MEMORY IN THE ONTOPOIESIS OF LIFE
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ACKNOWLEDGEMENTS

This volume, devoted to the ontopoiesis of memory, is the second part of the collected papers, presented at our 57th International Phenomenology Congress, held by the World Phenomenology Institute on the subject: “Memory in the Ontopoiesis of Life” which took place at the Istanbul Kultur University, in Istanbul, Turkey on June 18–22, 2007. Our heartiest thanks go again to Professor Erkut Sezgin for his initiative and insightful cooperation in organizing this Congress. We are sincerely grateful to the Kultur University personnel presided by Prof. Dr. Dursun Kocer and assisted by Yrd. Doc. Dr. Hikmet Cadlar and Yrd. Doc. Dr. Gursel Hacibekyrodlu.

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The extraordinary hospitality extended by the Kultur University, and the unique beauty of Istanbul will be remembered by all the participants.

A-T.T.
INAUGURAL STUDY
We have in the first volume on the theme of memory\(^1\) outlined the crucial role of memory in retaining our already actualized constructive accomplishments/efforts as an inventory to be called up propitiously in the creative thrusts of the becoming of life. The emphasis here has been on the constitutive role of the continuity of becoming and its grounding in the ontopoietic unfolding of life itself. Synthesizing, we may say that in some essential respects, memory was revealed to play a basic role in life as such.

As pointed out in the first part of this inquiry memory retains the constructivism of the individualizing living being as an organic *bio-memory* that the human being discovers partly through intellective acts of consciousness, partly through simple natural experience. It serves as an inventory to be propitiously recalled to provide links in the constructive continuity of becoming.

The striking function of memory in its first *vital* occurrence appears, in the simplest reactions of living agent on the way to its unfolding toward consciousness. Memory is active at all levels of individualizing life.

But in all its expansion the unique significance of memory is in its part in installing human existence within its changeable circumference and maintaining it in vigor. Memory truly blossoms within the operations of the fully developed human mind.

In sum, from the living agent’s recording of its elementary vital moves, through the evolutive progress of the mind’s conscious direction of its proficiencies, to the appearance of the human apparatus, in which memory plays the crucial role in numerous registers, conscious, specifically human becoming has developed its existence through memory.

Since our emphasis so far has fallen on memory’s maintenance of and allowing for the constructive continuity of the ontopoietic development of individualizing life, it is time now to turn attention to the creative inventiveness, that characterizes human life and lifts it to its stature. We will focus here on the varied roles that memory plays in this inventiveness on the functions of memory allowing for the inventive creative nature of human existence.
We may generalize that memory is the major element in the transmission of intelligibility not only in the organic succession of life’s self-individualizing development but also in the transmission that conveys coalesces, connects, links, analogizes, communicates, informs, impacts, influences within the circumference of the human realm of existence, within the reach of the human mind as it extends its probes ever beyond. The entire project of human existence’s stretching its tentacles beyond is suspended upon the understanding of meaning, its differentiation, and its transmission in communication, upon all that is accomplished owing to the functional power (force) of memory differentiated into universal “objective” as well as individual “subjective” perspectives (the intentional universal significance of meaning vs. subjective, differentiating understanding).

To return to a matter covered in the first part of our discussion, bio/organic memory within its generative horizon sustains the generative sphere of life. Upon memory is passing into the double unfolding of individual existence within the sphere of subjective experience and its simultaneous integration with the circumambient world, what the individual learns is transmitted and communicated along two lines – that of universal, i.e., objectified meaning and that of experiential singular understanding. Meaning and understanding draw their mutually determined sense in the existential functioning of language, the existential vehicle of human life. In their mutual growth memory unfolds the full potential of the creative human mind, to which we now turn.

In the evolution of living beings in which the living agent comes to acquire prerogatives of the human mind, a new platform emerges, that of the Human Condition. This embraces the entire spread of individualizing life in all its sectors and phases of becoming, but it is prompted and orchestrated specifically by the human creative mind with all its sentient/intellective/imaginative power. All the creative elements are received by the subject conveying an intelligible “content” in a ciphered presentation of reality having a specifically human guise: language. The full-fledged mind’s differentiation of reality as it is transmitted in Imaginatio Creatrix with all its perspectives on becoming accounts for the orbit of human existence. The innermost timing involved in life’s maintenance of an intelligible, ontopoietic outline is based on the concrete arsenal of the creative mind.

a. Language and Memory. Language, as the medium of a dramatic, dizzying, dynamic initiative of the logos in the communication of meaning among living beings about their reality draws on the complete register of the constitutive junctions of life. Sounds and signs differentiate in function of life’s unfolding
in complexity – feeling, sensing, pulsating, incorporating meanings in so far as they conform to the objective reality operated by the living agent and coincide in all the functional circuits of the subjects involved. It is by scrutinizing our past that we attempt to understand our tendencies, hidden drives and the unclear situations in which we have sought to find a right move, solution, etc. We scrutinize the past employing the imaginative aspects of our experience and circumstances.

“Reception” experiences that are seemingly “blind” (or “mute”) are “ciphered” by the full-fledged intellective outlay of the powers of the mind indispensable for the linguistic expression of both the universal human meanings of constitutive reality on the one hand, and experiential subjective reality, and experiential subjective receptivity, on the other. Owing to the inner power of memory to retain the past and reactivate its facsimile in the actual present, memory seems to be subsidiary to the progress of timing, and yet it is a basic function; it plays the role in life of enabling the transmission of life’s significant intelligible steps.

