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HYPER KLEIN BOTTLE LOGOPHYSICS ONTOPOIESIS OF THE COSMOS AND LIFE

Abstract: We present an ontoepistemology based on the self-contained KleinBottle and HyperKleinBottle surfaces and their logics; the latter incorporates interrelations and hyper-contextualizations within an heterarchy of Otherness. We introduce the associated logo-physics, as a basis for the unification of science and phenomenology, by surmounting the Cartesian Cut. Dualism is found to be a projection of the former logic, not an independent primeval ontoepistemology. We present the phenomenology of these logics, with regards to the geometries and topologies of space and time; of thought and language; of semiosis and its geological, cosmological and astronomical signs linked to the Myth of Eternal Return; of perception and cognition; of the common ontopoiesis of life and the inanimate realms, and of biological shape departing from embryological development and its unfolding as body-plans and their anatomy-physiology, and discuss its bearing in evolutionary theory, all which we present as embodiments of this non-dual ontoepistemology. We contrast this paradigm with: 1) the dualism of the theory of autopoiesis and the purported interior/exterior divide, as a general principle, which these logics subvert by self and mutual reentrances of the heterarchies; 2) the dual membrane of cell biology; 3) evolutionary theory associated to the metabolic versus genomic dualism; 4) the mereological fallacies of the neurosciences and the hypercontextuality of metaphors and anthropomorphisms; 5) the dualisms of Newtonian physics, Einstein's relativity and quantum mechanics which are found to be epistemic theories, and the assumption of non-contextualization in physics, chemistry and geology which we show not to be the case; 6) the psychophysics of visual, aural and musical spaces, 7) the anatomy-physiology of the sensorium and the healing reconstitution of integrity; 8) in the division of epistemology and ontology, of language and process, and the top-down and bottom-up systemic, and finally 9) the issue of design related to turning-inside-out of a sphere (the ovum), yet transcending creationism. We present their surmountal through the ontoepistemologies of the Klein and Hyper-Klein Bottles surfaces, of hyper-contextuality and complexity. We discuss teleological causation and design of processes/structures, in particular in paleogeology, physics, chemistry and biology, in terms of the latter ontoepistemologies and of the Golden Mean, generated by time waves and their guidance by the Fibonacci Algorithm. We apply this ontoepistemology to the interpretation of religious texts and discuss the relations with the evolution of science. We discuss the two-dimensionality of biology and the lifeworld, novelty and the time operators.

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1. Introduction

Philosophy has played a negligible role in the development of the sciences following the development of Mathematics by Descartes, Pascal, Leibniz and Newton in the spirit of metaphysical problems. Newton's lifetime activity was Alchemy, a lifeworld which attempted to reveal unity, a cosmical order, cyclic time its essence, which the so-called Age of Reason relinquished completely. This is where Philosophy and Science stand today, unity between them forsaken, unity internal to them, unattainable.The Cartesian Cut provided a formidable impetus –manifested, to some extent, as power to control Nature- for the sciences in terms of the positive world of objectivity. Aristotelian dualism, mathematically framed as the two-valued (true and false) logic by G. Boole, the Aristotelian-Boolean logic (ABL) turned to be the (largely unacknowledged) logic of discourse and structuration of the sciences, and their ontology (Rapoport 2011). Dialectical logic was considered by Hegel to be unrelated to mathematical logic,

establishing a disconnection of Philosophy and Science. The phenomenologies of Husserl and Heidegger, followed a dimmer fate.

Scientists ritualize and develop their investigations in the exclusive terms of dualism. Yet, a system of logic is a formalization of an ontology, which is further embodied (Rapoport 2011,2012, Günther). Thus, the ABL is already a formalization of an ontology, its embodiment are the broken sciences (and broken selves and societies), disconnected to Philosophy. The ABL, as an ontology implicitly subscribed by the sciences, has the particularity of holding Being as its sole locus, whilst Non-Being, Nothingness is cast into Being since the negation operation is purely reflective, and thus this operation creates no ontological independent locus.This reflexive operation introduced by the ABL's negation erases signification and thus semiosis, and the mechanical world thus purported, ceases to be comprehensible and altogether to have a meaning at all (Hoffmeyer). With reductionism for scientist's key instrument together with two-valued logic, further reduced to one single value by positivism raised to reduce the world to the Ratio of Objectivity, existence was equated to what can be measured.

For the ancient cultures, mensuration was related to time reckoning, central to their cosmogonies and their socioeconomical organization, embodied in the Myth of the Eternal Return (Santillana & von Dechend, Purcell). Thus, instead of the contemporary occupation of (even virtual) space as our vital contemporary mode, ancients societies self-organized in terms of the signification lived through cyclical temporal dynamics, framed from the knowledge of the positions of the stars and the planets, the precession of the equinoxes its most essential physical manifestation. Its importance was no less than providing the basis for semiosis. The symbol for semiosis was the Ouroboros (and the

Analemma), which we shall reencounter as the KleinBottle surface (KB), the embodiment of eternal return.

Marx made of the determination of the material realm by the ideative realm in his Capital Logic, the core of a second-order cybernetics, critically revised by (Johansen,1991); cyclical dynamics is encountered in economics, as well as in the history of culture (Sorokin, Pales). An imaginary action for the interrelation between Physics and Will was proposed by the founder of electromagnetic James C Maxwell, currently identified with the action of a Time operator, a logophysical cyclical operator implicit to the Myth of Eternal Return, that is crucial to self-determination, in particular in biology, chemistry (Rapoport 2011) and number theory (Johansen 2010). Thus, a cyclical non-circular KleinBottle logophysics was found to be crucial to cell biology, embryology, evolution and genomics, cybernetics and physics. This non-dual self-referential logophysics, which is the basis for the ontopoiesis of the inanimate and Life, surmounting the Cartesian Cut (CC), will be the subject of this article.

Also in the 19th century, psychophysics came to the fore with Fechner and von Helmholtz, yet it did not fit into the mechanical world. Following Planck's proposal of the quantum, appeared the Copenhagen Interpretation of Quantum Mechanics (CI), an epistemology in which an "observer'' was brought into the theory, through the res extensa of his measurements. Information (yet not in-formation, as morphogenesis) became the catchword of the sciences, extended later as a paradigm of Life through molecular biology. With the CI, a reduced form of subjectivity is claimed, with the subject as a reality-determining-object by reducing the potentia of infinite states to the one single manifested world, by knowledge acquired (as bits, that the observer contains, presumably in the brain,

and somewhat mysteriously projects onto the phenomenae) through measurement, becoming thus a partner to the world by the expediency of the reduction of wholeness. Thus reality, with the real numbers for its mensurable expression (although imaginary numbers, i. e. related to the square root of minus 1, provided the representation for the physical phenolmenae) was linked to epistemological action, yet conceived as having no ontological locus (but the implicit dualism), another form of Cartesianism. The physicists' models for this are multiple, yet subjectivity is ontologically absent in most theorizations: The observer is embodied by a measuring device, which may still divide the world into an infinity of worlds, all uncognizable but the one in which we actually measure, so that self-referentially the world amounts to what is measured because it is we who measure it. Thus, the worlds of Otherness are the loci for the unmanifested Potential to dwelve as an unacknowledged tenant, whereas the world we actually live is the fusion of the observer with the Apeironic Potential, producing a self-referential quantum space-time structure (that we shall encounter in this work) driving the phenomenae to manifest singularly (Rapoport, 2007). In the former rendering we are estranged to the source; in the latter we are unseparable to the source; this lifeworld is far from trivial.

It was Cybernetics, the newborn science created by the cooperation of scientists of a transdisciplinarian persuasion, with its aim of developing a theory of systems, in particular biological, and ultimately in developing engineering systems with life-like properties, that had to face the problem of mimicking life and subjectivity, by investigating their origins and essential operations. Indeed, it appeared as the promise of an epitome of metaphysics and pragmatics, but not without a paradoxical vengeance, which we are today suffering as an increased alienation to the cycles of Nature, trading instead to virtuality

and the notion of a "technological singularity''. Its credo is: "in technology we trust'' (Kurzweil). Yet, as in the Myth of Eternal Return (MER) in which the world is formed and brought to manifestation by cyclical time, the world through Will returns to itself in self-recognition and self-determination through and by wholeness. Indeed,the fracturization of Science into sciences, with a recurrent reduction to a never ending increase in specialization, and a sense of alienation that can not be concealed by the triumphalism by which scientists have come to forcefully offer their image of the world, is the current mode of the sciences, for which reality reduces to measurement and manipulation, and its paramount virtual operation is computation. It is signed by the ABL, and a linear-time-parameter progress that the world may intend to undo, by turning into integration, by and through self-reference, whose modes of manifestation stems from a topological phenomenology, in which a Time-operator, whose action and topology is non-linear, is embodied in the KleinBottle surface (KB); see Figure nos. 3 to 6 below. The KB is a 2-dimensional surface, a topo-logic (locus as logic and logic as locus, or still, logic and locus, undissociably) of self-reference; its phenomenology and its associated multistate (and multivalued) logic is the Klein Bottle Logic (KBL); see Figure no. 7 below. This topo-logic plays a crucial role in the MER (Rapoport 2012), as well as its self-referential predecessor, the Moebius Band (MB); see Figure no. 1 below. The KB is a surface not contained in space, but self-contained (see Figure nos. 3 & 4), and thus cannot be framed in the Cartesian mode of Being, defined by the formula: object-in-space-before-subject. While the KB is in-formationally complete, this completeness is not open nor closed, and has no global Inside nor global Outside, which are only local and dynamically intertransformable. It is generated by a primeval distinction on the Plenum (Rapoport

2011a) that acts as a boundary that does not separate Inside from Outside, but integrates them by embodying paradox, through self-reentrance, i.e. a principle more general than the Principle of Non-Contradiction, the backbone of the ABL. As we shall elaborate below, Being is unseparable of the KBL as an ontological locus of an integrated ontological system in which subjectivity is fused with Being, thought as an image and thought as a process, together with Time, constituting the four ontological loci that are embodied by the KB, and thus identifiable with its logic. Through this phenomenology, the Cartesian Cut (CC) was surmounted, and mathematical-physics, cybernetics, biology, anatomy-physiology, logic, perception, cognition, semiosis and the MER, found an integrating principle (Rapoport 2011,2012). The relations between the KB and ancient cosmogonies were elaborated in (Purcell).

A prevailing myth of our times, yet unrelated to the Cosmos for its foundation, is the current paradigm embodied in the fractured sciences; their mythical character being the claim of their finality and completeness of its ontology and epistemology. “Science does not rest upon solid bedrock. The bold structure of its theories rises, as it were, above a swamp’’ (Popper). Lacking a foundational ontoepistemological principle, the current sciences are, at best, based on bold intuitions that may reflect shreds of this missing principle. This claimed finality of the myth cannot be disssociated from the dualistic ABL (Günther). The fractured sciences speak about manifestations of things and processes *contained in* space (time as the container for change). These are the notions of Cartesian space and object resumed in the formula object-in-space-before-subject (Rosen). Thus, the self-contained KB does not fit into this myth. Furthermore, Gotthard Günther argued that neither subjectivity and Life belong to this myth, since the current paradigm of the

fractured sciences has for essential ontological locus only Being, into which subjectivity is cast as an object, and thus denied a locus for itself, but the one provided by the physical inanimate reality (Günther). He further related the objectification of subjectivity with the dual ABL which is the core of the myth underlying the fractured sciences.Thus, Life with its willful character of self-determination, can not pertain to this myth, since Life is not a thing (neither that thing, the genetic code, can be its structural source): Life neither is contained in Space nor in Time. Thus, Time, and Thought, continue to be outcasts of Being and its spatial manifestation, which is all that the current paradigm of the fractured sciences allow to exist. As it turns out to be the case, biological systems are self-created distinctions, which do not occupy space but actually are autopoietic, i.e. they create themselves as spatial manifestations of the KBL and a Time operator, as a morphogenetic materializing logophysical operator (Rapoport 2011). Since a logic is the formalization of an ontology, biological systems appear to be ontopoietic, as we shall elaborate below. Thus, biological systems do not conform to the myth of the sciences, if not in the dualistic stance in which is formulated by keeping Life and Consciousness as the Mysteries, glossed upon as epi-phenomenic emergentisms. Indeed, for the Cartesian formula object-in-space-before-subject, the subject being another such object, the observer, is reduced to the rods and clocks that made the core of Einstein's argumentations for objectivity in terms of ''relativism''. Further, the observer is contained in a mechanical universe, in contrast with a time-structured and self-determined world of the ancients (Santillana & von Dechend). For Einstein, time is more space, in which the contained observer through formulas of invariance, assess this presumed-to-be-objective character of the observations of objects and processes contained in spacetime, and his own account of them, to establish their inde-

pendence, relative to himself and to other observers which intercommune through the rule of invariance, yet all as detached beings, despite the "relativity" of their cognition. This is a theory of space-time based upon the notion of an unstructured observer relative to which spatial-temporal relations are established; yet both space and time are still containers of this passive observer, who does not participate in the making of the world although the status of his cognition of it are the issue of the theory: this observer uses the rule of invariance to establish objectivity by surmounting the "relativity" of his cognition. Yet, as remarked by Bateson, any experience is ultimately subjective (Bateson), to which we may add, that the fusion of objectivity and subjectivity is the case of any experience, in the degree that it is embodied in the subject, and further mediated by light, that has this self-referential character of fusion of objectivity and subjectivity. This rule of invariance, that allows for establishing the criteria for objectivity are in Special Relativity (SR), the Lorentz group transformations, and in the case of General Relativity (GR), the group of invertible coordinate transformations that charter the world as if real, as in Descartes' analytical geometry. This chartering of the material world reduces to a four-dimensional Cartesian world, in which the origin is the unacknowledged singularity, the mensurating self. The rules of SR preserve globally (requiring thus no charts) the equation between space and time, the light-cone. The rules of GR preserve the light-cone, but only locally due to the presence of curvature as the signature of masses, so that they do require chartering to emplace the single common theater, for objectivity to be realized.

