A. Mei del Testa

Arabidopsis thaliana: the vegetable Rosetta Stone

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It gives me great pleasure to present Alberto Mei del Testa's fascinating study of the relationship between hieroglyphics and genetic code. As well as agreeing with the thesis expressed by the author.
With the same firm belief I attempt to understand something about the work of a great artist whose genius I admire.
I am fascinated and enamoured of his art, but my attempts at a significant interpretation trend toward the illogical and inappropriate, much as the artist often declares his inability to explain in words that which he paints.
I wholeheartedly believe, as does the author, that hieroglyphics are without doubt a biological phenomenon, and they therefore must be interpreted as one of an infinite number of possible results of the logic of genetic code, at the same time giving due consideration to the development of both within the confines of the history of evolution and the environment.
All that remains for me to say is that hieroglyphics and genetics are both codes which only in the future and with more important contributions such as this present study, will we finally be able to fully understand and learn from.

Kary B. Mullis

In 1777, English botanist William Curtis, described for the first time the "Arabidopsis thaliana" a vascular plant from the Brassicacee family, as a plant "without any particular use or virtue", nowadays "Arabidopsis"
Is adopted as an example in all the laboratories around the world: it owns about 25.000 genes of which, excluding duplicates, 15.000 are organized in just five chromosomes where the sequence of the bases of chromosomes 2 and 4 have been announced.
Studying the genes of "Arabidopsis" made possible to decode the genetic hereditary characteristics of the "green revolution" that led to the development of several graminaceous, rice included, that reduce drastically the energy used to grow leaves, concentrating them in the production of grain.
This small infesting plant, grows well both in the polar climate of the Scandinavian peninsula and the tropical one of the isles of Capo Verde other than the facilities of laboratory cultivation.
Hoping to capture from its genes the secret of such ability to adaptation, transfer the capability of resisting extreme climate conditions to

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other vegetable kingdom representatives economically relevant to agriculture.
"Arabidopsis thaliana" has been compared to a vegetable "Rosetta Stele" that will help to decode the genetic heritage of corn, rice, wheat, oat and the cereals that are a valuable food for cattle.
Recalling the "Rosetta Stone" example made me think about all possible connection, analogy, and affinity between these two separate worlds of expression: the natural world, linked to genes and DNA, and the world of the oldest and most fascinating human language: the Egyptian Hieroglyphics. Bear in mind that the building up of a genetic code in amino acid sequences happens in two inseparable moments -transcription and translation- please note ho the "genetic expression" strongly reminds the identity of intuition-expression of "Aesthetic as a science of expression and general Linguistics" of Croce.
In Rosetta was discovered a stone meant to become one of the fundamental instruments in hieroglyphic decoding.
A group of soldiers was strengthening the defence of Fort Rashid, renamed Fort Juljen by the French,
A couple of miles north-west of Rosetta, when a soldier named D`Hautpoul discovered a big block of stone of a dark grey colour, covered at one side of hieroglyphic inscriptions. The official heading the commando, Lieutenant Pierre Francois Xavier Bouchard, informed his superiors, Michel-Ange Lancret.
The stone, one meter, twenty centimeters tall and weighing almost a ton, had three inscriptions, each in a different character: one in Greek, as Lancret himself was able to notice, one in hieroglyphics and the last one in unknown characters.
The content of the text on the stone, as later discovered, was not at all important, neither was interesting, since it was about a decree establishing a sort of cult for the Pharaohs ruling at the time.
On the other hand the presence of three inscriptions was fundamental, each in a different character and language, that would have represented the ideal key to finally break the mystery of hieroglyphic characters.

Environment and evolution - Evolution of the genome

The influence of environment on the genes takes advantage of the most important characteristic of the Genome, its complexity. Up until now, the relationship between environment and genome was basically passive: the environment was either rewarding or punishing those casual mutations that generated characteristics more or less compatible (favorable or non favorable) with their own environment.
One of evolution's problems is that the huge variety of species cannot be simply explained with a series of mutation due to casualty.
Today the genome relationship with the environment is fundamentally synergic: individuals with an organization suitable for the genome survive, while those not reacting in a useful way, gradually disappear.
As time goes by, what was a functional change, therefore due to genetic activity, becomes a structural change, of the actual sequences and the resulting genome is suited to the new environment.
Therefore, the evolution mechanism is the direct effect of environment provoking a functional response, then progressively transformed in structural answers.
The evolution of the genome can be recognized through a massive presence of "junk", enthrones and the correlated phenomenon of "splicing".
A gene is made up by a codifying region that brings instructions to build the related protein, a certain amount of non codifying regions to adjust the synthesis of the specific protein and a couple of control regions at the beginning and end of the gene itself. Considering just the codifying region of each gene, the different genes ensemble is made up by just 3% of our genome. On the other hand if we consider the gene in all its extension, that would be slightly over the 60-70% of the