We owe to its sustainable recurrence the progress of growth of the human mind, its ever expanding horizons, the widening of the orbit of human existence.

b. The Conscious Agent and Self as well as Communal Existence. Scrutinizing the meaning-fullness of the escaping past retained in memory, we find that this meaning-fullness acquires transformative twists with respect to the ongoing changes in circumstances and shifts in our present interests and tendencies. It accounts for the transformations in our view of past experience, of our own personality, and ultimately of the meaning of life.

Transmission of the inventory of the past creates/constitutes our self in as much as we constitute fabulated histories of our human groups pregnant with deposited convictions and values that then form us. History is far from being a deposit of present moments – on the contrary, it’s transmission of the logos of human collective experience in a fabulated story, the fruit of selective intellective memory, on the one hand, and its interpretation, on the other.

c. To return to a matter covered in the first part of our discussion, bio/organic memory within its generative horizon sustains the generative sphere of life. Upon memory is passing into the double unfolding of individual existence within the sphere of subjective experience and its simultaneous integration with the circumambient world, what the individual learns is transmitted and communicated along two lines – that of universal, i.e., objectivied meaning and that of experiential singular understanding. We move with the vibrant force of human mind upon the rails of the intellective logos as it gathers all its forces and virtualities in the creative/constitutive progress ahead in unfolding our self-hood in our unique self-awareness – in our personality within the social world.
Our selfhood and self-awareness are the most intimate center of our existence. In it our most intimate understanding of ourselves is nourished by our quest for the meaning of existence. This self-creative existence advances by constant recourse to our actual experience of flashes of the past in our personal and communal transmission of beliefs, customs, rituals, convictions, values, taboos, principles, etc.

**THE CRUCIAL FUNCTION OF MEMORY IN THE CREATIVITY OF THE MIND**

As we have indicated taking various perspectives, it is the human mind that basically guides human existence in all phases – vital, psychic, communal, spiritual, and sacral, from the primal living agent through to its conscious unfolding, to the fully creative phase of humanness. The human creative mind, with its horizons encompasses them all. It carries specifically human existence in an ongoing flux.

The human creative mind is far from being a stationary apparatus of intentional acts of consciousness regulated in their flux by the phases outlined by evolutionary mutations. Its very indentifying feature/core is the versatile progress flowing from its inventive/creative propensities. Its creative logos engaged in a vertiginous activity calls for a plurisided continuity. Here there is recognition of similar or contrasting elements, the discovery of issues, and the search for new solutions, “learning from experience”, etc. In the mind to be manifested is the continuity of the logos of innumerable perspectives, in these pursuits, in all the steps of the inventive/creative endeavor, in the turning over of possibilities, their selection, their selection, their adjustment, etc. And these operations, refer for their support to the active force that is informed and stimulated by memory.

The Creative Imagination galvanizing the mind propels it on a quest that transforms the already being constituted reality. It activates the mind’s radius of propensities and a fulgurating variation of virtualities. Imagination is served by memory as its crucial tool in its selective creative role. It finds in memory an essential reservoir of elements to be imaginatively configured and reconfigured.

*a. Memory as the Engine of the Human Creative Mind.* Our “rememorizing” of past events from our own life, of past events reported to us with a request to “understand” their “meaning”, an of far in the past events not even recollected by presently living people but just recorded and transmitted from generation to generation gives the experienced past a vast array of transformative virtualities. Not only does the rememorizing that involves the imagination
reconstruction of experience which is essentially interpretative references to all the horizons of living experiences, but this rememorizing also refers to the network of experiences subjectively established within the conscious individual, and this reference to all the transcendental horizons of life – involves transformative virtualities in numerous categories of reality – which means there are various divergent modes of endowing of the past. But while the recorded traces go through subjective filters in the revival of the sense of the past events, together with their transformation, a transformation of the understanding of our own experience of them occurs. In brief, the transformative nature of memory of the past in its experiential sense can transform our understanding of own sense of life. The great question then occurs: What guarantees the identity of the past over against the transformative virtualities involved in retrieving it in memory? What guarantees their identity of past events in cognition/recognition of our experiential sense and what guarantees their identity as past, as real, concretely events that may be believed to have happened in reality, that is, within the ontopoietic orbit? What actually remains unconditioned when it comes to the enormous radius of metamorphic variations operative in the retrieval of the past?

b. Memory manifests itself as an essential mediating factor of life. or we may say, as crucial device of the logos of life, a device that carries not forward not only the constructive continuity of the progress/regress of the ontopoietic projections providing the transformative coincidences and throwing bridges and links among the traces being “retrieved” (surmised) allowing for a fluent but, changeable, yet coherent, flow that we call “history”. There it is that imagination enters into crucial play. Not only is it imagination that lifts conjectural inferences from the factual status quo to the level of virtualities available on different horizons correlative, analogical or possible that may appear but its variations also allow for the adjustment of appropriate compossible virtualities with the already established status quo. Above that status quo imagination, operating among and between the variations available on multiple existential horizons, allows for the identification, approximation, association, familiarity, etc. by which are found surmised, and eventually established fragments of sense and the notes of innumberable logoic threads.