Since the photon is self-referential, it is not seen, it is seeing, the perceptual process, and thus a manifestation of fused objectivity-subjectivity (Rosen, Rapoport 2011, 2012, Young), Einstein's purport of vanishing subjectivity from physics, is maintained by denying

self-reference as an essential ontological and geometrical locus. Yet, this rule of invariance for establishing objectivy, can be construed as the rule that observers interrelated by their common identification of light's singularities, i.e. of the quantum action of the photon, as the most essential physical manifestation of a locus geometry (noted by dialectical materialist physicist V Fock), i.e. embodiments of subjectivity-fused-with-objectivity (Fock). These are the loci for the singularities of light electromagnetic waves, surmounting the wave-particle dualism (Rapoport 2009,2010,2012). This generation of a locus by light's singularity, the quantum non-pointlike photon, and thus the generation of a geometry, is the fundamental operation for the self-referential construction of space as discrete extended inhomogeneities (see figure 9 and Appendix). Inhomogeneities rupture the abstract continuity of sameness, the latter being convalidated by the mensuration of distances as in Einstein's theories, which were meant to omit singularities as a rejection of the aether that breaks the continuity, the untameable unbounded Apeiron, later somewhat mutated to the physical vacuum of quantum field theory, which is not empty but the Source for the physical world. In the topological phenomenology, Apeiron has the KB topology (Rosen). This inhomogeneity is the seeing subject, constituting a space through light's singularities, the photon, distinctions that create distinctions, as in Bateson. This operation is not anthropomorphic, since cells come to be in the same guise. Indeed, we have identified these geometries of physics, as those of biological structures (Rapoport 2011b,c), of thought (Rapoport 2011a), manifesting as vortical processes associated to torsion, i.e. shearing folding, crucial to biological and chemical shapes, and to a unification of physics (Rapoport 2005, 2007, 2009, 2010, and references therein). Thus, the self-referential basis for the central operation of Einstein's theories of relativity for establishing an operational epis-

temology for claiming objectivity is unacknowledged. Because these theories deny an ontological locus for subjectivity, and hence for its fusion with objectivity, they establish an epistemology (an thus Einstein's claim of deliverance of a theory for the objectivity of the physical world is found wanting) for detached observers based on light -yet unawaringly of its fusion of object with subject-, to determine objectively the physical operations, in which observers and light singularities are identified. Yet, this is a rather trivializing identification that has avoided recognition, since it obliterates self-reference and thus fails to acknowledge the fusion of objectivity and subjectivity (Rapoport 2011). Instead of light and its singularities being the basis for the res extensa for objectivity, Einstein in extending his theory of Special Relativity to General Relativity, due to the failure of establishing a theory of the physical world in terms of light (which is massless and then does not curve space-time), he proposed massive objects whose geometrical signature is the curving of the space which contains them, instead of space-time being self-referentially generated by torsion folding which requires, in principle, no such curvature. Thus, this central un-acknowledged operation of Fock's -further persued by Rapoport- reinstatement of Einstein's theory, which establishes an epistemological invariance based on the fusion-of-objectivity-and-subjectivity of light's quantum nature, and thus departs from the discreteness of space and time rather than its continuity assumed by Einstein through an observer which does not break space-time due to the disembodied generation of it being the premise of General Relativity. The latter assumption operates alike the CI of quantum mechanics, in calling in the observer to assess the world, an epistemic call. While the self-referential locus and the torsion geometry associated to it is based on quantum action, Einstein contested this epistemic character of the CI, during his lifetime, with his dictum

that God does not play dice. In other words, in Einstein's claim for objectivity, as embodied in a geometrical non-random world of his theories of relativity vis-à-vis the randomness of Quantum Mechanics and the CI, he failed to grasp (as well as the epistemologists and physicists, that have tried to make sense of his obscure discussions with Bohr) that both the CI and his theory of relativity were epistemic Cartesian stances. In (Rapoport, 2005) it was established that this rejected randomness is none other than the motions of Apeiron constituting self-referentially along the light-cone a torsioned space-time, a clinamen, through Brownian motions. These are random motions that their discoverer, biologist Robert Brown, claimed to be the motions of Life for their apparent willfulness. Einstein, the physicist to first theorize on Brownian motions to later neglect their essential role in Quantum Mechanics, also neglected from the very outset of his conception the torsion geometry produced by light particles as primeval inhomogeneities, generating vortical structures and folding motions, rather than the objectifying curvature. Though, torsion was unbeknownst to him at that time, the 1910-20s, and until the 1930s, when he started to collaborate with Elie Cartan, the mathematician that introduced the torsion geometries (Goenner). Yet, their approach failed since they could not identify the relation of torsion with physics altogether, nor with the quantum action, as the basis of the self-referential light torsion geometries (Rapoport 2010). Hence, it is that by the choice of a distance for the basis for an ontology for space-time, that Einstein obliterated the self-referential character of light and the quantum as the basis for his space-time geometry, and was further unable to perceive its essential role in Quantum Mechanics. Hence, till this day, the unification of General Relativity and Quantum Mechanics has failed. His followers,

and physicists of all persuasions, have overlooked the common self-referential origin of these two theories, which most physicists claim to be the core of Physics.

To resume, while post-18 th century philosophy played a negligible role in the development of Science, dualism in its manifold manifestations, and the omission of self-reference were and continue to be the crucial underwritten, and remarkably unacknowledged philosophical premises for the broken sciences. Thus subjectivity has been cast out of Science, and Life deferred to a Mystery, both as emergentisms.

2. Logic as a Formalization and Embodiment of Ontology: Language, Signification and Subjectivity, the Aristotelian and Klein Bottle Logics, and the Time Operator

In Aristotelian thought, from which stemmed the Western scientific tradition, we have as its core a dualist conception, the ABL and the Principle of Non-Contradiction. Dualism is expressed in the exhaustive division in the characterization of the universe with two values. One value is about designation, and thus, it encompasses all what the universe is and what can be said of it (Günther). The other value is non-designative, and due to the completitude of the designative value, this non-designative value points to no ontological object or phenomenon. This eliminates subjectivity from the universe, since subjectivity is incorporated into the subject qua object and the discourse of it falls into the designative value, ''there is''. Indeed, the subject qua subject is left outside of the realm of discourse exhausted by the affirmative value; the res cogitans could not be established in the all-that-there-is, the res extensa.

Therefore, the division between living and non-living, in the framework of dualism is rather contradictory, since whatever the ontological locus of this division may stand for, paradoxically this division exhausts the ontological discourse, while dualism excludes the

subjective element that living beings alledgedly possess to their ontological constitution and makes them a separate and complementary category of the non-living. In other words, this division already produces the violation of the principle of non-contradiction, and thus the ABL cannot be the ontology, in terms of which this dualism can be designated, if not by erasing non-duality. This subjective element which is associated to Will, is thus inherent to both animate and inanimate realms, or is inexistent to both, and the ontoepistemology for incorporating subjectivity and Life is a non-dual logic.

Greek thinkers interrogated on the nature of time as belonging to the objective designative value or to the non-designative subjective one. The response of the Eleatic school, whose most prominent figure was Parmenides, was that time does not exist, the universe is static and the subject is part of the universe. Heraclitus response was the non self-identity of beings in sequential time, or formalized in the laws of thought, A is not A at different *sequential* times.Thus, although the Principle of Non Contradiction is violated, it occurs in a certain ordering of time, which is linear and exterior to being. This time of Heraclitus, recovered by Newton's absolute time, is not the non-linear time order of the language which designates this flow. Indeed, while the appearance of descriptions is linear, the concatenation of language, due to its self-referential action, is non-linear. Hence, the perceived sequential time described by the ABL of designation, alike to our observation concerning the ABL's inconsistence concerning its designation of Life, is belied by the self-referential action of both the thought and language that describe it, showing the failure of the Principle of Non-Contradiction to describe its own generation and its association with becoming. Thus, the process of signification through language, the in-formation conveyed and produced by it, the subjective time unfolding this signification and the

thought process that generates it, all of them have an interwoven lifeworld, which has no interior nor exterior, but the one informed by their recurrent non-linear self-directed and mutual action, in which the Principle of Non-Contradiction is but a projection of this semio-ontological system of synergetic self-penetrations, and also penetrations on the others. Hence, the XXth century (meta) mathematical rendering of analytical philosophy in terms of set theory (culminating with Russell and Whitehead, further rendered obsolete by Spencer-Brown in his Laws of Form), in which the relation of being an element of a set is the cornerstone of analytical philosophy' claim to be rooted on science (surely dualistic, as the relation of belonging is), cannot embody these phenomenology; and thus much of contemporary mathematics is estranged of the lifeworld. We can represent the ontoepistemology of this system of articulated non-linear superposed self-operations, as the embodiment of the Hyper Klein Bottle surface (HKB); see Figure no. 8 below. Thus, time, thought, in-formation, signification are all embodiments of layers over layers of both continuous and discontinuous self-referential torsion folding and unfolding, mutual and self-penetrations of a semiological field, through which the material world is in-formed, as is the case of organisms and of space (Rapoport 2011b,c), and of geological landscapes, as we shall discuss below . In particular, the time which sustains designation is structured. The present ontoepistemology differs from the notion that the objectivism of science is born from the externalism of language, in that it displays the world and signifies it (Matsuno & Salther); as already shown, signification is not the case of the ABL, but of the KBL. The critique of externalism by these authors, implicitly considers language to be an epistemic instrument, instead of a morpho-logical semiological field, and thus disregards the fact that language and thought unfold simultaneously and unseparably, revealing the

topology of time and of the fusion of language and thought, and of the fused extension and intention of the self, for manifesting as if external res extensa. Thus, the construction of an "internalist'' perspective, in which the observer/speaker is placed inside the system, and can not see it as if from outside (Matsuno & Salther), as is also the case of the theory of autopoiesis (Varela), is based on the tenses of language which accompanies the linear sequentiation of Heraclitus and Newton's time. Yet, this tensional division of language, does not suffice, per se, to evidence the self-penetration of language and time, as a KB (in which outside and inside are fused by time, as in Figure no. 7), nor to evidence this logic of signification. The non-linear re-entrance of language has for ultimate expression, the non-linear gestalt of music and its perception.

It can not be more abysmal the contrast of the lifeworld just presented, with the dualistic paradigm in which being occurs in space and becoming occurs in time, so that time and space are passive containers, as in the Cartesian mode. The latter operates as if the topology and its being, of language and thought, would be exterior to the world they designate, so that signification is reduced to the usage of language to either claim or deny objectivity as expressed in the designative value of the ABL; further, time and space are homogeneous and devoided of self-referentiality. Newton and Einstein maintained this exterior character of Time, universal for the former, related to space and in fact another dimension of it, for the latter by erasing self-reference, as we already argued, while keeping the Principle of Non-Contradiction of Being (while Newton's alchemical conceptions belied this principle), and the Cartesian formula of object-in-space-before-subject, where the subject is itself a static object, with respect to whom beings manifest themselves.

It is in Hegel's system that a new approach is found in which Time is related to the laws of thought (Hegel). This laws are of internal necessity, a logophysical coherence, so while they correspond to the designative value, now they point to the internal world of the subject. In Hegel's dialectics we have a fusion of the designative value of objects and the non-designative value of subjectivity. Günther's analysis of the Hegelian stance is that the elimination of Time is related to the isomorphic character of the two-valued logic based on the Principle of Non-Contradiction, or Tertium-non-datur (no third value); the excluded third value is: Something can be and not be, or still, true and false are the only two admitted logical/ cognitive values. This isomorphic character divides all objects which are the realm of the designative value into two classes: 1) Ortho-objects which can be concei-ved separately from any other object (ideally speaking; this separation is established in terms of the hidden assumption of the validity of the Principle of Non-Contradiction) and 2) pseudo-objects which can be only be conceived with reference to other objects, their duals –yet not conceived as polars- (e.g., right-left, night-day, etc., which is also dependent for its definition in the assumption of two-valued logic where no merger of dualities can be the case, in opposition to Hegelian dialectics). We return to remark that the usual take of living systems as a distinctive category defined by dualism, identifies them as pseudo-objects Thus, the Zeno Paradox appears as a consequence of the impossible effort of reconciliating the phenomena of change and motion with the static phenomenology of Being. In the Aristotelian tradition, Being is the class of all ortho-objects and thus designated by the single (designative) value, while Time alike Life in the dualistic conception, is a pseudo-object designated by three states (past, present and future), and thus the claimed isomorphism is non-existent (an isomorphism requires a one-to-one

assignation). Thus in the Aristotelian tradition it is hard to find an ontological place for Time, if there is any at all, and as discussed already, this is also the case for Life. This might be at the root of the trivialization of Time that has been incorporated into the sciences and human affairs at large with non-trivial and tragic consequences (Raju).

Instead, we choose to abandon the association of the notion of value in logic as fundamental, to replace it by the notion of ontological locus with the elimination of Tertium-non-datur, we introduce the following ontological loci: 1) Being; 2) Its reflection on thought as an image (which requires the existence of light to form the image in terms of distinctions of light intensity, or more primitively, the existence of a boundary to establish images in terms of topology, which also requires light, for establishing the boundary as a frontier between the inside of the object reflected, and the outside); 3) Time. Thus 1), 2) and 3) form the Ego complex. We can extend this to include 4) Thought as a process, which in the Aristotelian tradition is confused with thought as an image, and thus with the introduction of this fourth ontological locus we have internalized time as the difference that makes a difference in the sense of Bateson; and finally the ontological locus 5) which operates as the detachment from the locus 4, implying also locus 2). Operationally speaking, locus 5) is an iteration or repetition of 1) to 4), so no infinite regression is possible. So a 4-loci logic is sufficient to describe Time, Being, and the Subject as the bearer of reflection of Being in thought, and thought as a process.