genomes. All the rest is made up by a certain amount of relatively brief sequences and repeated many times also known as "junk DNA" differently distributed in chromosomal regions the functions of which we ignore. It could be DNA without any role that the cell cannot discharge without endangering itself. It could also play a role, although passive, in those processes that lead to the birth and maintenance of separate species contributing in the creation of a genetic barrier. Another function of the repeated sequences is to maintain the physical integrity of chromosomes during cellular division when distributed between new cells and are mechanically pulled one towards the other risking breakage: but the traction applied to a DNA structure strengthened by proteins produces all around itself a resistant tubular protection; this could also compromise the activation of chromosome X and the "imprinting". Plants have several copies of a genome that contain huge quantities of non codifying sequences, otherwise known as "Junk".

In all the changes happening to eukaryote cells transcriptions it their process towards maturity that leads them to become RNA messengers, the most astonishing is the removal of internal segments located between the codifying sequences not specifying amino acids, these are "intercalary sequences" or "introni"because they always reside inside the nucleus, the intercalary sequences are removed when the transcription is riel borated through a process of excision-welding named "splicing" that needs to be realized with absolute precision in order to maintain the right module of interpretation. There are characteristic sequences in animal cells: two of them are at ends between an intercalary sequence and a close codifying one, the one at the beginning carries the pair GU, the one at the end carries the pair AG. These pair are surrounded by other bases that are constant and create the so called "sequences of consent". The extreme precision in the splicing process still remains an enigma.

The presence of many separate codifying sequences, of whatever origin they might be, brings a strong flexibility to a gene because, through splicing, they can be reunited in different ways, allowing the genes to specify several different proteins.

Maybe this was important during the evolution of species, but they have no use nowadays.

The presence of discontinued genes in archeobacteria suggests the theory they could have appeared in the early stages of Life History on Earth, and they might be an open window overlooking our past; therefore the intercalary sequences could be the vestiges of the DNA that surrounded primitive genes.

Still to comprehend is what would have been the function of introni since they lack completely in almost all the bacteria genes, and artificial genes created without them are perfectly functioning.

Maybe introni are alien sequences that invaded the DNA during evolution: Introni in superior organisms do not have invasive characteristics, while those of primitive organisms -such as unicellular algae- do have some. Introni acquired a new important role in superior organisms: to control splicing of genetic transcripts, In such way increasing the power of genes as information controllers.

No gene is born complete and perfect like Athena came from the head of Zeus; each new gene is nothing more than the elaboration of one or more older ones.

In a genome different genes work together to produce the final result: example of such cooperation can be observed in mice where, through genetic engineering, the function of one specific gene, responsible for developing different cellular types, has been excluded. Such mice are called "K.O." and they produce different results due to the different roles of each gene, the function of some genes is only necessary in certain circumstances.

Whole segments of Human and mice genome share approximately 50 regions that can be linked to evolution, that while constructing a new Genome, maintains the previous one at its best.

Besides, the ability of bacteria to transfer genes to those organisms they infect is used by plants to introduce foreign genes.
The result is a very dynamic picture of the genomes that can be inserted in the DNA and, once settled, can create copies of themselves to place in other parts of the DNA. The presence of repeated sequences makes us think they might come from the multiplication of a sequence that invaded the genome a long time ago and that its products can multiply inside the cell or jump from one part to another of the genome, as observed by Barbara McClintock studying corn.
The organization of Genes , together with the roles they play in different stages of development, suggest that their functional organization might be connected with the strategy of evolution, that adds new genes to those already existing, each step of the way.