Memory also provides associative channels for the waves of the flux of disjointed imaginative promptings.

Memory serves as a crucial schema of reference for fragmented and displaced experiences. Most of all, as the creative imagination comes into contact with constituted reality on any of the mind’s horizons, it proceeds on a continuous line with constitutive intelligence itself.
Memory’s transmission of cogency through all the phases of becoming, sustains creativity’s selection of pertinent becoming, and so advances existence toward all its human horizons.

In brief, imagination activates memory in its swing first, through its sentient intentionality of *vis viva*, then through its psychic and intellective intentional networks; lastly, imagination leads the logos of life through its labyrinths of existence and lived reality with its horizons toward their ultimate sense that we, human beings seek. That is toward the sacral horizon of life.

At last, we encounter the most striking challenge of memory – the sacral metamorphosis of life!

**c. Memory and the sacral transition of the logos.** We have seen how, imagination activates memory in its swing first, through the sentient intentionality of *vis viva*, then through human psychic and intellective intentional networks. Lastly, imagination leads the logos of life through the labyrinths of existence within the horizons of lived reality toward the ultimate meaning that we human beings seek, that is, toward the sacral horizon of life.

The horizon of the sacral logos does not issue from sheer inspiration. On the contrary, it proceeds part and parcel from the entire logoic life project; it belongs to the entire plan of the logos of life as it reveals itself through life. It is along the continuous thread of the logos of life that we move – that the logos moves – from the concrete vital realm of living beings advancing in their complexity and becoming conscious to lower and then higher degrees of awareness that proceeds the thread of the logos’ most intimate connection between heaven and earth, the divine and the human, two realms presumably distinct through-out human temporal evolution. The “passage from one realm to another”, that has been witnessed by numerous concrete individuals – individuals, of whom we have recorded as “historical” traces, which have been re-memorized and understood as “revelations” of the divine realm in human reality. The significant point, however, is that the passage “from one presumably distinct realm to another” is carried to us by various categories of personifying beings somewhere on the scale between ordinary living human beings and the divine, namely, angels, messengers, prophets. They assume bodily, human form and human modes of expression as well as when they “appear” in life-world situations. Their appearances are situated in the temporal and spatial coordinates of the known to us world and are interwoven within it, bearing, however a differently significant message – a sacral message.

It is upon the canvas of the logos of life that this sacral message is being limned, or rather intimately emerges from – and the bodily link between the seemingly two realms is privy to both. It is the continuity of the fragmentary occurrences in the reality that is plotted by the human mind as the outline of salvation. Or, to put it otherwise, here is the history through which the human progress in enlightenment, the revelation of the divine, the manifestation of
the sacral logos subtending life as its deeper, final sense is being made. It is out of fleeting fragmentary experiences that the sacral meaning of life and human salvation may be ciphered as we excavate the sense of the traces left in reality by these experiences, one advancing. Over another in our continuing anamnesis.

ONTOPOIETIC SOURCES OF MEMORY

We have many times over the opportunity to observe memory’s ever recurring function in the temporal becoming of life. Although it crystallizes essentially the past, the phases of becoming already gone, memory lies at the core of the present and is immeasurably active as it informs the future looming ahead. Is, therefore, its function in becoming as fleeting as becoming is? Immersed in becomings, does it emerge from and vanishes into the unknown? Are memory’s fragmentary contributions like pinpoints on a blind path of a labyrinth that even the Sphinx could not cipher the itinerary of?

Yet, as is readily manifest, memory performs some existentially significant functions without which life – human life – could not go on. It is enough to mention its role in promulgating the run of temporal becoming in all its registers, beginning with the natural organic phase, and then in communal and subjective existence as well as in personal self-unfolding, finally in the apprehension of one’s personal intimate meaning of life. Most significantly, we have pinpointed the crucial function of meaning in its bridging and bringing together the realms of creative imagination and constitutive reality.

Even human history and the transcendent horizons of our mind refer to the relics of memory. It appears that the work of memory, seemingly just subsidiary, in fact unifies the main thread of life and of human existence. Seemingly proceeding on its own, this work of memory is in fact enmeshed in the entire fabric of life, which could not proceed without it.

And when we consider that the creative work of the human mind embraces all the registers of becoming and crowns it in a crucial novum, could we possibly seek sources of each of its elements in isolation from the others?

Where else can we find the common ground upon which all registers of life emerge in tandem, differentiate, and forthwith unfold if not upon the primogenital, ontopoietic platform of life? And is it not memory that provides a system of references that unifies life’s entire dynamic network?

NOTE

TOPICAL STUDY
ABSTRACT

Thanks to some examples of the always more effective research on “vestigial structures” in the field of biology, this work puts in evidence as the evolutionistic paradigm, on the contrary of what is still believed by some opposite currents of thought, can extend its valence to spheres usually seen in incompatible opposition with the evolutionistic vision.

At first we show how molecular analysis of modern proteins and DNA, which are considered as evolutive vestiges, can solve some of the hard questions of systematics biology. Then we analyse the results of an interesting research which allows to propose a pro-evolutionistic conception of the first Genesis’ passages (Gn 1,3) defining a new “evolutionistic theosophy”. The abovementioned interpretation is based on anthropological evidences about a sociocultural transformation, dated back to the Neolithic age, that gave rise to new religious models.