There are two ways for representing this 4-loci logic, either directly through the KB as depicted in Figure no. 7, or through a matrix representation, as in Stern's Matrix Logic, which follows easily from the former (Rapoport 2011a). In the latter, logical operators are two by two matrices, operating in the two-dimensional plane identifiable with the complex

plane. Those operators that verify that their two-fold self-multiplication is the identically zero matrix, can be realized in terms of light rays in spacetime, unifying thus the physical and logical realms. Thus, light, as described by the null-light-cone equation, is seeing and thinking, and the converse is also true (Rapoport 2009, 2012). The unification is produced by extending the denotational world of discourse manifested as the system of real numbers, the ideal bearers of res extensa, to include the imaginary numbers as a second locus (which as a unified complex plane, has the topology of the KB), the action of Time transforming the real into imaginary axis, thus unfolding to a logic of thought as a process. Two essential features of this system of loci are further evidenced. On the one hand, the non-duality of True and False operators of Matrix Logic in which the negation operator does not intertransform them; in contrast, in the ABL, in which True and False are not operators but a two-valued system, 0 and 1, which are intertransformable through negation. Now, True and False are no longer in specular reflexive relation; there is a folding in the cognitive plane, which is embodied in the twist of the Moebius Band and the KleinBottle (Rapoport 2011a). This torsion defines a cognitive operator, M, given by the difference of True and False, i.e, M = True – False, which is not equal to the null operator. Yet, its two-fold self-multiplication is null and thus it can be decomposed as light rays.

Therefore, the torsion produced by the lack of specular (under negation) symmetry between True and False, defines a non-null cognitive operator, M, in Matrix Logic, which further allows to transform cognitive statements to physical quantum mechanical statements, thus unifying cognition in the logical and physical realms. Furthermore, logical connectives are both operators and operands, such as thoughts are, and thus self-referential action (as is the case of light) is essential to Matrix Logic. This logic is unseparable

from a topo-logic, namely the KBL (Rapoport 2011a,b,c), as in Figure no. 7. A most important fact is that in Matrix Logic, the ABL is the projection under the action of the KB represented as a matrix, on the superposed topological states true and false, nor true nor false, as in Nagarjuna's logic (Nagarjuna), to the Boolean states true and false, from which the latter can be recovered by further action of the KB.

Therefore, dualism is incorporated in this non-dual logic, yet produced by the KB as an operator which actually generates it: It is not an independent ontology (Rapoport 2011a). For the KBL shown in Figure no.7 below, this reduction to dualism, appears as the reduction of the four loci to the Outside-Outside and Inside-Inside states ,thus eliminating the intermediary Outside-Inside and Inside-Outside states that realize the integrity of the KB. By further identifying the Outside-Outside and Inside-Inside states (violating thus ABL, for which are absolutely separate), the double-helix model of the genome is generated (Rapoport 2011c) also the generation of space is related to this model and bistable perception.

Now, M = Time + Spin, the Time and Spin logophysical operators, respectively (Rapoport 2011a); the former computes the difference between logical states, and thus a (logical) distinction that generates distinctions, in the sense of Bateson, and geometrically operates rotating the real numbers axis to the imaginary numbers axis. Hence, Time connects the representation for res extensa with that of res cogitans. Spin produces a rotation normal to the complex plane, and thus together they form a primeval logophysical vortex operator (identically to the torsion of spacetime), produced by the non-duality between True and False. This operator was somewhat intuited by Hegel in his dialectics, incorporated to the geometry of the helix. Time is further associated to self-determination

and self-control, and thus to Will (Rapoport, 2012). Yet, in strong contrast with the open-ended evolution of Hegel, and of Teilhard de Chardin to reach for Ω, we have a self-referential Eternal Return, embodied in the algebraic operation of recurrence, as the two-fold self-multiplication of M coinciding with the zero operator (all elements of its matrix equal to 0), and thus the cognition operator has the same self-referential character of the light-cone. Rather than the zero operator being the Nil (Kauffman, Rowlands), it is the Plenum, the source for all distinctions, even of the illusion of their pretended reduction to nilness.

3. Visual and Aural Space, Perception, The Klein Bottle, Time Waves, Golden Mean Teleology, and the Phenomenological Philosophy of Space and Time

Physicists and philosophers have studied visual perception and the geometry of visual space (Heelan, Luneburg). The latter was a central issue to the Renaissance (Leonardo and Dürer its pioneers), which through projective geometry abandoned a trivial plane in which a fusion of object with subject operated, aiming to represent three dimensions on the plane. The identification on this plane, of object with subject, was the signature of the Middle Ages, evidenced in the lack of depth (Foucault). Thus, the Renaissance introduced depth accompanied by a detachment of the subject to observe the world as an outsider, setting the stage and the scenery for Descartes. Lüneburg discovered that hyperbolic metrics (as in Einstein's Relativity) for which parallels converge, may describe the geometry of distant-object-vision instead of the near-vision Euclidean geometry, and that a psychometric function dependent on the observer is crucial to visual perception. Thus, a plural visual representation geometry (there is a third zone with a distinct geometry) was propo-sed. Thus the Principle of Non-Contradiction, the backbone of the ABL, is no longer

valid for visual perception, which requires an interpretative contextualization by the subject, who enacts space (although not as in Varela's dualistic theory of cognition, as discussed in (Rapoport 2012)), rather than the detached Renaissance lifeworld and its posterior Cartesian formula of object-in-space-before-subject. This ambiguity which the ABL can not account for, is more notable in auditory space (Varèse). Yet the sensory modes have a topographic map representation in the body whose topology is the KB (Werner, Rapoport 2012, Swindale) and thus its ontology is the KBL. Amazingly, seeing our seeing is possible, and thus we "objectify'' our self-referential being. Indeed, thousands of photographs of natural sceneries have been digitalized and processed mathematically to identify the topologies that may underlie this extreme richness. To the surprise of the researchers, the KB appeared, uniquely, up to a resolution for the observer's determination, zooming out and inwards, itself the ultimate enaction of this process, for the effect of scaling the in-formation to manifestation (Ghrist, Carlson).

The lifeword of the auditory mode appears to be related to depth (Varèse), the primeval dimension as in Merleau-Ponty, which is the dimension by which the KB is embodied. Visual space is unseparable from our lifeworld, no less than being the space in which we practice our measurements, and further enact our lifeworlds. Yet, phenomenae which we attribute to space-time as the container of the physical realm, say time dilation and space contraction, as in Special Relativity, have a correlated perceptual phenomenology taking place in the visual space of our lifeword, in which subjective time has a fractal geometry, argued in terms of an "inner-representation'' in (Vrobel) related to the ontology of language as being pure externality, which instead we associate to the hypercontextualization of the HKB, to be introduced below.[1]

Therefore, there is no “pure objective” cognition of an object (nor of a process); furthermore, the ABL does not sustain the ontology of visual (nor the auditory) perception due to the plurality of geometrical *superposed* representations in visual space: Indeed, visual perception and cognition depend on contextual interpretations by the subject, which we note that they are already incorporated in the KB. Furthermore, they depend on cultural and theoretical constructs, to some extent (Berlin & Kay), so that rather than the KB, a HKB is the case as the latter integrates the body with the Socius, as we shall discuss below. Thus, the classical Cartesian formula as expressed by object-in-space-before-subject is invalid, and furthermore perception is not secondary to cognition: the subject is a full-body participant in the construction of his visual (and aural, as we shall see) model.

Rosen ellaborated his KB phenomenology departing from the works of Merleau-Ponty and Heidegger, presenting a theory of space and time which is ultimately related to the process of individuation of the subject (Rosen). In Merleau-Ponty we find a critique of the classical formula object-before-subject-in-space, by which all points are exterior one to the other.The lifeworld is characterized instead by the transpermeation of objects, by their mutual interpenetration, inexistent in Einstein’s theory if not by light (which as we already said is not an object), by the reciprocal insertion and intertwining of one in the other (Merleau- Ponty, p.138,1968). The key point is that if objects are related by mutual containment, no separate container is required to mediate their relations, as would have been to be the case with externally related objects. They do not interpenetrate and the interactions are through forces, which in Einstein’s General Relativity forces are substituted by the curvature of the geometry, which was introduced to the effect of keeping the Cartesian formula object-in-space-before-subject, but now on the curved signature of

objectivity. Rosen conceives the world as a living object in which reality is a joint construction of the dialectical relation of object with subject; in the lifeworld space and time are not mere containers but the essential core of this relation. It is important to mention that to Merleau-Ponty, the Cartesian formula is one of the absolute positivity of space: it is the absolute explicit openness instead of the Ouroborical dynamical self-reentrance, the sheer positive extension that constitutes the field of strictly external relations wherein unambiguous measurements can be made, to which Einstein provided the rules for establishing this positive character, which he called an objective theory of realism, obliterating self-reference, as already argued.

In Merleau-Ponty, depth is the primordial dimension, a protodimension from which all Cartesian dimensions appear which are furthermore idealizations of it. Depth is a self-containing dimension, not merely a container for objects separated from it, and this is embodied in the KB of Figure no. 7. This bestows on the object and the subject properties common to both, as a fusion which constitutes them solidariously, alike the case of the self-action of language and its conveyor, as discussed already. Thus, being the case that the subject qua object is extended, it necessarily shares this property with objects, which can only be pointlike if we attribute to points not the idealized structure we usually prescribe to them (a prevailing take in mathematics and physics), but an extended structure, lest we should need to abandon altogether the concept of a pointlike structure, which is the unextended projection of the res cogitans of the subject, and thus a purely idealized structure. Actually, it is a contrivance witnessed by experimental physicists in the bubble chambers of particle accelerators as is the case of the neutrino which appears with a distinctive Möbius Band form (JPARC). The torsion self-referential geometry, based

on the extended (i.e. non-pointlike) quantum photon, produces the fusion. With respect to time, in Heidegger we find the notion of time-space or “true time’’. For Heidegger, time is not pointlike but rather extended nonlinearly, as a relation between past (which denied to us by the linear-time-present is felt as memory), present (which in physiology is quantized as an interval of 50 ms, and thus in the lifeworld time cannot be purely continuous but structured as in biological systems as we shall discuss below) and future which it is withhold from us, yet is active as in Libet’s experiments (Libet). Time extends nonlinearly and the three states of time are interwoven. Furthermore, for Heidegger, time is the protodimension and thus identified with the Merleau-Ponty dimension of depth; it is the source for space. The nonlinear form of time is to Heidegger, the precondition for space, and this was found to be the case for embryological development, of the periodic table of Mendeleev, and the appearance of space from the depth produced by two intertwined KBs, that also generate the double helix of the standard model of genomics (Rapoport 2011b,c). Mathematician-polymath Charles Musès claimed the existence of chronotopologies,through time acting as an operator (Musès) while Heidegger’s operator-time-space appears to be the universal case, blending with Musès chronotopology through the KB, the topology of the Myth of Eternal Return, thought, cognition, as well as of the human organism as an unseparable lifeworld (Rapoport, 2011b,c, 2012). It is the topology of the photon particle (Rapoport 2009) and of the neutrino (JParc).

Returning to the transpermeation of objects in space, which the Cartesian notion of space fails to address, is essentially the case of the perception of music. As much as there is a visual space with KB twists, there is an aural space of musical tones, which is nonlinear, as is the generic case of language, as previously argued. The listener, and more

concretely of music, is an interpreter alike the subject in visual space, yet one which fuses with the music and his own interpretation, so it is the domain of the HKB. In contrast with visual space which is "out there'', the omni-directional nature of the auditory field places the listener still more firmly in space: auditory space is all around – and even inside - the listener (depth is thus crucial to language), and the body is much more a participant in space. The vagueness of visual space is qualitatively enhanced in the aural lifeworld; we turn our bodies to sounds, attempting to identify and contextualize them; our bodies can even convulse. If visions invite our examination and thus to support the notion of detachments, sounds may be lived with the urgency and amazement of the domain of Otherness, yet not quite alien as the experience of music shows; as the ancient Greeks assisting to the tragedies, the chorus and the music, pregnant women could be induced to delivery. Thus, whereas visual space can give us the illusion of detachment, for reasons not to be examined here, aural space is a lifeworld of embodiment that cannot be denied. This non-linear structure of aural space was empirically verified by psychologist Roger Shepard (Shepard), which he further associated with the double helix, as in the standard model of DNA, and became a point of departure in studies in experimental psychology and music. The double helix of the genetic code is ultimately associated to a more fundamental KBL generation of the genetic code (Rapoport 2011c), rather than a double helix and more akin to the single helix of aural space proposed early in 1855 by M. Drobitsch. It is currently accepted that pitch perception, the subjective time-frequency sound perception by which a listener assigns musical tones to relative positions on a musical scale based primarily on the frequency of the vibration, requires an aural space which has been

torsioned, by introducing a twist of 180º (Merrick), as is the case of the identification of opposite sides with opposite directions of a rectangle to produce the Moebius Band.