Historical evolution of Hieroglyphics

The same synergic relationship between environment and genome -mutatis mutandis- in the evolution of Hieroglyphics writing.
Clear is that hieroglyphic writing could not avoid, even though ever so slowly, the flowing of the great history river than nothing can escape -as Hegel would say- just like the body cannot escape the skin.
The History that is of men and is real knowledge as it was made by man: Vico`s "scienza nova".
Hieroglyphic writing is not the only mean the Egyptians use to bring us their written documents; Egyptian hieroglyphics have always preserved, in constant evolution, their figurative aspect. For practical reasons they developed a "cursive" form of writing known as "hieratic" known since the earliest dynasties, almost contemporary to the invention of the hieroglyphics.

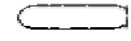
Its use, increasingly faster makes the original figurative form of the single signs becoming more and more stylized, that in the end the original traits of the hieroglyphic sign it started from is hardly recognizable (with "cursive" we mean a faster, simplified way of writing). The cursive form maintains a one to one correspondence between hieroglyphic and hieratic signs:
To each hieroglyphic sign corresponds a hieratic one. This writing is practiced with a brush of reed and black ink; red is used mostly to start new paragraphs and for profane texts: administrative documents, court of law paperwork, literary texts, scientific books, accountancy logs, private correspondence etc.; and also religious texts.
Different from the hieroglyphic texts, the hieratic ones were written from right to left. It's also noticeable a better calligraphy for the important official documents (uncial hieratic) and the faster one for business and logging (cursive hieratic). Beginning from the XXII dynasty, the calligraphy in cursive is so far from the uncial one that we start talking about an "abnormal hieratic" in the higher Egyptian regions; in the lower ones, besides, the evolution of cursive hieratic writing leads to the creation of the "demotic" writing.
Beginning with the pharaoh Amasi (570-526 BC) the demotic becomes the writing of current use, while uncial hieratic almost exclusive to religious texts on papyrus. That is why the Greeks gave the name "hieratic to these writing, meaning "writing of the priests" because it was strictly connected with religious texts.
The difficulties for reading hieratic are due to the very simplified graphic signs, and also the individuality of each scribe can change sensibly the results especially in the most cursive forms.
According to Malinine old or archaic demotic is a cursive Egyptian writing from the XXII-XXX dynasties exclusive to administrative use. This writing developed naturally, with no breakage or corrections, from a branch of cursive not linked to hieratic, that originated in a centre of lower Egypt. Demotic experienced a slow, continuous evolution during the millennium in which it was used, and its use slowly came out from the restricted area of use it was meant for, beco-

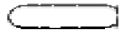
ming common writing system for all kind of texts, even literature, religious and official documents. Its possible to distinguish three great periods: the ancient demotic, Persian demotic and the Arab demotic.
XXVIII-XXXI dynasty, Herodotus, Greek, historian, created the term "demotic" meaning, popular, as a writing support papyrus is commonly used, always writing from right to left, on horizontal lines; the demotic alphabet, adds new signs to the hieroglyphic one, deriving from bi-literal signs used with one letter value.
"Copt" term deriving from the "Egyptian" in Greek language, is the last stadium of language and writing evolution used by old Egyptians. "Copt" was the indigenous language of the countryside population.
To obtain a written translation of the Sacred Texts of the triumphant Christianity, a new writing system was developed, using Greek capital letters ("Biblical uncial") amplified with 7 extra signs from the demotic, to have characteristic sounds from the Egyptian language, unknown to Greek. Copt also had vowels; always written from left to right in horizontal lines. Copt appears in dialect forms, five gained literature value, they were used to transcript Sacred Texts: the dialect "Sahidico", "Bohirico", "Fayumic", "Akhmimic" and "Subakhmimic". After the Arab conquest "641 ad." the use of Copt slowly and steadily disappeared, and the Arab became more popular.

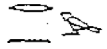
Genetic mono-factorial diseases

Genetic mono-factorial diseases - not numerous and quite known from the clinical and genetic point of view- are greatly conditioned from the unhappy and unchangeable genetically response. In fact, reducing genetic factors, the role played by the environment is reduced too, however knowing the gene is not a Leibniz monad, and always depends from the complexity of interactions of the whole genome; paraphrasing Aristotle: the gene, like man, is a political animal.
In the Human species there are 30.000 genes and it is easy to foresee that during their reproduction, in some phases, errors happen, that cause illness and create a catalogue of unheard human sufferance.
Hereditary disease happen when there is a malfunctioning of one or more genes or when correspondent proteins are not produced. A classic example is the Anemia scythe-form, due to a gene mutation from the protein chain of the beta-globulins; the sixth amino acid of the chain on 146 is the glutamic acid coded by the triplet GAA. The substitution of glutamic acid with the amino acid Valine, coded by the triplet GTA on 438 triplets, is enough to cause death on the subject. It is important to remember how passing from mono-factorial to pluri-factorial characters, a growing environmental influence is recorded, that lowers the genetic character strength.