Such a new scenario leads to different philosophic evaluations concerning the conceptions of anthropology and cosmology strongly coherent with the modern scientific branches; it also provide a prove of the strong degeneration of such transformation from a cognitive and psychosocial point of view.

Since its formulation the theory of evolution underwent very strong debates: in particular this has happened in relation to the philosophical implications of the evolutionistic paradigm. The evolutionistic vision seems to have touched the raw nerve of institutions and currents of thought firmly rooted in the western culture, giving place to a comparison often extended to the white heat. In reality the theory of evolution, like any other scientific theory, doesn’t contain in itself such an element to invade the “correct” areas of theological speculation and the connected philosophical aspects. Yet the evolutionistic vision, proposing a totally uncommon acceptation of reality, relativized and confuted contingent and inadequate metaphysical, anthropological and cosmologist conceptions, implicitly adopted in the theological–philosophical reflection most rooted in western society: therefore it wasn’t the metaphysical theme of theism
in itself that clashed with the evolutionistic paradigm, but rather theological speculations and fideistic groundless superstructures, built around and above this thematic on purpose.

Even today, a strong cultural element typical of fundamentalistic environments hostile to the evolutionism persists in opposition to the theory of evolution on the basis of the presumed lack of scientific elements as a support. In general, they try to oppose to the evolutionistic ideas a series of exceptions aimed at emphasizing how, in front of the complexity of the living, the a-teleonomical and stochastic valence of some key processes of the evolutive mechanism is absolutely inadequate and strongly reductive. The idea of Darwin neutralistic evolution, – however accepted and daily applied by all the existing scientific community – seems to disturb the sleep of many consciences and, often beyond solemn proclaims, of the hierarchies of confessions that obviously cannot see any objective agreement between their faith positions – expressions of a real and proper philosophical perspective – and this paradigm.

“Unfortunately” for these people, compared to any other theory, the epistemological superiority of the new-darwinian paradigm is incessantly confirmed, even “required” by the correct application of the scientific epistemological method, for which the scientist “must” rely on that theory which, compared to possible alternative theories, allows the greater degree of description/forecast of the experimental facts – obviously until (scientific) evidence otherwise.

To this day, the evidences in favour of the evolutionistic conception are growing to a more and more tumultuous rhythm and, decisive fact, turn out to be epistemologically more and more refined and pertinent. That derives from the fact that science got rich of techniques of investigation which were unthinkable in the past, and these techniques are supporting the darwinian original intuitions in absolutely inedited areas, spacing from the molecular level to the psycho-neural one. So we watch a quantitative and qualitative spread of these experimental validations without precedents; a “trend” that cannot postpone proposing, at last in a constructive propositional way, the evolutionistic thought in areas that are incompatible to it. The example of the evolutionistic theory of knowledge (ETK) and of the evolutionistic today’s tendencies of the neurosciences, which revolutionized the secular philosophical acceptations of man, of the nature of the mind, of the human conscience etc., is remarkable.

In such perspective we will refer to validations of evolutionism really concerning the theme of the ontogenetic and phylogenetic “memories” found in the living world. Moving from the molecular level to the organic one a particular “memory” of psycho cultural nature which will reveal an unusual approach to the heart of the “theologic–philosophical problem” of evolutionism will be finally reached: the supposed contrast between evolutionism and the tradition of the doctrines of biblical stock. As provided by the study of the “vestigial
forms”, a pro-evolutionistic interpretation concealed in the text of genesis able to propose an inedited interpretation of “memories” of fundamental aspects of our socio-cultural reality will turn up. A result that would sanction the goodness, and to this point an intrinsic superiority, of the evolutionistic paradigm in defining not only an inedited and pertinent “evolutionistic metaphysical frame” of the scientific research and of today’s philosophical speculation, but also an as well peculiar “evolutionistic theosophy”.

The importance of the “vestigial forms”, “historical memory” of the evolutionary processes, was already caught by Darwin himself. The comparative anatomy proposes cases by now classical, concerning the conservation of corresponding structures in distinct living forms. It goes from the skeletal analogies of the birds’ and bats’ wings, from the fins and atrophied pelvic bones of the cetaceans to the human limbs, from the nails, residual forms of ancient limbs, which still stick out along the body of snakes, to the opening of branchial cracks during the embryonic development in the superior mammals, man included, to the caecal appendix, with all the pathologies connected to it, etc.

This type of investigations, carried out in the past only at anatomic and paleontological level, knew a period of big ferment starting from the second half of the last century with the development of sophisticated techniques of molecular investigation. The testimonies present in the cellular plasma and in the molecular structures light up the darkness of the ancient evolutionary dynamics in an absolutely unexpected way, often solving important scientific controversies.