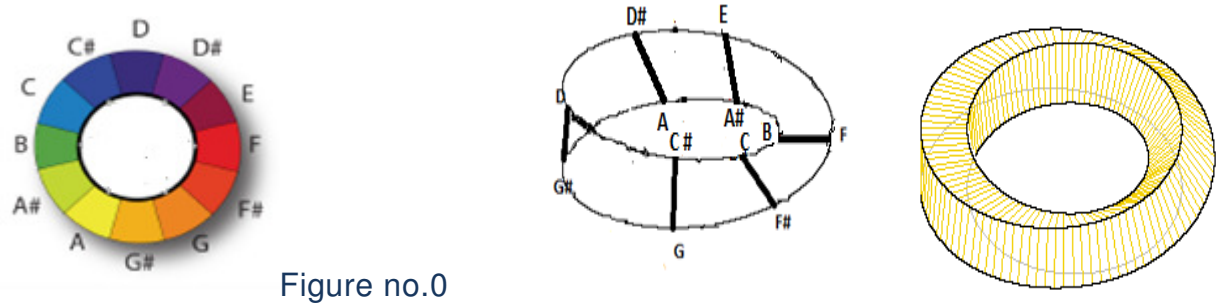


Figure no.0

We consider Figure no. 0: In the lhs we represent the octave placed on a circle with its 12 pitches, in which the centre has been eliminated, with antipodal (opposite) points identified along the imaginary centre as in (Shepard, Deutsch); it has been removed since otherwise all pitches would perceptually be a single pitch and colour. The lhs is the disk-type real projective plane, represented as disk without a centre. The colours represent the synesthesic nature of perception in which the pitches are each associated with a colour according to the frequency (Merrick), which are further related to the chromatic changes of Earth's vegetation, a seasonal phase shift in organic chemistry along the circumsolar yearly rotation thought as an octave; this harmonics is the basis for climatology and crustal formation and dynamics. In the centre we depict without the colours the octave on the single edge of a Moebius Band (MB) in Figure no.3 below, with the opposite points joined by lines representing the tritone (half octave) perceptual identification of the lhs figure of a circular octave. This represents the fundamental 2:1 resonance: A complete rotation on the lhs circular pitch space of an octave perceptually translates into two complete rotations in the MB, say D-D#-E-F-F#-G-G# followed by G#-A-A#-B-C-C#-D, completing the single edge of the MB which is not the perceptual pitch space - which we map in the rhs, on a torus. The perceptual space turns to be the Klein Bottle (KB) surface, on identifying the

antipodal points –depicted by lines on joining the antipodal pitches on the edge of the MB- as perceptual identities; the KB thus arises as the identification of the equally oriented sides of Figure no.3 B, since already the identification of opposite orientations of the other two sides in Figure 3B produce the MB. These lines represent the perceptual identification of the tritone (half-octave). Therefore, perceptual space -according to the Tritone Paradox- is a Klein Bottle surface, which has not been acknowledged before. Therefore, the 2:1 resonance inherent to the MB in which a complete 360º circular turn on the tonal-chromatic representation of the left hand side figure, is translated into two complete turns in the MB and KB surfaces, a 720º rotation which is the basis for Relativistic Quantum Mechanics in terms of spinor fields and the double covering group of the Lorentz symmetry group basic to physics. The 4π rotation is pervasive to vortical structures in Nature, as an eternal re-entrance, embodied by the Myth of Eternal Return. In particular it shows up in the neutron's precession around its axis when acted upon by magnetic fields (Fischer *et al*). The 2:1 resonance with its musical halving of the octave's frequency range, is fundamental to astronomical temporal cycles and to geological time. In the Solar system, it produces the crustal configurations of Earth: it is the phenomenological core of the precession of the equinoxes and the Analemma, the MB-KB produced by the circumsolar yearly revolution of Earth around the Sun –see Figure no.1C below-, with the appearance of the signature of the Sun projected on Earth generating the diverse alphabets, the Platonic solids, the hypercube, etc. (Purcell). On the right hand side figure we show the embedding of the MB in a torus (which we have flattened for the purpose of visibility),by drawing the 2:1 resonance; the torus is wrongly conceived to be the topology of Self-reference (Young) and of bilateral symmetry bodyplans (Jockush, Gordon), say of humans.

. To resume the gist of the phenomenon: 1) “Subjects interpret circularity’’, i.e. the re-entrance of pitch space on itself, “in the frequency doubling at the octaves’’ this is the fundamental 2:1 resonance -which we shall further relate with the pattern formation of Earth’s crust and the Myth of Eternal Return, and 2) “Subjects interpret tones in an interval having a tendency or tension to move up or down on whether it is less than or greater than a half octave or tritone’’ (Merrick, page 39 and 40). This is the so-called Tritone Paradox (Shepard, Deutsch), “which indicates that we perceive pitch intervals as ascending when in an interval between 0° and 180°, and descending when in an interval between 180° and 360°’’, the 180° being the torsion twist that produces the Moebius Band, as in the Figure above. This is the case for the perception of two pitches presented either sequentially or simultaneously (Deutsch). Topologically, this means that the interpretation of pitch as ascending or descending, for an octave, can be identified with the Moebius Band, in one local side we interpret as ascending, in the other local side, as descending, alike the case of chemical enantiomers, presented in (Rapoport 2011c); furthermore, the perceptual identification of opposites elements of the octave, actually yields a Klein Bottle, as explained in the commentaries following Figure no. 0. Already, musicologist Dimitri Tymoczko proposed through complex mathematical argumentation, that ordered tones lie in a surface, the Moebius Band (Tymoczko), yet stopped short of providing a connection with the physiology of hearing. The connection is that aural perception (not necessarily restricted to music), as is the case of the sensorium’s codification, has the topology of the KB (Werner, Rapoport 2012), while anatomically, the outer ear has the topology of the Moebius Band (which is built-in in the KB) and the cochlea has the shape of a Golden Number spiral, the generic architecture for harmonics . Φ and the Golden Spiral appears

to be a teleo-logical structuration through harmonics: any disturbance is assimilated by the Fibonacci sequence to yield the Golden Number structural teleo-logic; we shall argue below that this is a general principle also proposed by Merrick. This brings back Harmonics together with the KB topologics as a scientific principle for the philosophy of Nature, as already stressed by Plato in *Timaeus*, which is radically distinct from the analytical philosophy of Frege, Wittgenstein, Russell and others, claimed to be anchored to science; indeed the sciences based on dualism, as already discussed. It far exceeds the *customary* Fourier (or still wavelets) harmonic decomposition of functions and specifically signals, regularly practiced by scientists and engineers, which in the case of perception is anchored in the Klein Bottle, a well known fact to neurologists (Swindale, Tanaka) and image recognition processing (Ghrist).

Aural perception is triggered at the ears as vibrations of hair cells so sensitive that only Brownian motion roar may saturate them, and as pressure differences produced by spherical waves reaching the ear. Alike a drum, the eardrum is fundamentally elastic, and thus the pressure is transformed as elastic oscillations, whose singularities are identical to the singularities of electromagnetic fields, i.e. photons, as noted with respect to cell biology in (Rapoport 2011b). Thus, it is no surprise that like visual sensorial input, the aural lifeworld is perceived alike spatial perception, since the singularities, either elastic or quantum, as differences producing differences, are the same in both aural and visual spaces. These elastic vibrations couple to the vibrations of the sphenoid bone which connects with the auditory system, whose signature invites its designation as the Wings of the Body's head, and whose differences in shape due to elastic loading, have been linked with evolutionary traits as the change of quadripede to biped locomotion of present

humans. Thus, the twist of aural space is anatomical (the ear and the clochea's Golden spiral shape) cognitive/perceptual, and still physiological and anatomical, since the topographic map of the sensorium transcends the final end result as a neurological representation at the brain, but is the very nature of the body, as a bauplan turning inside-out and outside-in, as we shall argue further below. Richard Merrick proposed in his mathematical theory of music and its cognition/ perception, that the tones in aural space are produced by a standing wave (Merrick). The Periodic Table of Elements of Chemistry of Mendeleev, which following its inception was claimed to be related to harmonics, has been proved to be related to Golden Mean spiral dispositions of the natural numbers (representing atomic numbers) which can be mapped, to a KB topology for the atomic (and their stable isotopes) elements of the Periodic Table (Boeyens). Furthermore, this topology implies a unification –rather than the duality purported to be a fundamental principle for Physics- of atoms of matter and anti-matter as lying in either side of the MB or the KB, which can be mutually inter-transformed, alike the unification of pitch as ascending or descending, in the same form. Any perturbation to an atom producing radioactive decay returns to the stable Φ structuration on the KB of the Periodic Table. Furthermore, the atoms and stable isotopes can be generated from a sinusoidal standing wave, as in Merrick's theory of music. Therefore, the torsioned/twisted geometry of harmonics and the Golden Mean, Φ, lie at the very basis of bodyplans (as shown by Leonardo da Vinci in his *Man of Vitruvius*), the musical, perceptual and physical/chemical world, and further to the genetic code (Rapoport 2011c), the Matrix Logic derived from the KBL (Rapoport 2011a), and the natural numbers (Johansen 2010), which turn out to be generated in toto by standing waves, at least already mathematically proved in the case of the Periodic Table

and music; notably, the stratigraphic Moebius Band formations of geology, are produced by the harmonics of the Sun, Moon, Earth and other planets interactions (Overton), and structures crystalize/sediment with respect to the teleo-logical action of Φ.

The essential role of standing waves is here evidenced, they provide for the generation, of structures and processes, while the Fibonacci sequence provides the meta-algorithm for assimilation of disturbances, whatever their domain may be. Indeed, already the photon which is a standing wave transaction between emitter and receptor of electromagnetic waves, manifesting as a singularity of the wave, biological, musical, geological, etc., yet in the present phenomenology, they appear as time waves from which the physical (in the ample sense) world comes to be organic (in the sense of holeness), unseparably from the KB, as the logophysics sustaining this organicity. In both the aural space and the Mendeleev table, the KB embodies the organicity (in the sense of holonomy) of aural and atomic/chemical material space and particularly of massless particles (photon and neutrino), while Φ appears as the asymptotics teleo-logical result, of the most fundamental meta-algorithm claimed by (Johansen 2012).

The Fibonacci sequence as algorithm, embodies the res extensa mensurable relations, of the unfolding fusion of res cogitans with res extensa, to reach for stable manifestations; this teleo-logical process is reached by interaction with the enviroment, so it is an issue of contextualization, embodied by the KBL. Thus, it is universal, applying to all domains, whether biological, cognitive, economical, physical, in the natural numbers (Johansen 2010), music, astro/geo-logical (through the Croll-Milankovitch cycles and the Moebius Bands stratigraphy, to be later discussed), astronomical (the distribution of planets in the Solar System), and chemical/cosmological, as related to the KB topology of Mendeleev

Table (Boeyens). In the latter case, we see that the conformation of periodicity in a graph with atomic number N as independent variable and the ratio of number of neutrons to the number of protons as dependent variable, where the periodicity of the table appears when the latter ratio converges to 1/Φ following the Fibonacci sequence from which a ratio equal to 1 can be extrapolated. The latter value corresponds to the formation of more complex atoms starting from hydrogen, by the addition of α-particles, under very extreme pressures, say in the interior of a star, with a notable structure, which amounts to the turning inside-out of the electron orbital ordering, which later, in less extreme pressure conditions, turn to their usual electronic configuration proposed early in Quantum Mechanics, while the high-pressure conditions produce a neutron which itself has a Klein Bottle topology, in the framework of the theory of Hadronic Mechanics which supersedes Quantum Mechanics in incorporating the environment (Johansen 2006). A figurative representation of this would be that a spherical plasma from which the Solar system was thought to have been born, would have turned inside-out to constitute the planets which were further ordered into their present orbits following the Golden mean relations through the recurrence of the Fibonacci sequence, while the Sun retracted to become the center of the Solar System. So, on the one hand we have that the naissance of atoms from hydrogen atoms, the latter being the building blocks of the atoms in the periodic table, by inversion of their electronic orbital-like configurations on reaching for their stable organization achieved by fusion of hydrogen atoms; this is similar to the case of aural perception in which the sequence of tones perception is inverted in aural space in its KB topology. So the dual logic is not the logic of the evolutionary formation of the material world, but rather a logic in which inside and outside are fused, the KBL. We shall later find

that the turning-inside-out of an ovum, is also the logophysics by which a fertilized egg unfolds to become an embryo. Furthermore, in the unfolding of the periodic structure of the material atomic/chemical world, basic also to the biological realm, the Fibonacci sequence acts as the generative meta-cognitive meta-algorithm which constrains standing waves, by dampening; as we already discussed in perturbation of atoms, this self-referential sequence produces their radioactive decay to their stable harmonic configurations. This meta-algorithm drives the Plenum to irreductible singularities; in the case of the natural numbers to evidence the prime numbers (Johansen 2010).

The relation between Φ, proportions of bodyplans of animals, the genetic code and music was elaborated in (Petoukhov & He). But still more important than Φ's guidance of body development to the proportions of lengths of bones (musical pitches, atomic weights, etc.) is the notion that it might be more fundamentally related to the gaps between them (more generically, of singularities) as the result of the contextualization with the environment; already the photon as the primeval domain of articulation of res extensa and res cogitans, generates the Fibonacci sequence (Rapoport 2012). In other words, Φ may be related to the domain of articulation of res cogitans and res extensa, as a teleo-logical feedback guide directing through recurrence of the Fibonacci meta-algorithm the unfoldment of the process towards stability and holonomic coherence, of music and language, of the material world as appears to be the case of the Periodic Table) and the freedom to move, create and recreate. This is also already the case of the Matrix Logic derived from the KBL which fuses res extensa and res cogitans, in which the Golden Mean is associated to OR, the logical disjunction operator. This conception of the role of harmonics in the case of the gaps of bones, is related to the total null torsion of bodyplans, postulated

in (Nevin & Rapoport), following work in the surmountal of the Cartesian Cut and human gait (Nevin).

4. Logophysics and the Problem of What is Life

This section will deal with the logophysical (fusion of physics and topo-logic) ontopoiesis of both the animate and inanimate worlds, the former being associated to Life, usually conceived to be a separate distinctive realm. This division of animate and inanimate is based on the designative value of the ABL, and also linked to an anthropic differentiation, since for the basis of this paradigm, lies an extrapolation of what is considered by humans to be animate and by logical negation, the inanimate real is defined, or conversely. This characterization already presumes the ABL and its ontology (recall, a system of logic is a formalization of an ontology, and an actually embodied one as is the case of KBL), in which one presupposes a realm of discourse, and the complement of this realm is thus established by default. Thus, the relation between Life and Non-life is based on the action of the negation operator of the ABL, which ignores contextuality, and thus cannot find nowhere its origin, in this dualistic setting.

A dualistic interpretation of the negation operator can be given by identifying this operator with the primeval distinction or boundary that defines a system (say, a body's skin, a cell's membrane, a planet's or a star's surface) as in (Spencer-Brown). For Spencer-Brown, "… a universe comes into being when a space is severed or taken apart. The skin of a living organism cuts off an outside from an inside. So does the circumference of a circle in a plane. By tracing the way we represent such a severance, we can begin to reconstruct, with an accuracy and coverage that appears almost uncanny, the basic forms

underlying linguistics, mathematical, physical and biological science, and can begin to see how the familiar laws of our own experience follow inexorably from the original act of severance.'' The severance manifests through a distinction (either ideative or concrete), embodied in a sign of distinction with two elementary rules of self-action, that generate a calculus of forms. This calculus, in its essential abstraction, is universal, since it applies to the operation of any system defined by a distinction, even if ideative.The embodiment of the distinction as a sign (intimated by Wittgenstein in a 1938 seminar at Cambridge – personal communication of Spencer-Brown to this author) essential to its constitution in and through self-reference, indicates the semiotic character of the primeval distinction.The algebra of forms generated by this distinction and the elementary two rules attached to it, is complete, and thus the undecidability Gödel type of problem is, in principle, surmounted. If we keep the operation of the forms to be generated on the plane, so that forms do not re-enter on themselves, then the ABL is the ontology for this calculus of forms and indeed the distinction/boundary is the sign for the negation operator of dualism. But then, the *fusion* of object-and-subject in the sign of distinction, intuited by Spencer-Brown, which for its representation he further introduced the re-entrance of the distinction on itself through imaginary logical values further associated with paradoxical states, which we identified as the KBL, cannot be established in terms of the ABL. It excludes subjectivity altogether.