Cartouche

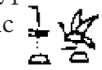
On the day of their rise to the throne, Egyptian kings were given five names "great names". These distinguished unmistakably all the kings that followed on the throne of Egypt, are the "Royal Protocol".
We could, for analogy, create a royal protocol with all the mono-factorial diseases that are a painful catalogue of unheard human sufferings and close it in a cartouche for the future recording.
The Kings of ancient Egypt are known as "Pharaohs" derived from the Greek translation of the hieroglyphic  meaning "big house" that in the end it meant "great ruling house". The Cartouche takes its name from the soldiers of the Napoleonic expedition in Egypt, that thought that elongated sign resembled the shape of the bullets of their rifles.
The hieroglyphic of the cartouche  derives  from the one meaning "all that is surrounded by sun" and indicates the king as the sovereign of the universe; the circular shape became oval, simply to contain all the hieroglyphic needed to distinguish the names of the

pharaohs. Truly, the cartouche is a knot, with a double rope its extremity are linked forming a sort of ring. It is possible that originally it meant that the person whose name was in the Cartouche, was the king of all things surrounded by the sun.
Both signs  and  were signs of Eternity.
On the day of their rise to the throne, Egyptian kings were given five names 

"great names"  .

These distinguished unmistakably all the kings that followed on the throne of Egypt, are the "Royal Protocol".
These names are usually closed in a cartouche.
The oval shape, and not circular is due to the necessity to contain the name of the king.
The name Horus: this name. following the sign of the Falcon  was the king as terrestrial incarnation of the god Horus, the first mythical king of Egypt.
Name " the two ladies" following the hieroglyphic keeps  the king under the, protection of the two dynastic goddess.

These two goddess, recalling the ancient division of the country are therefore the symbol of royalty over the high and low Egypt.

Name "Golden Horus" introduced by the hieroglyphic  picturing the falcon, horus sitting on the sign of gold, has unclear meaning and origins. According to Egyptian mythology, the meat of the gods was golden.
Name "King of Upper and Lower Egypt" introduced by the hieroglyphic  the "prename" the first of the two names of the king in the cartouche. Is the name the king was given when rising on the throne at the time of its coronation.
It symbolizes, the union of the two lands under the authority of a one king.
Name "Son of Ra" introduce by the Hieroglyphic  puts the king under the protection of the god Ra, declaring him his son. Corresponds to the "name" the "actual name" that the king was given at birth.
Similar to the cartouches are the SNIP (Single Nucleotide Polymorphism)
Of the human genome, and if associated with disease carrying genes have the role of "placemats" allowing their identification.

Chargaff rule on "base complementarities"

"Whatever equation describing fundamental laws of nature has to have great beauty in itself" affirmed Paul Dirac and Henry Poincare` added: "this harmony is at the same time a satisfaction for our aesthetical needs and a help for the mind".
"Just after discovering the double helicoidally structure of DNA, I went to present it in the United States in the laboratory of Cold Spring Harbor. I had a demonstrative model with me, and a young student, very attractive, approached me asking if I was an artist, she thought the structure of DNA was an abstract structure, this shows how science inspired Imagination and Fantasy".
Interview to James Watson-"Dna, no more orders from heaven"- La Stampa, 25th February 2003 Piero Mastrolilli.
"The regularity of the composition of the deoxyribonucleic acids, known as Chargaff rule, are presented as follow: in Chargaff own words:" a) the sum of purine-adenine and guanine is equal to the one of pirimidine-chitosine and thiamine, b) the relation between the masses of thiamine and adenine is 1, c)the relation of the masses of guanine and chitosine is 1; immediate consequence of these relations, d) the number of 6 amino groups-adenine and chitosine, is equal to the number of 6 cheto-groups, guanine and thiamine".
For a long time I felt strong reluctance accepting this regularity because I always had the strong conviction that our research of harmony, an harmony easily recogni-

sable and pleasant, was useful just to embellish or exclude the difficulty of understanding nature... I wanted to avoid falling into an updated form of the old trap where many famous scientist fell from the field of chemistry of nucleic-acid Ibidem.