“Molecular vestige” have emerged from the analysis of proteins and nucleic acids. A pioneer study consisted in the analysis of a protein present in all the superior organisms, called “eukaryote”: the “cytochrome c”. About 2 billion of years ago a deep transformation in a few unicellular organisms which were populating the earth developed a metabolic process able to effectively use the chemical energy of the food: the modern cellular respiration. One of the most important members of the new process was an ancestral form of cytochrome c: a protein whose “molecular descendants” are the cytochromes c of the cells of today – ours included. As every anatomic member – eye, skeleton etc. – a protein represents a “biological realization” in which similarities and interspecific differences which can be considered as “phenotypical” expressions of processes of evolution and/or divergence are expressed. The current molecules, which descend from common ancestral molecules, can reveal “vestige” of the evolutionary processes which separate us from the first cells able to respire. A pioneer analysis of the cytochrome c of the horse was carried out in 1963. If extracted in purified form, this protein forms true and real “proteinic” crystals made up of proteins tidily arranged along the various axis (a protein is a long filament of molecules,
called “amino acid”, folded on itself). X rays directed on these crystals are deflected with different corners according to the distribution of the electric charges in the proteins. Analysing tens of thousands of these trajectories of diffraction at the computer true and real maps of the protein were obtained: the three-dimensional structure of the cytochrome c.

The complete sequence of the amino acids of the cytochrome c was rebuilt in several kinds. Comparing the different cytochromes c, their analogies and differences, it was possible to rebuild the past evolutionary events. For example it was possible to quantify the speed with which the protein changed (evolved) from the moment in which plants and animals separated themselves in distinct kingdoms. With this datum it has gone back to the approximate date of this event: about 1,2 billion of years ago.

Really interesting data emerged from the study. The cytochrome c is identical in man and in the chimpanzee: in both the species the molecule consists of 104 amino acids having an identical sequence and the same three-dimensional structure. On the other hand, the human cytochrome c differs from the cytochrome c of the mould of the bread (Neurospora crassa) only in 44 of 104 sites, although the space structure of the two molecules is essentially the same. It should be noticed that in an incomparable way the darwinian theory explains, with respect to “every other theory or interpretative model of the evolutive fact”, both the reason why such a big number of 104 amino acids of the cytochrome c is interchangeable in such a measure, and why certain amino acids cannot be replaced without the protein losing its activity; and above all why the molecular differences between cytochromes c of species are proportional to their phylogenetic distance.

These studies allowed to rebuild detailed family trees in a way independent from the traditional morphological and paleontological methods. The remarkable aspect is that these results are in agreement with those of the classical systematics, based on geology studies, on paleontology, on comparative anatomy, on the dating with radionuclides etc. So in their complex these transversal researches represent an experimental confirmation of fundamental epistemological value of the evolutionism. The probability this agreement is purely accidental is totally derisory: so the coherence between these evidences, drawn independently one from the others, is a qualitative and quantitative expression of a very high truthfulness of the evolutionistic paradigm on the bases of the single checks. This confirmation is surprisingly ignored by many opponents of the evolutionary paradigm.

Other important contributions arrived from the studies of the nucleic acids: the DNA and the RNA. In the late 1980s, the biologist Lynn Margulis suggested that the modern cells originated from a process of fusion, “endosymbiosis”, between the more elementary protoplasts of ancient cells
without nucleos: the “prokaryotes”. Now, a typical character of the *procarioti* is just the presence of DNA rings in their internal. In the same years a particular type of DNA of the modern cells was started to be studied: the mithocondrial DNA. This DNA, made up of a ring of nucleic acids, is present in the “mitochondrions” that constitute the cellular cytoplasm seats of important stages of the respiration. The structure of these DNA rings and their method of duplication constitute true and real “vestige” of the *prokaryote* DNA, a “molecular memory”, able to support the thesis of the *endosymbiotic* origin of the modern cells: an event that seemed to happen about 1.5 billion of years ago.\(^6\)

But the mithocondrial DNA has more surprises in store, being able to testify another remarkable evolutionary moment: from the 1980s the human mithocondrial DNA has been studied.\(^7\) In man, the cell produced by the union of the sexual gametes inherits the cytoplasm\(^8\) only from the female egg cell, while the spermatozoon contributes with the nuclear material, the paternal chromosomes, that came abreast of the maternal ones. This makes sure that the cytoplasm of all our cells, both in males and females, “descends” from maternal cells: from the cytoplasmatic point of view we are identical to the mother. So the mithocondrial DNA, which duplicates independently from the nuclear DNA but in synchrony with the same, exclusively derives from an only parent in the same way as we all inherit the paternal surname in our culture.

The study of the differences of a wide sample of men found in the mithocondrial DNA allowed to define, in evolutionary optics, the so-called process of “coalescence”, by which it is possible to determine – with a “molecular clock”\(^9\) – the necessary time to cancel the differences present in the mithocondrial DNA of two individuals of the same kind. With this study it was built the phylogenetic sequence of the mithocondrial DNA of modern men, who seem to have all inherited this DNA from a single female who lived in Africa about 200,000 to 140,000 years ago: the so-called “mithocondrial Eve”.\(^10\)

Another important molecular trace of the biological emersion seems to be contained in the RNA and in a few processes connected to the synthesis of the proteins. A precise biological mechanism gathers the proteins in the cells according to instructions contained in the RNA. As already mentioned, the proteins are made up of long filaments, like a multicoloured bead necklace. The RNA too is a filamentous molecule, obtained by the repetition of four distinct elements, called “ribonucleotides”. The RNA filaments precisely describe, through a true and real biochemical code of “translation”, the long sequences with which the 20 different “elementary constituents” of the single proteins are repeated: the amino acids (the “beads” of 20 different colours of the above-mentioned “necklace”). It is thought that in the processes of the origin of life there was a slow biochemical evolution with which, in a crescendo of complexity, the living plasma emerged from simple (*primeval*) early biochemical
substances. But how all this happened? Was there an evolution phenomenon, like the one of the living forms, also dependent on the pre-biotic molecules? Are there any traces of these very ancient processes in the actual amino acids and in the RNA?

