic and quantum hypothesis which postulates that information is the same part of the organization of existing physical structures , and therefore the real world.

Thus, the appearance of the MU in the 1940s sparked the largest process flattening the real world and its first corollary task of counting and indexing of that same world.

This phagocytosis of reality is accompanied by de facto registration and focus on these new electronic and magnetic media , which , over the years , and exponentially since the advent of the microcomputer and the WWW in 1990 , enabled store massively whole history .

But this prehistory of digitization is now complete and leaves room for digitizing real-time information, real-time digitizing and digitizing real world . A new stage begins : the information is created with digital , conveyed by the digital and stored in digital.

And although it is still possible in 2013 to find examples of media declined outside or in addition to digital as the book , technological evidence , economic, political , sociological will make these examples some exceptions.

The couple MU / WWW reached such a level of infiltration of the real and the organization that generates information within MU , which feeds and maintains itself , creating an informational inflation incommensurate in the history of humanity and the individual one of each human.

Moreover, this loss of reality is accentuated with digitizing real itself : 3D scanners and mapping tools reconfigure this " in the making " statues dust as fine as they invite the projection of concrete and perfect illusions : a real augmented or REAL + +.

THE ZEROONEISATION but does not stop there: " the ultimate avatar of MU comes in Mu + + , technological and mechanical Appendix MU , a robot or a 3D printer that produces REAL from ZEROONES .

Thus , the real world is engulfed in the MU without particular issue for making REAL + +.

One could always argue that this reification MU + of REAL in an Avatar zeroone composed of crushed sand or plastic fiber can extend the REAL but we will say that the result is a medium of low quality, poor in everything, a kind of pocket empty : a REAL MINUS.

One could also argue that the REAL is an illusion that the zeroone happen perfectly emulate and imitate perfectly the illusion returns to create a new instantiation , plus the benefits of torque MU / zeroone : A WORLD + +.

The purpose of this manifesto is not to fight against the MU , the REAL WORLD + + but to show the dangers and hazards.

The objective is to put into play the relationship between MU and REAL if the MU come to disfunction or burn because of radiation magnetic storms because the REAL + + / WORLD + + is a component of the MU , there we will not help in case of disappearance .

Thus, a simple and obvious way : We belong to the REAL WORLD , and we believe in and navigate with the REAL WORLD and we are made from the same illusion that the REAL WORLD .

Saving REAL world .

We will look at all the creations , all organizations , all procedures that secure information and nuke all artistic endeavors , scientific, conceptual , all works of the mind that are striving to organize the real world for a permanent storage in zeroone world and its restitution in case of loss .