Chargaff will remember many years later: "in the last years, I don't know whether for better of worse, they inflicted great influence on the biological thought, like the discovery of the pairing of bases in the nucleic acids".

The principles of complementarities are today fundamentally for the new views about the structures of nucleic acids and also are the key for changing all the reflections, whether valuable or not, on the physical properties of these composts, on the transmission of biological information from the deoxyribonucleic acid to the ribonucleic acid, and about the role he plays, controlling the synthesis of specific proteins. The actual explanation of the mechanism is based on these rules, activating the amino acids before they unite to synthesize a protein, and are constantly used even in the trials for decoding the nucleotide codes, responsible for the specific sequence of the amino acids of a protein".

As Erwin Chagraff remembers, few conquests have inflicted such influence on the biological thought like the discovery of pairing in the ribonucleic acids, what could be said about the cult of beauty and symmetry in Hieroglyphics so eradicated in the mind and culture of the Egyptian writing?

Symmetry and Aesthetics in Hieroglyphic

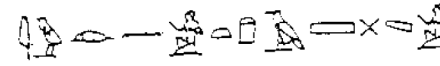
Hieroglyphic texts can be presented in horizontal or vertical lines. The writing and reading direction can be from left to right and vice versa. And it is easy to determine observing those particular hieroglyphic sign that, numerous, represent animated objects; these, painted in profiles, look, safe some exceptions, in the opposite direction than the reading one, if they look right, the reading direction is from right to left, if they look left, the inscription must be read from left to right.

Exception to this rule to determine the direction of reading is in "retrograde writing" where signs look in the same directions as the reading.

For particular composition reasons, linked to their passion for symmetry and balance, Egyptian used the opposite sense.

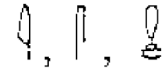
When, for example, some text where surrounding a door, the signs where painted looking at the axes of the door itself, therefore, on the left of the door, (for the observer), the signs were written from right to left, while in the right of the door, they were from the left to the right.

Ancient Egyptians did not write their hieroglyphic signs one after the other like most other writings. A disposal like this:



for any Egyptian scribe, would result completely estranged from the taste of aesthetics and beauty that was natural for him. Scribes, on the other side, tried to group different hieroglyphic signs that might have different dimensions, inside equal hypothetical squares, traced ideally, combining them in the most harmonic way possible

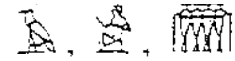
Uniting vertical signs



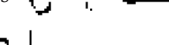
horizontal signs

Small signs  in order to avoid un-aesthetic empty spaces.

Other signs

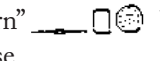


of greater dimensions, occupy the same square.

This  sign becomes  "his heart"

Becomes  afterwards,

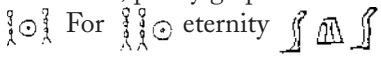
 becomes

"turn"  becomes  erase.

To obtain these "squares" scribes

could also reduce, if necessary, the proportions of other signs:

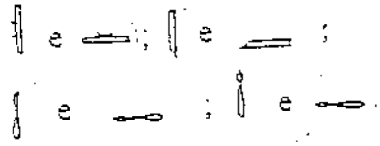
These would have taken a whole square.
Otherwise, always for aesthetic reasons, they even moved signs, using metathesis, purely graphic



For

under the feet

Also, some signs could, according to needs, be written horizontally or vertically



Aesthetics, always came first before orthography, for the orientation of signs and their order.