Nowadays the “genetic code” “translates” the sequence of *ribonucleotidic* symbols in a sequence of amino acids in a ratio of $3$ *ribonucleotides* $= 1$ amino acid.

Why a code of “codons”? Why this ratio 3:1 and not other more simple ratios?

This molecular process is assimilable to a real and true linguistic translation: there is the need to give univocal names to 20 different objects writing the 20 distinct “names” with an alphabet of only 4 “letters”. The only possible way is given by the “combination” of the available symbols/elements/“letters” (four in the case of the RNA) in sequences of opportune length (words/names) – also repeating the single “letters of the alphabet”. By doing so the possible combinations grow according to the $n^k$ formula, where $n$ is the number of the available symbols/elements/“alphabetical letters” and $k$ the length of the words/names.

The existing genetic code, founded on codons, turns out to be oversized compared to the necessities: from the combination of 4 *ribonucleotides* to groups of 3 we obtain $4^3 = 64$ codons. The 64 codons are redundant in view of the need to identify the 20 amino acids: why this redundancy? Why 64 “words” in the “RNA” language in order to identify the 20 “objects” in the “proteinc” language?

Also nature has found itself in front of a semantic and mathematical problem. It could have recoursed to a code in pairs: 2 *ribonucleotides* $= 1$ amino acid. Though that way there would only have 16 combinations ($4 = 16$), absolutely insufficient to codify 20 amino acids (included special codes for the beginning and the end of the “translation” process). So would the coding in codons be forced? No, it wouldn’t. In fact there is a further, intriguing facet of the problem.

We are more and more convincing ourselves that the available number of the amino acids in the present world is greater than in the initial phases of life. After the early evolutive processes we have watched an increase of the amino acids at disposal to form proteins. This background would seem realistic also taking into account how the existing code of codons is too refined to come from a single evolutive step. But proposing early phases with proteins made up of a less variety of amino acids also involves the existence of a process of parallel evolution between proteins and RNA: from a primitive code of a more simple translation, founded on couples of *ribonucleotides*, would we have therefore reached the existing one, based on codons? Has nature effectively organized
an original and more elementary code of translation in order to shift (change) to a more refined and powerful one or not?

Also here the answer seems to be a “not”. The hypothesis of an evolution from the coding in pairs to that in codons strikes against an insurmountable “semantic” or “informational” obstacle. It’s impossible to change from a code in pairs to a code in codons: changing from a binary interpretation of the genetic message, of the CG–GG–AU–UU–GG–UA type etc., to one based on codons of the CGG–GAU–UUG–GUA type “all” the pre-existing codes of translation would dramatically lose sense. This would biologically involve an unbearable short circuit in the coding of every protein, an insuperable obstacle: every form of life would die out. Insofar as at present the genetic code is founded on codons from the beginning it “must” be therefore based on an identical structure of codons: it was still more redundant, because of the inferior variety of amino acids to identify compared to today! Still more redundance? Why? Have we traces, any “memory” of these very remote phases, such clues to propose a well grounded reason?

The attempt of an answer of another important problem stems from the studies concerning the origin of life. Which was the original system of assembly of the proteins? The RNA, like the DNA from which it comes from, is a molecule which for its existence implies the presence of proteins that catalyze its formation. But, in their turn, proteins require the presence of DNA and RNA. In biological field, this reciprocal dependence exemplifies the classical dilemma of “first the egg or the hen” – or of the “functional bootstrap”: which of them first developed: the RNA or the proteins?

Many elements indicate the concept of auto-replication/auto-duplication of the RNA as a solution of the problem of the “molecular bootstrap”. Simple RNA molecules can develop in a spontaneous way, and even act as enzymes/catalysts of processes of auto-duplication, a precious event of the complex mechanisms which are present in the living world nowadays.

In other terms, in appropriate conditions, short RNA filaments spontaneously produce, through auto-catalytic processes, complementary filaments of RNA, in which the father filament acts as “cast” to produce a structurally complementary “son” filament. Everything is due to the spontaneous capacity of specific ties between ribonucleotides C–G and A–U: through random movements filaments of opportune RNA dimensions can on themselves, with the result than the ribonucleotides can face and bind between themselves. In this case the ribonucleotide C joins G in a specific way, and the ribonucleotide A joins U and vice versa. But even more these filaments can drive, as true and real “casts”, the synthesis of a filament of “complementary” sequence: a GGCAAU filament can act as “cast” to produce the “complementary” filament CCGUUA.
This last one, in its turn, can reproduce the GGCAAU original filament and so on, slowly beginning a process of molecular selection.\textsuperscript{13}

In 1976 several scholars of the Medical Research Council Laboratory of Cambridge proposed that the necessary direction of reading and the necessary punctuation of the RNA for “scanning/encoding” in codons “of the informational message” of the RNA from the beginning were founded on a mechanism of translation in codons having the $RRY$ sequence. In these sequences the two $R$s represent ribonucleotides G or A (Guanine or Adenine) put one next to the other and $Y$ a ribonucleotide C or U (Citosina or Uracile). Also $RNY$ type sequences (where $N$ represents any ribonucleotide) seem to give the same results.