Thus, as already argued, signification and semiosis can not have its ontological locus in the ABL, but in the logic that yields this fusion, the KBL; this has been overlooked by La-can's follower Wilden (Wilden) and other semiologists (Hoffmeyer), that purport that signification is the case in the dualistic interpretation of the distinction/boundary. Thus, the ontoepistemology of all systems defined by a boundary, in particular biological systems, is

the logic of re-entrances of the systems, subverting the boundary by imaginary motions, associated to logical imaginary values (i.e. given by the square root of minus 1), which in the KBL are the self-penetration states, Outside-Inside and Inside-Outside, as in Figure no. 7 below. They correspond to logophysical time waves (Kauffman, Rapoport 2011), the re-entrance of a form on itself, the dynamics of holonomy, the fusion of context and content which signification requires, a contextualization that the ABL obliterates since the negation operator can not embody, as is the case of the dualistic definition of Life as the complement of the inanimate.

Therefore, signification and semiosis which can not be achieved in the ABL, is embodied in the KBL, and thus Life can be introduced yet *unseparable* of the inanimate realm (Rapoport 2011c,d). This is also the case of consciousness.

Therefore, the approach to the problem of the Being of Life and consciousness through the dualistic ABL, misses precisely the very Logos of the world, which does not separate between inanimate and living realms, unless we project the KBL of wholeness to its reduced dualistic ontology in which dualism is produced by the action of this logic, not an independent ontology. Yet,we must remark once again: inanimate and animate systems have to be understood no longer as closed nor open, but *re-entrant* on themselves, both closed *and* open, both continuous *and* discontinuous. This is the logophysics of the KBL; it admits no absolute separation between Creatura (Life) and Pleroma (inanimate), but a continuity between them and still a specification that we shall present below. Contextualization is always the case, for *both* Creatura and Pleroma, a lifeworld unbeknownst to us (Bateson). Indeed, whatever the choice of polarities is, animate/inanimate, living/ non-living, they are rendered as separate antithetical categories

by the principle of non-contradiction, thus producing a categorical confusion of categories, between polarities and opposites.The negation operator of dual logic only eliminates what is not, but cannot affirm what there is. We remark again, that there is an anthropomorphization acting in stating this opposition, yet further this introduces an element of subjectivity, even of cultural and ideological background, which the ABL background cannot account for. The ontoepistemology for this is rooted in the HyperKleinBottle Logic (HKBL) as in Figure no. 8 below, to which we shall return.

Instead of dualism, there is a continuity between the inanimate and the living realms. The attributes that biology ascribe to living systems, namely self-organization by entropy control, turning positive to negative entropy by metabolism (not necessarily linked to DNA control), self-determination, reproduction, self-repair, growth –an in particular in preferred directions, a primer determinant of a specific pattern formation, fracture along preferred plandes –a process which is at the basis of reproduction, memory, adaptation to the environment (which we recall in the KBL that there is a continuous transformation of a system into its environment by which we have a turning inside out and the converse), etc. already point out to self-reference as the ontological category at stake, rather than living/-non-living. These very properties are also encountered in self-referential chain-like, Moebius and KB topologies of organic molecules (already benzene is cyclical) (Herges, Rapoport 2011d) and even identified in inorganic chemistry; already benzene is cyclical) and physical systems as well, and basically in crystals (say viruses, or still, the Earth's mineral crust and also its nucleus), and most especially in water crystals.[2] Water is crucial to what is deemed to be a lifeform on Earth. It is known that the water in the cell (need not be a living cell, a lipid bilayer membrane containing a gel will do), is very highly structured,

This ordered water, forms conglomerates of positive and negative electric charges, in violation of the dual tenant that likes expell likes, establishing a form of premetabolism of the cell (Pollack). No DNA is necessary for this to happen. Instead, the phenomenology that creates this violation of the ABL are related to the quantum fluctuations of a self-referential light torsion geometry of the cell, crucial to the formation of the cell's quantum tensegrity (we can think of a spiderweb made of light) structure which is basic to its integrated physiology and its extension to the environment and the body at large (Rapoport 2011 b, c,d). It is associated to a non-dual logo-physical principle in which physics is unseparable of a *paradoxical* logic, the KBL, and is crucial to the integration of the cell with the outer world, providing for the anatomical and physiological integration of the living system as a whole with a myriad of cells, tissues, organs, etc., to be discussed below.

Viruses are crystals, as well as the most important cellular organelles, such as ribosomes, nucleosomes, chromosomes and thykaloid membranes of chloroplasts. Biocrystals consist of three-dimensional arrays of calcium, silicon, magnetic crystals, or other elements, alone or in combinations. It has been empirically shown that living organisms are using the same chemical processes used in the inorganic world to build their own crystals during the initial stages, and they do so by following the same atomic principles which lead to the crystallization of calcium carbonate and phosphate in a Petri dish. Lima de Faria in his theory of autoevolution without Darwinian selection, observed that it is only in the later stage of development that the cell uses the molecular messages from the nuclei to transform the biocrystals into novel configurations. Molecular biologists Inoué and Okazaki, concluded that ‘’Biocrystals dramatize the interplay between inanimate

molecular forces, which tend toward a minimum-energy configuration, and the organizational capacity of living cells. Life of necessity follows inanimate principles, but instead of doing so by brute force it seems to channel the flow of energy, guiding the arrangements of matter into increasingly complex and thermodynamically improbable forms'' (Inoué & Okazaki). Furthermore, to Lima de Faria, the main types of plant and animal patterns are already present in minerals, and thus no Darwinian selection can be attributed to their formation and modification to environmental signals. Thus, physical/chemical symmetries lie at the foundation of the patterns of Life. Furthermore, it is the regularities of the chemical elements, as embodied by the Mendeleev table of periodic elements that are crucial to these processes, and more fundamentally to its KB topology, as remarked in (Rapoport, 2011c), that lie at the basis of the physical/chemistry of living structures.

Under the influence of the all-in-DNA paradigm, contemporary biologists at large when they qualify "living'', they are thinking in metabolism and *hereditary* replication, which according to J. von Neumann, logophysically they are two *separate things* which in the current biomolecular paradigm for biology, the latter has the upper hand (Dyson). Dyson claims the Dual-Origin Life Hypothesis, namely that Life could have started either from proteins (metabolic evolution) *or* from nucleic acids (DNA based, parasitic evolution). DNA-free oleic acids droplets in acqueous media display a primitive form of metabolism, goal-directed behaviour, and even, problem solving capabilities (Hanczyc et al, Lagzic et al); more recently life-like cells made of metals have been produced (Cooper et al). Dyson's hypothesis is justified in terms of the hardware (protein)-software (nucleic acid) dualism,

which in the present conception, is not the case, operators and operands are integrated in the Matrix Logic representation of the KBL (Rapoport 2011a, Stern).[3]

Yet, any metabolic system is autopoietic, in the sense of Varela & Maturana, i.e. ‘’… capable of self-maintenance owing to a process of components self-generation from with*in* This generalizes the definition of life. Systems involving RNA- DNA coding (as in *actual* cells) are no longer the only possible living entities. The important notion is that the activity leading to life is a process from within, i.e. dictated by the internal system’s organization. ‘’(Bitbol). Thus, the theory of autopoietic system proposes a definition of Life, yet, once again, we remark it is defined by a dualistic logophysics, which divides the system and its environment, Inside and Outside, further chooses the "inner-representation’’. Thus, it then has to account for its integration with Outside, which is established, by a physicalist hypothesis, namely by assuming a semipermeable membrane, an assumption that attempts to surmount the dualism by suggesting a mechanism to do so. Yet in this take of the enaction of autopoietic systems, homeostasic metabolism and cognition are identified (Bitbol & Luisi). Thus, the enaction in the theory of autopoietic systems, operates as a negation operator of the environment, which as discussed before, the negation is tantamount to obliterate signification and contextualization, and thus the claim of cognition, in the ABL ontology, is left wanting. In contrast, the ontopoiesis of the KBL with the re-entrance of a system on itself, surmounts the need for a mechanics for an integration. either in a passive or an active manner, which thus projects the modes of self-referential action to dual worlds, the Inside and the Outside. This operation is pervasive to both Philosophy (as in Kant), and the sciences. We find here an occasion to retake Popper’s comment: The lack of an ontology for integration, i.e. of the KB logic or still its

hyperextension, while it does not disallow for bold intuitions to deal with foundational issues, can only lead to confusion between what is claimed to be the case by intuitions which follow from ad-hoc assumptions, and what the ontology can actually account for. Glossing on the issues without this holonomic ontology, while it may give the impression that an ontoepistemology for integration has been shown to be the case, is belied by the assumption of dualism, as in the psycophysics by (Vrobel), based on ‘‘inner’’ representations, and in the conception of language as a mere descriptor, which we already discussed.

The dualistic approach to define the inanimate and living realms presume the dual division of Exterior (E) and Interior (I) as irrevocably distinct and it is the metaphysical character of Life that bridges this division in terms of responsiveness of the systems with relation to the environment. The latter is deemed to be the Outside, an Other, in terms of which a responsiveness and contextualization is to be postulated. It is with respect to the Other, that a system is considered as living by asserting itself –by self-determination and self-organization by acting upon Otherness (so contextualization is the case), while the inanimate is acted upon by the Other, yet in a mode in which contextualization is presumed not to be the case, and thus the system is deprived of Will. As we said already, this implicitly assumes a dualistic asymmetry between the living Self and the inanimate Other, which also is apparent in the difference of the capability of contextualization (wrongly assumed to be nil in the case of the inanimate) in a remarkable contradiction with the symmetry of the negation operator in the ABL which deprives the world of subjectivity, to ex nihilo asign it to one of the elements of this symmetry, which cannot be accounted in the ABL, due to its suppression of subjectivity and of Life. This presumed asymmetry

between Life and inanimate, implicitly requires a direction of causation, in which, the former realm acts on itself and on the environment by changing sign of the entropy from positive to negative, at the physical level, while the essential action to regard it as lively, is its capacity for contextualization presumed to be not the case of inanimate systems. Yet, the quantum theory of chemical reactions, surmounting hitherto lose unrelated mechanical and quantum concepts, based on David Bohm's concept of the quantum potential, incorporates contextuality as its basic principle (Boeyens). Chemical activity requires a shaping of molecules in which the environment, through quantum fluctuations, i.e. Apeiron, mold the molecules for their interaction, and the absortion and emission of light quanta (we recall, the fundamental self-referential physical agent) is a fundamental logophysical manifestation of contextualization vis-à-vis the environment. This is fundamental for establishing the principles that will allow for molecular recognition, in particular for biochemical activity. No such thing as a contextual-free molecule nor atom exists, but in the paradigm of the chemist (or still, the physicist that ignores quantum fluctuations) that believes that chemical reactions take place as an ideally closed system, in accordance with a contextualization-free mechanics (Boeyens). Thus, the quantum theory of chemical reactions, as understood by Boeyens, following Bohm's interpretation of Quantum Mechanics, which has a cybernetic self-referential ontology (Grossing), which can be formulated in terms of the self-referential spacetime torsion geometry (Rapoport 2010), is nearer to the alchemists' conception of active contextualization, than to a mechanics of bonding molecules determined independently of their environment.

Yet, this contextualization of chemical structures, is also the case of crystal minerals, in particular a planet's crust, as foreseen by Teilhard de Chardin (Teilhard). Hence, geo-

logical conformations are the consequence of a logophysics of contextualizations, rather than the proof of an inanimate geology. It is no accident that we are struck in awe and bliss in witnessing the sceneries of Nature's signification, since an identity transparency is at the root of this experience. As noted in (Lima de Faria, page 110, 1995), "minerals contain atomic processes that allow chemical variation without changing the final pattern, and allow variation of pattern without changing molecular construction.'' He calls this phenomenon as "molecular mimicry'', say the configurational identity of water and iodoform crystals, which is also the case of plants and animals (say, of the flower of orchid Ophrys and wasps which drives the latter to copulate with the former). In the latter cases, already it is an example of signification, which Darwinian evolutionary theory has made the core of intentionality of Life, yet which does not depend on DNA, but on the (self-referential logophysics of) electronic configurations of key atoms determining the actual shape of atoms and molecules, present in proteins and other molecules (Lima de Faria). This author establishes that this mimicry, a word for cognition in a higher- order sense, is a non-genetic trait that arises from the regularities of the chemical elements, which as we already signaled, is unseparable from the KB topo-logic of the Mendeelev table of periodic elements. Hence, Lima de Faria introduced the notion of *biological periodicity,* in which the regularities of biological structures, in particular their symmetries and shapes, rather than being of genetic hereditary origin –also contested by epigenetics (Raff), are the manifestation of this hypercontextualization in which genes and minerals co-operate (as is the case of the non-dual HKBL) –though there is what we would consider as an asymmetry in the direction of the contextualization, and is also the case of the creation of landscapes by the action of bacteria

on minerals, as is the case of stromatolites, the older evidence of fossils on Earth, as depicted in the picture aside, formed by the action of prokaryote bacteria on mineral depositions. We recall that for those that subscribe to the theory of the living earth, it is the prokaryotes that maintain the homeostasis of Earth, rendering the biosphere habitable for all other life, by maintaining and recycling the atomic ingredients of which proteins, the essence of life, are made, including oxygen, nitrogen and carbon. Furthermore, a modification of the composition of the atmosphere occured. Hypercontextualization is crucial, indeed. It is central to the conformation of Earth's crust and climatology, and to paleobiology which is unseparable, in some time scales, with them; this belies Darwinian continuity (Bennett).