Codifying sequences, regulating sequences and control sequences

Some triplets play a fundamental and exclusive role in controlling the translation.
Four triplets are the same: one AUG- is the initial code, that specifies when the translation starts. In other positions, the same triplet codifies for the amino acid methionine -MET. Three end triplets UAA, UAG and UGA- specify where the translation ends and only one is used in each case.
Eight amino acids are entirely defined by the first two bases, the third having no relevance.
Other 11 amino acids can have one or the other of the two bases in third position and only two -methionine-tyrosine require a specific base. Two amino acids-leucine and arginine- could even accept two different first or second bases. Different triplets, then, can codify for the same amino acid. One triplet, can never codify for more than one amino acid. In many triplets, as we observed, the third base does not play any role. Bear in mind that our concept of gene needs redefining: in fact it is not a sequence of bases but a codifying sequence. Some segments contain codifying sequences or "eosin" other segments inserted in the codifying sequences do not specify amino acids (introni" because they reside inside the nucleus). It is important then the process of excision-welding (splicing) that must done with absolute precision to maintain the same reading module.
Some characteristic sequences are known, that we find at the edges between an intercalary sequence and the codifying sequence next to it. The first contains the pair GU the second has the pair AG.
These pairs are surrounded by other cases, rather constant, they are the "consensual sequences".
The presence of many separate codifying sequences, whatever their origin might be, gives a great flexibility to the gene, because they can be grouped in several way, allowing the gene to specify many different proteins.
Intercalary sequences, present even in ache bacteria, could be the DNA vestiges that surrounded primitive genes.
Different triplets can codify for the same amino acid; one triplet cannot codify for more than one amino acid in many triplets, the third base does not play any role. This represents a great advantage for the genome functionality, because, having to codify in a split second a huge number of amino acids, will allow him to choose those triplets with the bases that are mostly available at the time.
On the other side, the problem of "homophony" same sound for more signs- as we will observe in the hieroglyphics, if brilliantly solved with the use of "determinative" with exclusively visual value and not to be read- adds another obstacle and weighs down an already difficult interpretation of the text.
Different genes have to act in a regular way: the complexity of events that brings to the start or the end of single genes is named "genetic regulation". A gene that specifies the amino acid sequences of the correspondent protein chain, follows or is followed by regions of DNA containing sequences useful to regulate times and ways of the

synthesis of the chain itself, Regulation sequences."
The region contains all necessary sequences to codify the synthesis of the correspondent chain "codifying region" must contain also its "regulating regions" and the gene then will or won't be active.
The start or the end of specific groups of genes, is the most intimate essence of life, the reason of its ordered and organized functioning, and the base of the presence of different tissues on the same individual, if all cells own the same genes.
Every gene is regulated by a certain amount of transcription factors, different regulation genes, and the same factor controls many different genes: so they avoid a regression. Regulating genes activity is safer is checked by many controls: we do not inherit single genes from our parents, but complex of genes in a web of specific interactions of regulators under the stimulation of a double series of signals, some internal and other external; it's the gene in its complex, that controls when and how of its production, decision taken from the gene itself on the base of signals coming from other regulation genes.
A kind of regulation for transcription implies chemical changes for the DNA molecule.
Save some exceptions in the control regions of the genes that are not transcript, there are methyl groups linked to the base C: a gene that contains methyl groups will stay inactive, while one with
The methyl groups will be transcript.
The presence or absence of methyl group will persist in these genes after many replications, therefore it is a perpetual characteristic.
Another factor that regulates transcription is the status of the Chromatin: one segment contains the control region, is very compact in inactive genes while it is very compact in active genes. Studying chromatin revealed another important principle: a gene, even inactive, could be instantly activated when specific signals reach the cell: this kind of genes, ready to react, is made up with low-compact chromatin.
The signals controlling transcription of different genes are all made from the same general plan, they strongly differ in their particular.
In eukaryote cells, the analysis offers the following picture: very close to the gene there is a brief positioning segment that determines where exactly the transcription will start. Just above there is another signal, probably in the place where the transcriptase is linked to DNA, if this second site is removed, the transcription will not take place. The two sequences are also known as "promoter" in the end, even further above there is a segment that intensifies or inhibits transcription "potentate" "solicitor" as a response to cellular protein interaction. The potentate sequences, which are the best known, have extraordinary properties: one of these is the capacity to act intensifying transcription after being moved 1000-2000 bases from their original site. Base sequences of potentate segments, except brief tracts, quire regular, they vary from one gene to the other. The potentate sequence is an important instrument to control the transcription of genes, but it is not the only one. Seems some operate in an absolute way and start the transcription overcoming any form of control, while others have just a reinforcing role. This complex organization reflects probably the need of a strict rule of when and how a gene is transcript, and it is also necessary, because many signals, from the outside and inside of the cell, could require the activation of a gene.
The complexity of controlling depends also on how they developed through evolution , being this controls added to those already existing.
Codifying sequences are like piano keys, the controls are the fingers of the pianist, both are necessary for the execution
Admirable and complex interactions that from the "Transcriptome" lead to the "Proteome" through codifying sequences, regulating sequences, control sequences, find an efficient analogy in the structure of the strange grammatical and syntactic rules to have a right reading of hieroglyphics.