Are there elements in the genetic code of the system of current translation which allow to establish if it had origin from this archaic structure of $RRY$ or $RNY$ type? Computerized researches of possible relationships between biological polymers drew phylogenetic trees in which the correlations between proteins and corresponding nucleic acids are highlighted in various kinds. The RNA of transport (RNA \textit{transfer}, tRNA) lend themselves particularly well to these analyses.

The tRNA matches only amino acids to the RNA codons: a crucial role. Their structure, rigidly submitted to ties that obstructed every molecular change, would reflect the way in which the correspondence between amino acids and RNA was established. Computerized rebuildings of the optimum phylogenetic structures and of the most probable primitive sequences of biological polymers applied to well known tRNA sequences confirmed such studies leading to interesting conclusions. In all the examined species the sequences of specific tRNA seem to give origin to a tree structure that shows a reduced evolutionary divergence in comparison to that of other biological molecules: a sign that this very ancient particular type of information, relatively remained unchanged during all the next biological evolution. The sequences of different tRNA of a same kind reflect a divergence from a common ancestor through a distribution of mutants similar to a “quasi-species”. A “quasi-species” is a particular type of accidental distribution of molecular mutants that is observed during spontaneous processes of auto biochemical duplication.\textsuperscript{14} These analysis have identified the possible “ancestors” of modern tRNA: they were indeed very rich in G and C and their prototype-sequence (which was rebuilt giving to any position inside the filament the most common base of the examined sequences) would show a clear reminiscence of a primitive structure in codons of the $RNY$ type.

Genetic “memories” of the $RNY$ structure are present also in virus in DNA, bacterial genes and superior organism, a sign that such structure is very widespread in the living world. The strong stability of the chemical coupling
G–C strengthens the hypothesis that the \textit{RNY} initial code had limited to 4 codons of the \textit{GNC} type. The fact that in the modern genetic code there are precisely the following associations: GGC = glycine, GCC = alanine, GAC = aspartic acid and GUC = valine is extremely suggestive.

At this point it is not possible to ignore the pioneer simulations of the early chemical environment realized by Stanley L. Miller of the University of California in San Diego. In the pulp that resulted from his experiments these amino acids were present in greater amount. Also here, the fact that this constitutes a pure and fortuitous coincidence is rather risible. As disquieting, in consideration of this evidence, it is the analysis of some meteorites (carbonaceous chondrites). They contain significant traces of amino acids of extraterrestrial origin present with a percentage of abundance similar to that obtained by Miller: a mute echo, but solemn, of the possible pre-biotic processes to which we all owe our present existence.

Other important remains are present in the psycho-cognitive field, both at anatomic and functional physiological level: it would be enough to observe how our brain traces out the structure and the working of the brains of other primates. The analogies of social affective manifestations, in the parenteral behaviours, in the intellective cognitive \textit{performances} of supremacies (records) closer to man (chimpanzee, \textit{bonobo} etc.) are as important. It would be possible to add the genetic and ethological similitudes about the evolution and the structuring of language, some symbolisms etc., to not talk about the evidences on the evolution of the single languages in the specific historical and geographic areas: a field of studies that often confirms how often staggering “mnestic” traces of the past evolutionary processes are present in the various levels of reality. Furthermore these evidences add to the endless theory of verifications that supports with greater foundation – in case it was still seriously necessary – the goodness of the evolutionistic paradigm in numerous areas of the scientific research.

However, as we were saying, our main subject is the existence of very original \textit{vestiges} of evolutionary processes in a precise socio cultural area: in particular the presence of an important “memory” of psycho-cultural evolution concealed in the most ancient text of the Old Will for millenniums: the three first chapters of Genesis (Gn 1–3).

This purpose appears staggering or maybe “striking”, if we think of how and when evolutionism was ferociously opposed by the same supporters of the theological tradition founded on the biblical texts. Yet in Genesis 1–3 it is possible to identify the “memory” of an important socio cultural transformation that involved the anthropic sphere both in the psycho-sociologic and cultural spheres: a decisive aspect in the comprehension of today’s reality. These chapters of Genesis, already fundamental in the definition of the theological and
eschatological positions of today’s confessions of faith of biblical stock, in reality constitute a deep testimony of a different and absolutely ignored historical event, able to damage our theological, philosophical, cosmological and anthropological conceptions.

Our interpretation defines a definitively antithetic background to the one supported as a rule in the philosophical debate between atheism and theism. From one side this dichotomy sees the laic, atheist pole, supporter of a scientific and philosophical analytical materialistic, rigid method; from the other the “canonical” theistic acceptation expressed in our culture by the foundations of the doctrines of biblical stock, which postulate the existence of particular metaphysical entities (God, soul, hereafter, redeeming eschatological plans and so on), placed in cosmogonical and cosmological frames and theatre of natural and supernatural alternate events.

This “canonicity” is daughter both of the secular diffusion of such doctrines in the western world both from the fact that, in the world of the history of the religions, the confessions of the biblical stock have been univocally seen as among the most refined theological systems, especially in relation to theologies of less advanced or more ancient cultures. Actually such systems show characteristics which place them on levels of extreme prominence in the group of the well-known worldwide confessions in an undeniable way: they develop first-rate traditions and have marked important pages “also and above all” of the modern philosophical thought.