To Lima de Faria mimicry does not appear as a genetic trait, it rather starts at the level of the physical symmetries, which are related to torsion, and carries to chemistry, to the shapes and symmetries of living systems, and further the genome which we related to the HKBL of the genome (Rapoport 2011c) and the latter's isomorphism with the symmetries of Quantum Mechanics and the self-referential syntactic foundations of Physics (Hill & Rowlands) which we have found to be based on the KBL (Rapoport 2011c).

Thus, signification is the case of chemical reactions and chemical mimetical regularities, the symmetries of shapes and properties of minerals, those of shapes of plants and animals, and still is the case of Earth's crust as a mineral, all of them as a KBL logophysics, in which the KBL coding of the genome is the same self-referential coding of Physics, and can be translated to the lifeworld of the I Ching (Schonberger, Petoukhov & He). We shall see that the determination of bauplans and their evolution has the same logophysics of hypercontextualization, i.e. of an interrelation of the system with a

distinguished environment, a logic at least of 3-ness, as is the plurally reentrant HKBL presented in Figure no. 8 below.

We return to the identification of cognition and metabolism. The first form of cognition is identified with the integration of an environmental factor yet by introjection using it in the previous net of relations; this is the minimal in-formation that establishes what we purport to be lifelike, and as we saw, the logophysics of this contextualization is embodied in the KBL. The second more developed stage of cognition, as in Piaget's accommodation, installs a new network of organization (Bitbol & Luisi). An example of this, is the transition of life as metabolism in a prokaryote nucleus-free cell, by symbiotically introjecting a parasite and thus creating the organelles associated to the eukaryotic form which has given rise to all the animal and plant life we see around us. (Margulis, Sapp). Yet, as argued before, this is also the case of landscapes and the atmospheric composition through the action of prokaryotes on minerals. Already, Dyson's Dual Hypothesis based on the evolution from the "prokaryote" to the "eukaryote'', stems from a negation operator, since it is based on what the former organisms are not (they are not eukaryotic), rather than what they are, either archaea or bacteria; in fact Archea together with Eubacteria, and Eucarya are recognized as the three domains of Life, instead of the dualistic prokaryote/eukaryote tenant (Sapp).

There appears to be extensive evidence to support the idea that the origin of the complexity of living systems as defined by the cell's apparatus crucial to metabolism and hereditary genomic replication, resides precisely in subverting the E & I duality membrane operator. (We should recall that a cell is fertilized, by incorporating an exterior element and making it its own, by creating a new entity. Hence, the Eternal Cycle of Life has no relation

with the ABL but is related instead to the HKBL.) Indeed, it has been proposed, and empirical evidence appears to support this claim, that the main internal structures of eukaryotic cells, did not originate within the cells, but descended from independent living creatures that invaded the prokaryote cells from outside, like carriers of an infectious disease (Margulis). The invading creatures and their hosts, gradually evolved into a relationship of mutual dependence. The erstwhile disease organism became by *degrees* (thus belying duality) a chronic parasite, a symbiotic partner, and finally an indispensable part of the substance of the host, an evolution whose logic is undistinguishable from that of metamorphosis. Thus, the environment was introjected to define the being of the cell by transforming HKBL-wise the Other into the Self to yield a new self, a transformation by hypercontextualization from Boolean antagonism into a state of identity transparency, while the opposite directionality of causation is also the case, which thus becomes self-referential to the interrelating elements (environment and bacteria, instead of one of them), as appear for stromatolites. This mode of symbiosis, created the complexity that sustains Life as is currently conceived, in terms of a genome; notably this richness –the single most crucial instantiation in evolution which is also claimed to be the basis for the appearance of sexuallity (Margulis)- did not unfold as the result of Darwinian selection, but rather from hypercontextualization, in which two different entities metamorphose through a non-dual logic, and evolve to become a new entity. As we shall see below, this hypercontextualization and creation of complexity are the lifeworld of the HKB. An essential point in this, is that nor the "exterior'' bacteria to become an inner parasite to the prokaryotic cell (as one could think of haemoglobin's fagocitosis) nor the "interior'' host-prokaryotic-cell have primordialility in establishing the direction of the transformation to

reach identity transparency, and we can conceive this evolutive transformation as a *metamorphosis* of both into a new symbiont, since this hypercontextualization has strong *anticipative* character (Rapoport 2011c, d). Proof of this can be argued to be the case, since that there are species in which evolution and metamorphism are superposed (Lima de Faria); evolution is to be understood as the dialectical relation between development and environmental contextualization (Ulanowicz, Nijhout), in which the HKBL of both the genome and development play a crucial role (Rapoport 2011 b,c). Yet, rather than a exclusively biological trait, we have hinted that this is also the case of paleogeology and the evolution of the atmosphere.

Thus, Dyson's Dual Hypothesis for Life can be replaced by an initially self-referential autopoietic (actually, a KBL ontopoiesis) metabolic system (prokaryotes are the most metabolically diverse of all organisms), that having achieved homeostasis with respect to the undistinguished environment, evolves from contextuality to hypercontextuality, by adaptation to a parasite as a distinguished element of the environment (so that instead of 2-ness, the prokaryote and the undistinguished environment, 3 and 4-ness is now the case: the prokaryote, the parasite having the prokaryote for its host, the nascent-to-be-eukaryote symbiont and the new undistinguished environment from which the bacteria has been substracted), transforming both itself and the parasite into a single new being, the eukaryote cell with a highly complex architecture-functionality. In this evolution from metabolism to the genetic code, both DNA and RNA (Lima de Faria, Barbieri) could have coded for the canalization of the regularities and symmetries-asymmetries of the form/function polarity that starts already in the structure of Apeiron, to the physical and the

physical/chemical realms, the cell's membrane, the cytoskeleton and the integration of the cell to its environment, all of them having a non-dual logic as well as the unfolding itself.

We should also remark that perception is an element of this interrelation; already, the cytoskeleton and the extracellular matrix are sensory systems. Yet adaptation and inter-transformation is not exclusive to the symbiosis of (bacterial) lifeforms [3], while the perceptual apparatus may be absent in one of the elements of the symbiosis, thought as a being together that generates a living together of other systems not yet manifested. Indeed, as mentioned already, prokaryotic Cyanobacteria are thought to be largely responsible for increasing the amount of oxigen in Earth's atmosphere through their continuing photosynthesis. Thus, bacteria also by oxidizing ore, modified the landscape defined by a geoastronomical physics to be discussed below, and the atmosphere, setting the course for the appearance of higher-order complexity lifeforms.

Returning to the Dual Life Hypothesis, the genome, in turn, operates through self-determination in which the metabolic proteins agents hold a dialog with the nucleic acids in *both* directions, as proved recently by the Genome Project (Pellionisz), thus belying the Standard Dogma of biology, in which in-formation goes from the nucleic acids to the proteins. Thus, the genome operates in its relation with proteins, with the characteristic feedback of *second-order* cybernetics, in which controller and controlled are fused, as embodied in the KBL (Rapoport 2011a). We recall that the KBL embodies a fusion of content and context due to the dynamical interpenetration of both (see Figure no.7 below), so that the first form of cognition of functional introjection of an undifferentiated environment is *always* (for both inanimate and animate) the case for a self-re-entrant system. Yet, the second form of cognition, which is about the hypercontextualization of 3

and 4-ness, we shall argue for in terms of the HyperKleinBottle Logic, a logic of hypercontextualization; see Figure no. 8 below.

Therefore, Exterior and Interior are not separate but intertransformable in the KBL logophysics. But what was denied to the inanimate realm, the capacity for a contextual being, is far from being the case; we already pointed out the case of oily droplets, chemical and geological activity; thus, in the KBL logophysics the first form of cognition, is embodied already . Furthermore, what has been deemed to be universal constants of nature and universal laws of physics, have been found to be the related to contextualization. Since this involves in principle the l*ocal* interplay of globality –the whole universe- and locality, this is also the case of hypercontextuality (the global universe, the local manifestations and the self-referential reentrance of the global in the local,and the return of local to global, as the singularity of the KB), that we pledge to be the case of living system. This phenomenology keenly resembles Spinoza's panentheism (Spinoza). Thus, physical laws and physical symmetries, instead of representing a supradetermining contextualization-free invariance, they rather sustain that capacity for environmental hypercontextualization; we shall discuss this issue further below in relation to metaphors and the Anthropic Principle and in relation with a proto-form of Newton's Third Law (Rapoport. 2011c). As noted in (Pattee), constraints rather than physical laws play a fundamental role in biology (as is already the case of physical systems); they operate embodying holonomity (as is the case of both KBL and HKBL), which is tantamount to the self-referential torsion geometries, which we have found crucial to lifeforms (Rapoport 2011 b,c). Constraints act as symbols (Pattee), and particularly we can think of physical symmetries as symbolic molds, in which by evolutionary metamorphosis ontogeny

produces phylogeny. Those constraints that arise from torsion folding, as a transformation from orientability to non-orientability, as in the creation of a MB and for the self-penetration of the KBL, which we shall present below, are fundamental to semiosis, as we shall see further below in bodyplans, geological and cosmological signs.

Let us retake Dyson's dual logophysics hypothesis, that Life may have appeared either as metabolism (Life started from proteins) or by symbiosis (the DNA centered origin). Under the spell of the all-in-DNA paradigm, contemporary biologists at large when they mean living, they are thinking in metabolism *and* hereditary replication, both believed to be controlled by the genome. Lately, epigenetics (Raff) has shown to be important and the presumed control of development by genes is contested, as a metaphor for what is a phenomenology of hypercontextualization (Nijhout). The association of genes with causality *logical implication operators* that control development, rather than canalizing it as if in-formational catalyzers, is valid under the assumption of the ABL, which by blockading a gene's expression, development is impeded; in a multi-causation phenomenology and its multivalued logic, this inference is incorrect. This empirical application of the ABL, is widespread in the sciences.

Thus, metabolic changes (which we have already identified with cognition) as to produce modifications of a species to the appearance of new ones, which the Darwinists might choose to overlook, do not require, in principle, genetic changes of the old species with regards to the new environment, say an earthly species moving to the sea (Lima de Faria, 1995), and thus the appearance of a species is related to hypercontextualization which produces shape, physiological changes and semiological modifications (say, whales communicate through ultrasound and songs, which its ungulates land ancestors we know

not to posses), not to hazardous action and its introjection by reaching homeostasis in the new species configuration. Thus, the determination and development of an organism's bauplan and its evolution, rather than being an unicausality issue of genomic determination is, in essence, about hypercontextualization, as is the case of the HKBL.

5. The Role of Logic in the Sciences and the Dual Logophysics

We already argued that ABL is the formalization of an ontology in which subjectivity and Life cannot be accounted for, and thus have no locus in the world if not in a dislocated from the world imaginary. A manifestation of this arises on the conception that scientists uphold, essentially, that logic and the phenomenology studied by any particular science are separate and unrelated. Logic is concerned with the laws of thought, an instrument of epistemological discourse to argument how to face or learn about reality, either by experiment or theory, with no relation with the "world out there"; simply an issue of methodological discourse. In this conception, logic is not an element of reality and with no relation to, say physics or to biology. An example.

The living cell membrane in the usual model entertained by most biologists, is a Boolean logical gate in the sense that ions, molecules, etc., are enabled to go or not to go through it. Here, a clearcut separation of the 'exterior world' and the 'interior world' is placed as a theoretical assumption. This is the dualistic logic framework in cell biology that determines the physical modelisation of it, as we shall see next, has profound implications in the biochemical model proposed for the cell, in accordance with this mechanical model of dual complementarity (the lock and key model of biochemical *recognition)*

Of course, the cell's physiology requires its unification with the environment through the membrane, which thus cannot longer serve as an unpenetrable barrier (we have

already found this framework in the theory of autopoietic systems) but rather requires the membrane/barrier to be violated and with this to violate the Boolean dual assumption of "exterior'' (or "outside'') and "interior' ("inside'); henceforth, we shall denote these states as E & I, respectively. The physics model associated to this assumption of a dual logic is the mechanical pumps models that are unseparable of the E & I logic, since they are designed to surmount the membrane's dual character by asserting itself as the solution to the mechanical integration of cell and environment. Thus, the logic and the physical model are integrated, and the physics claimed to solve the problem of getting through this Boolean context, follows from the logic. Although most scientists are unaware of this mindset, which is quite dominant not only to biology but to the sciences at large, it actually turned to manifest as a construct for cell biology. Experiments have disproved this model and thus the ABL is invalid as an ontology for cell biology. Yet, instead of following the advocation for Newtonian physics as the recipe for avoiding vitalism (Ling), a physical model of cell biology which integrates the cell to the environment in a non-dual logic,which is fundamental to embryological development and differentiation (the generation of different tissues) as the unfolding of a logophysical principle, the Klein Bottle logic (KBL), integrating it further with biochemical recognition, was developed in (Rapoport 2011 b,c).

The philosophical discussions raised in the purported framework of surmounting the Cartesian Cut (CC) in the neurosciences and the so-called *cognitive sciences* (a name for the CC and of the breaking of science, which is otherwise unbreachable from cognition!), uphold the same principle to the one applied to cell biology in the previous paradigm. For philosopher Bennet and neuroscientist Hacker, "conceptual questions are not amenable to scientific investigation and experimentation or to scientific theoretization. For the

concepts and conceptual relations in questions are *presupposed* by any such investigations and theorizing'', page 2 (Bennet & Hacker). Furthermore, "Our concern here is not with trade union demarcation limits, but with distinction between *logically* [our italics] different kinds of intellectual enquiry''. These authors purport to surmount the CC by separating ontology and epistemology, further claiming that logic is purely epistemological.