Fundaments of hieroglyphic writing

The Egyptian language owns two grammatical genres, masculine and feminine, female substantives end with the consonant the ending of the two genres are as follows:
Singular feminine
Masculine plural
Feminine plural
Dual masculine
Dual feminine
Plural ending for plural and dual are not always written, in fact the scribe can write the number with graphic artifices such as repeating twice the ideogram.
Two houses
houses
The predicative adjective, precedes the substantive and has the grammatical form of the singular masculine, could be emphasized through the ending
"How beautiful is this woman!"
The Egyptian language has no declination; the function of a word in the phrase can be deducted just from its position: the verbal phrase contains a finished form of the verb.
The word order is as follows: verb, subject, complement, adverb or verbal phrase.
The non verbal phrase could contain the "copula" in the invariable form
Comprehending the Egyptian verbal system is difficult for the lack of vowels in the writing, this practically erases all the modal and temporal differences.
As a conjugation paradigm we use the verb "listen".
The present passive is obtained through the insertion of the element
The past is obtained inserting a
Negative forms of past and present is obtained putting this sign before
The future can be obtained inserting between verbal root and subjects, the formatives or
The propositions are a very numerous group.
The most common are:
"state in place" in the night
"separation" went out of the house
"caused by" "he is satisfied about me"
"dative" to his majesty.
The structure of grammar and syntax rules is therefore complex and has to be applied strictly to fulfill the lacunas of the hieroglyphic language such as the lack of conjugations and genres ending, the absence of vowels that erases all temporal and modal differences, (Hegel: the night where all cows are black").
The need to insert purely visual elements like prefixes, suffixes and determinatives to make comprehension of the grammatical issue easier.
The rigorous application of such rules indispensable for reading makes them closer and similar to the meticulous application of the signals of control and regulation created by the DNA to transcript and translate the codifying sequences.
Now, with regard to the intriguing treatise provided by Alberto concerning Egyptian hieroglyphics and the genetic code, I am at a loss to say anything about it. It's a little bit like trying to understand some of Linda's art. I like her art, but my interpretation of what it means are usually inconsequential—Linda herself claims not to know in words what she is painting.
Hieroglyphics is no doubt a biological phenomenon and, like the human pancreas or the liver must in the final analysis, be understood as one of the uncountable possible results of the logic of the genetic code, giving of course due considera-

tion to the entanglement of both in the history of the environment and evolution. But I would guess that there is very little besides the fact that they are both codes, which we can learn about one from the other.

"Arabidopsis Thaliana" - "The vegetable Rosetta's Stele" Rosetta's Stele

"Arabidopsis thaliana" - vascular plant of Brassicacee's family has an incredible adjustment to the most diverse of climates is a relatively simple genome and partially unknown. It is described as a kind of stele of Rosetta in the vegetable world which will help to decipher the genetic patrimony of corn, oats and all cereals used as precious foods for agricultural animals. The "Stele of Rosetta" owes its importance to three inscription, each in different characters on its leaves, which have supplied the reading key to enter the mystery of hieroglyphie characters. The link to the "Stele of Rosetta" made me think of all possible connections, analogies and affinities two distant expressive worlds: the one of nature, linked to the genes and to the DNA and the one of human language, the more ancient and charming: Egyptian hieroglyphics. Both take us back to an ancient dream of man expressed in the biblical story of the Babel Tower: where we find the original of language and the possible proof of there only being of one ancestral language in the dim past of mankind. One root seems common to all languages: the etymon "tik" whose meaning is based on the equivalence between one finge and number one (the first three numbers are very 'conservatives' therefore rather useful in establishing connections between distant languages).

The linguist Noam Chomsky recognized the existence of a deep structure of language that the human mind has the innate ability to comprehend. Today in fact there is an attempt to recognize a "language of thought" rooted in the universal process of the human mind with which enunciations can be expressed in a formalized language (U. Eco - "Dire quasi la stessa cosa" - Mondadori 2003).