Under the social political profile the history of western culture is marked in depth by the prominence of these institutions, and that takes place today as well. Yet none of these considerations objectively allows to attribute any prototype status, of “canon” of the theistic options to such doctrines. A radical scientific and philosophical confutation of this role, centred on an inedited interpretation – which can “also” have a theological but principally historical, scientifical and philosophical importance – from their origin and from their wider socio cultural meaning is possible.

This interpretation, duly exposed in the work “Il Dio laico: caos e libertà”, is characterized by two fundamental points.22

The first consists in an analysis of the cosmological and theological models and of the essential characters of the position of man in the dimension of the sacred; in other terms, of the most universal nature of the man-divinity relationship. The second aspect is that the distinction between two large classes, “theoethotomies” – this is a neologism – and religions,23 due to an analysis originally independent from Genesis, can be proposed as the most appropriated reading of the first chapter of the Bible. Let’s see how.
The analysis of the various religious models allows to place them in two classes: in the first those where the divinity expresses an explicit moral authority, an evident ethical sovereignty towards man and his acting. In other terms, systems that envisage a “knowledge of the Good and the Evil” from which the idea of sin derives, that is to say to disobey or not, during earthly existence, precepts given by the divinity are placed in it.

In these systems the theological system, the cosmological and ontological frame of reference are all expression of an ethical “personal” relationship between a “personal” being/creature and a “personal” being/creator God. These theologies must necessarily define a series of dynamics and of redeeming and eschatological principles regarding the manifestation of “sin” itself, and even more contemplate the origin of this ontologic condition in the area of the original creation – a fact that ends up in giving a hint of corruption and degrade in the social modern reality. The possibility to “commit a sin” makes man slip into an ontological condition of impurity: a true and real natural degeneration, but not less supernatural, able to deeply influence the ontological “personal” relationship between the creature man and God. For these theological models, and the relative class, a neologism has been coined: “theo-etho-tomies” (from the greek \(\text{thèos}\) (God) \(\text{ethos}\) (custom of life) τομη (caesura)).

The “theoethotomies” express peculiar theological characteristics, origins and evolutions absolutely distinguished compared to the systems which will be included in the second class. In this last one religious systems in which the divinity does not affirm any ethical authority and moral sovereignty towards man will be placed; in other terms, systems in which there is no “knowledge of the Good and the Evil” and “the concept of sin is not affirmed”. These systems will be pointed out with the usual term of \textit{religions} – written in italics.

The distinction theoethotomies/\textit{religions} reformulates both the idea of theism in itself and the contrast between atheism/theism. Instead of the two classical positions it is necessary to understand the comparison between three philosophical poles, each of them deeply distinguished: atheism, theoethotomies and \textit{religions} – where these last ones share and in a peculiar way express aspects and philosophical approaches typical of the laic critic to theoethotomies. That allows inedited evaluations of the theistical pole \textit{tout court}, contextually freeing the comparison theism/atheism from the distortions due to the recognition in the theoethotomies of the canonical form of theistic expression.

This formal distinction between theoethotomies and \textit{religions} is perfectly verifiable on the basis of remarkable ethnographical confirmations. The unequivocal differences between the two models are such to present origins, theological contents, evolution and socio-cultural, political and economical, but above all psycho sociological, implications absolutely different between
them. This will also allow to propose an interesting historical cultural rebuilding of their coming in the history of man, their authentic psycho-cultural emphasis.

It is well known how the social political nature, the class structure, the nature of the social economical and interpersonal relationships, the forms of familiar institute and of course the religious sphere of a culture are deeply connected between them, as several authors show, from Marx to Weber etc. The cultural anthropology shows how the hierarchic structure of a society is speculatively represented in the hierarchic structure of its cult modality.

An interesting scheme of Marvin Harris quote the association divinity/cultural form here proposed as an example:  

<table>
<thead>
<tr>
<th>Active divinities on the sphere of morality</th>
<th>Society</th>
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<tbody>
<tr>
<td></td>
<td>With social classes</td>
</tr>
<tr>
<td>Presents</td>
<td>25</td>
</tr>
<tr>
<td>Absents</td>
<td>8</td>
</tr>
</tbody>
</table>

The religions are therefore associated to a-class cultures, while the moral divinities, typical of the theoethotomies, are typically affirmed in class-societies. These confirmations show how the authentic valence of these social cultural elements of the sacred has been so far evaluated in a partial and superficial way.

The cultural anthropology and the history of religions highlighted how the original urban societies, stratified and hierarchic from which the social arrangement of the modern historical societies will proceed, rose as theocracies in which the power and the institutionalized management of the sphere of the sacred were expressed and managed by sacerdotal classes which were showing narrow ties, if not true and real identifications with the government élite. These datas show how the theoethotomies appear in the human history only starting from late epochs and exclusively in association with well defined forms of social aggregation. Even if they constitute the almost totality of the doctrinal forms spread on our planet at present, these models have started to appear in a recent phase of the true and real history; so they do not represent the modality of the original religious demonstration of man. They “can’t” do it, because of obvious reasons: they are too young!

But this decisive aspect has not obviously been fully caught: without any concrete ground, the theoethotomistic models have inevitably been considered as terms of an “evolutive” process substantially monotonous starting from