This is a clear example of how the ABL may operate to transform a non-dual ontoepistemology to a dual one, by the expedience of proposing an epistemological locus which is non-ontological, but still *rules* the ontology (by reducing it to a single locus)! As previously argued, these authors have reduced the four ontological loci to Being by keeping the ideative role of logic and conceptualization (thought as a process being the locus for them) restricted to that of a detached epistemological locus from which we can cognize the world, and ourselves. We can take stock on this by identifying one of the modes of the CC, as the separation of ontology and epistemology, as is the case of the usage of language in the dualistic ontology, exclusely descriptive. This separation is a mode all too pervasive, that permeates the sciences in the frame of the dualistic stance, and in our previous example of the mechanic cell/membrane/environment complex, it was assumed to be the organizing principle. Instead,we examined concepts both scientifically and philosophically, yet not as separate domains surmised to be unabridgeable. As for the logical distinction between conceptual and scientific issues raised for the neurosciences, this is no more but the usual positivism revamped as surmounting the CC; in this case the cut is between philosophical and scientific operations. This logical distinction by these authors is not only the trademark of the neurosciences, but the trademark (and unperceived watermark) of the broken sciences. Yet, what Popper suggested to be the case of the sciences, as a

bypro-duct of the lack of an ontoepistemological principle, it has surfaced also to be the case of Philosophy.

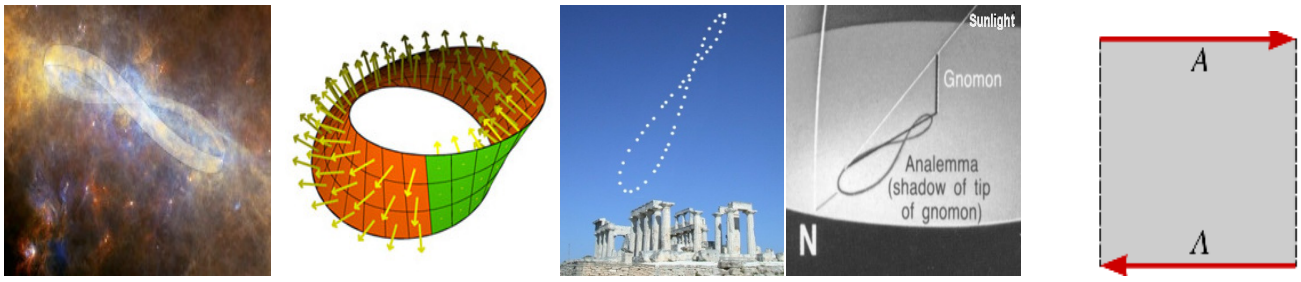
6. Logophysics: Nonorientable Topologies and their Geometries, Signification in Physics, Geology, Astronomy and Cosmology

Another example for logophysics, the fusion of physics and logic, originates at the foundations of the former. Indeed, Newtonian physics, actually the Third Law, claims the existence of a reaction force to an action force, to further claim that they are duals; i.e. they have the same magnitude and point in counter directions. This is the dual setting of classical physics, that carries to the whole body of Physics, in terms of a principle of equilibrium. Thus, Newtonian spacetime geometry, is considered absolute and independent of the forces, which have space for their contention, yet with no connection with space on which they merely are placed. Space-time is thus a medium for forces, which operate linearly, in contrast with vortical rotational (non-inertial) motions (unaccounted by Einstein's Relativity restricted to inertial motions) as is the case of torsion, which have no counterforce, and thus are called pseudoforces, despite their universality; this is another example of Popper's indication of sciences having gone amiss, with very too few physicists having any qualms with the loss. This is the Cartesian conception of space and of objects which are deemed as separate from forces; hence they turn to occupy space and thus they signify it by introducing ex-nihilo a difference which is not ontological if not associated to dualism. Forces and objects become experientable sensorially, either by direct interaction or through measurements. Thus, forces have no determining action on space, although they manifest an influence on it. Indeed, in General Relativity, massive objects in some

ranges curve spacetime, yet they are extra-geometrical objects –for which Einstein postulated a non-geometric source for the geometry, the so-called Einstein energy-momentum tensor, which he dubbed to be "clay-like'', for its ontological incoherence and epistemic brittleness, as Popper would have it. This take on the geometry that is the core of General Relativity, is unlike the living cell which is a self-referential space construct, say, an amoeba extending pseudopodes to move and act in the environment and on itself, or more generally, the self-construction of the cell. Also, the conception of time as another space variable envisaged by Einstein, is not the case for living structures for which time is not the mere physical parameter associated to material existence and communicability through a distance. Instead, time for living structures is processive, the very essence of their self-determination.

Yet, on a MB, one sided, bounded by a single contour line, we need to make no such assumption of the existence of dual forces nor to further turn them to a fundamental law of physics. Instead, the physical law appears as a topological constraint produced by the twist of the MB and the ensuing symmetry, stating an equilibrium between them, while indeed the physics is determined by the global topo-logical structure. We have here -as we did previously- separated topology, the field of morphological spatial studies in mathematics, by hyphenazing topo (locus) and logic. This was done in order to emphasize that in our understanding of topology, there is another fusion which is disregarded, that of cognition through logic and through form (locus), thus topo-logic is associated with in-formation: locus and form, as logic. This is the active field of morphing through thought, intention, which we usually ascribe to Life, yet it is general to all processes (Rapoport 2011b).

Indeed, a normal vector placed at one point of the surface is moved 360º to face normally the "other" side, an other which is fictitious, and this second vector is identical to the first, it actually is the original vector but motioned, yet it points outwards of the surface. This is due to the one-sided non-orientable topology of the surface in question, an embodiment of a 180º torsion. We can move this vector a further 360º turn, and return to the original point, as in the Figure no.1 below:



A B C D E

Figure no.1. In E, the Moebius Band is constructed by joining the top and bottom sides of a square together so that the directions of the arrows match; this requires a 180° torsion/twist, as in aural space. In A, the MB, in the centre of the Milky Way; photographed by the Herschel Telescope, July 2011; in http://herschel.cf.ac.uk/results/twisted-ring-galactic-centre; courtesy of NASA. In B we see the continuity between the positions of a normal vector at one point near to the transition between red and green areas,facing say outwards. We move in anti-clockwise direction to reach the same point, but now it will be pointing in the opposite direction than the original. In C we show the MB Analemma, taken through a whole year exposure of the sun to a fixed camera, placed on the site of a Greek temple; http://solar-center.stanford.edu/art/analemma.html. In D we show the Analemma as produced by the image projected by the Sun on the tip of a rod, the Greek gnomon or the Egyptian merkhat/obelisk (Purcell), or a humble rod. Remarkably, the pedestal sustaining the rod as in sundials, i.e. the gnomon, was called the Analemma, ‘’that what supports’’, instead of the image. The reckoning of the Analemma is an operation that demands a whole year for registrations. Charles Ross’ *The Year of Solar Burns* reckoning of the Analemma, can be found in the Chateaux d’Oiron, Loire Valley, France, and as far as we know, is the first one to have been produced in several centuries, until more recent photographies serials.

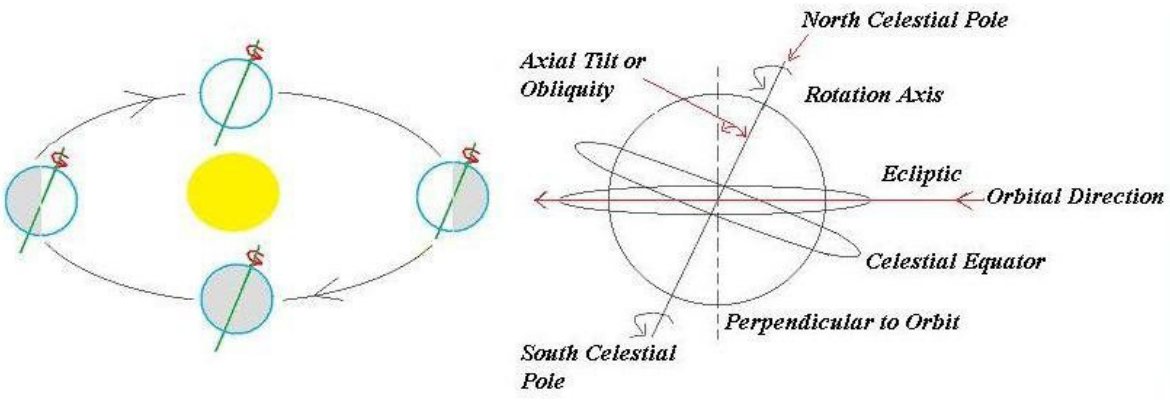


Figure no.2. In the lhs the motion of the Earth around the Sun in an elliptic orbit, combined with the precession, the cyclically variable axial angular tilt of (current value) approximately 23.5º of its axis of rotation with regards to the line that joins the North and South Poles. This is the origin for at least two cycles, Analemma and the motion of the North Celestial Pole with respect to the Polar Star. The precession of the equinoxes was central to the Mithraic Cult (Beck).

The MB does not only appear at the very centre of the galaxy we inhabit, a sign of self-reference for us and to others, if not to the galaxy itself. Figure no.1 C shows the Analemma produced by the precession of spinning Earth along its elliptic orbit around the Sun in Figure no.2. By projecting the image of the Sun on Earth, say by a rod-merkhat-gnomon, in its yearly elliptic orbit around the Sun, the MB appears as the signature of the precession (Figure no. 1 D). Also a serial year long photograph as depicted here in Figure no.1 C, obtained by fixing the lens to a point of the sky, taken at a certain fixed hour all year round, will manifest the MB Analemma. Another way of tracing the Analemma is through a pin-hole camera or still a hole in a roof as in Rome's Pantheon, and in the cathedral Santa María del Fiore, Florence, Italy.

Earth, with regards to the Universe, can be thought as a pointlike particle submitted to the action of the self-referential torsion geometry of the universe which couples with the rotation, producing thus a precessional motion with respect to a tilted axis of rotation with respect of the geographical poles (Rapoport & Sternberg).The precession of Earth produ-

ces many cycles, but two of them are particularly basic: Analemma, the year long rotation of Earth around the Sun, basic to time reckoning by sundials and for the determination of the four seasons through the equinoxes and solstices, and thus to agriculture, social organization, religious life as embodied in the Myth of Eternal Return (Purcell). Secondly an approximately 26,000 year long cycle. It is manifested by the 50'' shift of the North Pole's star, every 72 years, due to the precession, which establishes thus the cycle of return of the polar star, *Hamlet's Mill* in Santillana and von Dechend's account. According to these authors, who were unaware of the Analemma, it is also the basis for the Myth of the Eternal Return, an invariant across civilizations (Santillana & von Dechend), also basic to the Mithraic Cult (Ulansey). These shifts are associated to the initiation of new Zodiacal ages. Santillana & von Dechend: " It is said that it must have taken an almost modern instrumentation to detect the motion over the brief space of a century, and this is certainly correct. Nobody claims, however, that the discovery was deduced from observations during one century''. The Analemma appears in the overall design of Newgrange, Ireland, the megalithic site built circa 3500B.C, which directs light into the passages of its structure in the winter solstice; a similar phenomenae is found in the principal gate leading to Angkor Wat, Cambodia.

Common to many civilizations, Celts, Egyptians, Sumerians and also appearing in the Torah, was the lunisolar system, and particularly, cycles of 30 and 40 days length. Devices, both of seemingly simplicity such as the Nebra Sky Disk, or of exquisite complexity as is the case of the Antikythera Mechanism (circa 100 b.C.), the first known –to us- computer system, allowed to determine the solstices and predict solar and lunar eclipses. J. Dwyer argues for the importance of the lunisolar 40 days cycles, quoting the Torah, Philo

Judaeus, early Christian scholars, and the astronomy Book of Enoch, the Etyopian, that were crucial to Moses' and Jesus' probational epiphanies (Dwyer).

Yet, what civilizations have reckoned and artists have reproduced, Nature, the unmatched semiologist, by the same logophysical principles, which require further specification, has engraved Earth's crust forming a landscape of geological Analemmas of awesome beauty, as is the case of the Paria Plateau, Vermilion National Cliffs National Monument, USA; (Analemma). We cannot but venture, that this example would have deeply impressed Teilhard de Chardin. Indeed, he could not integrate the cyclicity of Infinity in Nature with the open ended teleonomics that he advocated in his perennial work -see page 101 in (Teilhard), an integration which is the case of the present ontoepistemology, yet in a joint open-closed development, as is the case of both the KBL and the HKBL, for which there is a return to the Origin. Most remarkably, these geographical stratigraphic Analemmas which appear from the interaction of Earth's crust with the electromagnetic and gravitational fields of Sun, Moon and other planets, are related to the Croll-Milankovitch cycles, which are the signature of the Hyper Klein Bottle Logic of the interrelations that stem from both the obliquity of Earth's axis of rotation and the precessional rotation, as well as the cyclical variation of Earth's eccentricity orbit. These cycles are further related to the folding of Earth's crust according to different harmonic scales, and to the establishment of *geological time with discontinuities in its crustal manifestations*, and further of ecological time (Bennett), and to climatological cycles (Croll) as is the case already of glaciations (Muller & Gordon), to oceanology, to the actual formation of storms, etc. (Milankovitch, House). It is not just two cycles that are related to the Myth of the Eternal Return, but a myriad of interrelated cycles that are the substantial history of Earth and of the inanimate and living

domains, as manifestations of coupled Time operators intertransforming the virtual and the real domains. This is the astro-geo-logical design of Earth's crust and dynamics as well of its atmosphere, rather than the notion of chaotic landscape and atmosphere and their dynamics, that imperates in the trades of these separate sciences. In fact, the turning-inside out of an embryo as the unfolding of the bauplan of a body, is also the case of Earth's crust, in which older geological strata, through rotational motions came to sit ontop of younger strata (http://homepage.smc.edu/grippo_alessandro/unc.html); thus in distinction with Newtonian time, geological time is evidently non-linear, and harmonics are associated to its establishment and still to its gaps, the unconformities ignored by Darwinian evolutionists. Alike the case of the conformation of Earth's crust, these cycles are actually embodied by organisms as defect configurations, lines of growth patterns, as in the case of invertebrate skeletons, as first suggested by Leonardo da Vinci (Clark). Hence, inasmuch harmonics appear already in the 2:1 resonance inherent to the Moebius Band and incorporated in the Analemma, their signature embodied in the Earth's crust and atmosphere, extends to the patterns of organisms. Hence we are lead to propose, again, that harmonics play a fundamental structuring role in which Φ plays a modulating teleonomic role of interfering with resonances, modulating their amplifications to yield a final form, already evidenced in the Periodic Table of Elements (Boeyens), and to further propose that this is also the case of the human bauplan, as implicit in the Man of Vitruvius. It very much seems that after the movement of the Renaissance to bring them to the fore, harmonics has been cornered to music and acoustics, although implicit already in the old quantization rules of the first epoch of Quantum Mechanics, suppressing its fundamental organizative role in Nature.