In the past one hoped to salvage an original Adamic Language, a perfect language, before the chaos of language according to Water Benjamin's intuition (Benjamin, 1923). Unfortunately all attempts to reproduce the meanings of the source-language by using all single language, have failed and could not lead to solve the arcane of the origin of a pure language. All languages show a basic unit of very similar degrees of complexity. One could suggest that all languages spoken by population we consider more ancient, are even richer and more complicated then ours. Italian has lost, in comparison with Latin, the noun declentions, periphrastic conjugations have disappeared and 'deponens' verbs. Also in English there has been an increase in regular verbs, a decrease in irregular ones and other simplifications. Only personal pronouns are among the highly preserved words. Darwin in "The Origin of The Species" wrote: "If we were to have a perfect genealogical tree of human races we could have the best classification of languages spoken in the world today". There are similar linguistic mutations as well as in genetic; all semantic changes being frequent as phonetic ones, but more rare grammatical ones We can reunite the story of the splitting of languages using a procedure called "glottochronology". In fact there is a fixed change that there is in the unity of time a semantic change know as "lexical diffusion" which is incredibly similar to the genetic "bio-clock". In fact if we observe a single protein like haemoglobin alfa in two of the same species, we will find that it is identical or very similar, whilst in two organismus separated from a long evolution this same protein is missing or substituted or some amino acids are added. This simple evolutionary difference and the time in which it has happened is the basis of the "bio-clock".

Environment and Evolution - The Evolution of Genome Historical Evolution of Hieroglyphics

Every environmental relationship with the genome is basically synergic. The evolutionary machine consists of the direct effect of the environment which stimulates a functional reply, which comes progressively transformed in a structural reply. No gene can be born complete and perfect like Athena

from the bead of Zeus. Each new gene is nothing but a re-elaboration of one or more further ancient genes. The genes' organization, and roles occurring at the different stages of development, suggest that their functional organization is connected with the evolutionary strategy, which at each level adds new genes to the already existing ones. The same relationship between genomes will be found in the evolution of hieroglyphics writing which is associated an'italic' from called 'Hieratic'. The evolution of hieratic brought in the development of 'Demotic' and from this the 'Copto'. Hieroglyphic writing could not be influenced by the great river of history from which one cannot escape, even on an incredibly slow scale, Hegel would say, the body cannot escape the skin which encloses it, it is a truism indeed. History is real knowledge because it is done by man.
G. Vico calls it: 'New Scienze'

Genetic Hereditary Illnesses Cartouche

Genetic hereditary illnesses, not very many and very well know from the clinical and genetic point of view, are largely conditioned by the discouraging and unappealing result of the genetic response. A typical example of hereditary illness is cell anaemia duo to the mutation of a protein chain of beta-globuline; the sixth amino acid of the chain and glutamic acid being codified by the triplet GAA. The glutamic acid replacement with the valina amino acid, codified by the triplet GTA (out of 438) triplets is sufficient to cause a person's death. On the day of their coming to the throne, Egyptian sovereigns took a title formed by five "Great Names". These characterising, alone, all Pharaohs of all centuries on the Egyptian throne, are known as the 'Royal Register'. By analogy one can identify as 'Royal Register' and enclose it in a special 'cartouche' for future reference about all hereditary illnesses selected in a sorrowful catalogue of incredible human grief.

The Chargaff Rule on the Complementation of the Basis of DNA Aesthetic Symmetry in Hierogliphics

'Soon after the discover of the DNA's double spiral structure I went to present the information in the United States, at Spring Harbor laboratory. I had an explanatory model with me, and a very attractive German young student came close and asked whether I was am artist. She thought that the DNA spiral was a precious abstract sculpture. That show how science has inspired imagination and creativity James Watson.
'For a long time I felt great adversity in accepting this regularity, because I always had a clear impression that our search for harmony, of an easy detectible and pleasant harmony, was only ment to decorate or avoid the worries to comprehend Nature'.
Erwin Chargaff

If only a few human conquests have exerted such a great influence on the biological thought, like the discovery of the basis for matching nucleic acids, what can one say of the beauty and symmetry in hieroglyphics, so totally entwined and absorbed in the Egyptian culture and mentality?

Codifyng Sequences, Regulation Sequences and Control Sequences The Foundings of the Hieroglyphic Writing

The rather complex grammatical and syntactical rule structure must be applied in a strict way to fill the gaps in the hieroglyphic language. The missing declentions and endings of genders, the vowels which nullify the temporal and modal differences, the need to insert purely visual elements like prefixes, suffixes and determinatives to make the grammatical discourse easier, finds an efficient analogy in the admirable and complex interactions which from Trascrittome lead to the Proteome through certain codifying sequences, regulation sequences and sequences of control.

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