In the past, civilizations were aware, although we know not how they reached for this information, unless perhaps by interpretation of places like the Paria Plateau -which would have been a formidable feat in itself, that they appeared and lived as manifestations of Time through which Space was signified; they organized their lives and lived through Time and its terms. Will was the agent of this manifestation, and the KB and HKB logophysics manifested the climatic, cosmological, astronomical, and as revealed, geological cycles as well. We shall complete this lifeworld, by showing the embryological bauplan, and its anatomy-physiology, as another manifestation of this logophysics.

7. The KleinBottle and the KleinBottle Logic: Foundations for Logophysics

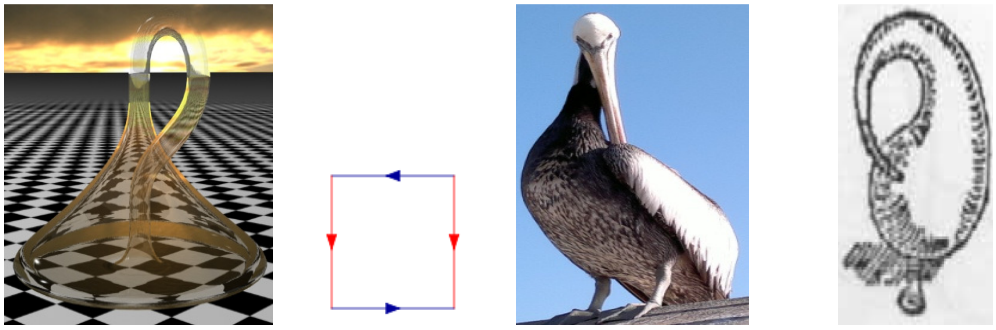
We consider the Klein Bottle surface (KB), for which the topo-logical lawless proto-form of Newton's Third Law is also the case, as a topo-logical constraint: a normal vector pointing out in one side is driven to stand in the same point albeit in the ''other'' side. Now this end vector opposes the initial one, but now in what locally seems to be a second side which is not the case (Polthier, 2003). Globally, it is the same side, the same vector that its motion constitutes an holomovement, yet one in which the wholeness is manifested and realized by the singularity, the hole of self-penetration.This is the embodiment of the logic. It can be formed as the zipping of two Moebius (MB) surfaces with opposite twist as in the right hand side in Figure no. 4.In distinction with the MB, it can be generated as the superposition of a torus identification (as in Figure no.3B) and the MB opposite orientation, which can be seen factored in the other three images below: Initiated by self-penetration completing thus a full 2π rotation, the realize the second MB identification is accomplished by a second 2π rotation and thus the KB, is completed, through a full 4π rotation. For visualizations see http://plus.maths.org/content/os/issue26/features/mathart/Build and

http://www.youtube.com/watch?v=TGe6m9gfUNk&feature=relatedwith4pirevolution.)

Alternatively, we can understand the formation of the KB as first producing the 2π rotation to produce the Moebius identification, completed with the formation of the torus by self-penetration, as in:

1. http://www.youtube.com/watch?v=E8rifKlq5hc

2) http://plus.maths.org/content/os/issue26/features/mathart/Build3



A B C D

Figure no. 3: The KB placed in a background environment (A) and the topological identifications that abstractly produce it (B); opposite sides are identified yet in accordance with the direction of the arrows; those equally directed establish the symmetry structures and the two sides with opposite direction, the asymmetry structures, both crucial to the form/function –respectively-polarities integration that is crucial to the Cosmos and Life, as in the Pasteur-Curie Principle (Lima de Faria) . The KB and the iterated chessboard, generate a representation of the genetic code and the algebra of quantum mechanics (Rapoport, 2011c). In D the alchemical flask, Pelican; heat entered in the bottom as in A heating the elements which flow through the neck unifying Inside with Outside (Purcell). The pelican in C beaking its chest as in the Pelican Christus, a symbol of the Redeemer (Purcell). The KB originally appeared as the cap of freedom of the Phrygians of ancient Anatolia (Purcell), weared by Mithras, as a principle that unifies the opposites. According to Jung, a cap represents what is thought, and thus the Phrygian cap is a sign for Self-reference. This cap appears in Picasso's 1930s works, related to the Tauroctony, the "slaying of the bull'': the turning away from the constellation of Taurus as the polar locus on the long cycle in the MER to initiate a cycle headed by Aries (http://en.wikipedia.org/wiki/Tauroctony). It was weared by the *Three Magi Kings* http://en.wikipedia.org/wiki/File:Early_Christian_Magi.JPG, by France's Marianne as the emblem of the Republic and the French Revolution, by the Celtic Pixy which thus became a symbol for the shamanic cap, and weared by Troy's Paris (Cirlot) as a symbol of his servitude to Eros. Thus, it was further related to the Phallic Cults and to the origin of the practice of circumcision, also practiced by the Mithraics. The Phrygians, enslaved by Alexander, were related to the early Scythians, who migrated from Ireland; they adored a goddess of fertility, Cibeles, taken by the Romans as their own, as Alma Mater, was considered by the Greeks, as the mother of all creatures, gods and earth.

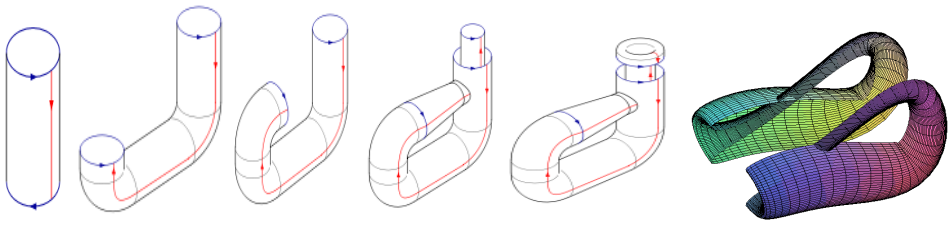
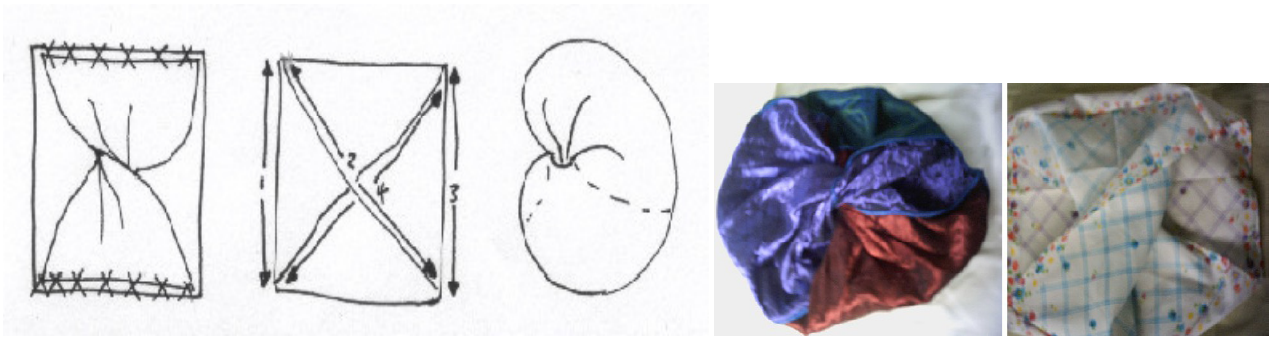


Figure no.4: The identifications as they unfold to produce the KB; courtesy of Inductiveload ©. In the final picture –courtesy of Theon ©, we see two oppositely twisted MBs produced by cutting the KB along the longitudinal section; conversely, zipping them we obtain the KB. Yet a single MB can be obtained from the KB, an operation that we shall not present in this article.

The construction of the KB as presented above in Figure no.3B, as an initial identification of two sides of a rectangle by glueing two opposite sides with the same orientation and further identifying the other sides having *opposite* orientations, makes the actual construction of this figure in 3 dimensions impossible without the recourse of self-penetration, in distinction with the non-orientable MB which can be seen as contained in space in a Cartesian sense, and requires no such penetration, but a self-identity. This creates a topologically imperfect model in 3 dimensions since a hole has to be produced (which glassblowers handle using glass, i.e. a liquid crystal, which is the structure of biological cells) so that its construction already introduces singularities which through the in-formation flow produces the whole structure, so that the wholeness and holeness are in dialectical complementarity. Remarkably, this self-penetration will manifest the torsion folding embodied in the KleinBottle jointly with the singularity. This can also be seen in producing the KB from a MB: the Moebius Klein Bottle, presented below.



A B C D E

Figure no. 5 The Moebius Kleinbottle, a posture of the KB, is easily constructed using three squares. This is the model described in Lewis Carol's Mein Herr. Two squares are joined together to make the twisted MB to finally stitch a third square as in B: Moebius KleinBottle in C and D. The model in C made with three different coloured squares shows the twist in the purple square. In D, a model is of the same design and is offered for the reader to sew the third handkerchief onto the continuous edge of the Moébius strip. Being a fabric with a grid printed on it, the orientation of the diagonal and orthogonal weave is revealed. From (Purcell), reproduced with the kind permit of the author.

To avoid the self-penetration, the Cartesian mathematician spells out the contention of the KB in 4 dimensions as the solution to its impossible construction, unless through self-penetration. The Cartesian conception of Mathematics strives for constructs whose realizability is pushed away to a passive abstraction, a non-action, an idealistic creed for which Mathematics is the metaphor for the power of ideation of a suspended from recognition fusion of the real and ideative realms. It is by the sole fact that the KB is a mathematical entity, unattainable without the enaction of the subject, an operation absent in the ABL ontology, that the KB is claimed to be a metaphor, yet unrecognized its metaphoron, i.e. the being which is being recognized in its likeness to the KB. The suspension stems from a missing ontological locus, constituted in essence by self-reference as the self- action of Being by and through ideation and further, the reification of the ideative realm. We have identified this system already at the start of this article, in which Time and thought as image and as process, which we have already seen is the case of the KBL, are the additional loci that allows from Being and

subjectivity, to close on four onto-logical loci by self-reference. Since the classical dualistic stance has obliterated from its being this system but kept an exterior Being to which positive and fractured science is attached as its deplenished metaphor, it is no wonder that the Cartesian mathematician cannot identify the metaphoron for which the KB stands for. It is the four loci ontological system of Self-reference, that the broken sciences can not conceive nor embody, as witnessed also in the failed attempt to suppress Paradox in Russell's and Whitehead's *Principia Mathematica*.

8. KleinBottle Logophysics, the development of the embryo and the Mystery of Life

We have seen that the reification of the KB requires self-penetration and with it the singularity of the reentrance of the surface on itself, blending context and content, exterior and interior, body and idea; it is an *embodied* ontoepistemology and one of its examples is the embryo. Several models of the embryological differentiation have been proposed, both chemical and physical. The logic that is ascribed to differentiation, and to the genetic code and evolution is the ABL apparent in the 'exterior-interior'(E & I) dualism ascribed to biology in terms of membranes and the fact that the formation of the embryo, appears to undergo in *each* step, a differentiation which takes two possible developmental states: endoderm and ectoderm. Already the ovum, conceived as a two-sphere, is conceived as an E & I which are fixed, and in terms of which the formation of tissues will proceed repeating this logic; This contradicts the fact that pluripotent stem cells, i.e. those cells which are related to the primeval mother cell, have the factual possibility of regenerating organs and tissues, thus showing that ABL can not be the logic of embryological form and development.

Topological studies of embryological differentiation, that have epistemologically returned to the basics of morphology , have pointed out that the two-state character of the ovum's membrane,

only orientable (i.e. with a distinctive E & I) geometries are singled out (Jockush). Our notions of E & I are related to the perfect static figure of the sphere. Yet, an ideally infinitely elastic 2-sphere can be smoothly transformed through eversion (Smale's paradox), i.e. the "outside'' can be transformed into an "inside'' and viceversa, through smooth (i.e. no sharp edges produced in the process) self-penetration, without producing holes nor any creases .The latter condition is not the case of the blastopore invagination in which the crease (a folding which is not about curvature, but a shearing torsion motion) is produced superposed with the invagination, showing the torsion folding of the geometry produced by shear; see (Rapoport, 2011b) .

Thus, through topological (i.e. continuous and invertible continous) transformations, self-penetration -as is the case of the KB, rather than being ruled out, is indeed possible and in the case of the blastopore invagination, torsion is the field that will develop into cleavage, though non-orientability is not manifested in the process nor the end result. Yet, the eversion of the 2-sphere is realized in terms *half-way surfaces* that mediate the eversion:untwisting two mutually interpenetrating KBs (http://www.youtube.com/watch?v=bGiVPj2P19s&feature=related), particularly 0:21 to 1:06, and 5:16 to 5:46, the Morin Surface, which we notice that has no holes), that mediate-partake in the process of eversion, to create orientable sections of the 2-sphere. It is the superposition of the outward and inward motions that produce these intertwined KBs, after self-penetration of the caps (which undergo each one a 180º rotation, each cap in a direction contrary to the other one in the alternative eversion, in 3:30 to 4:0 http://www.youtube.com/watch?v=x7d13SgqUXg&feature=relmfu transformation from non-orientability to orientability); we shall see that in this eversion may reside the solution to the logophysical principle for Life and the inanimate, as well. Thus, the blastopore invagination

may be related to the actually non-infinitely elastic 2-sphere-ovum eversion. Indeed, in the actual completion of the invagination, with the formation of the mouth, the development front of the shearing will indeed push the inner side of the ectoderm to face outwards by pinching the North cap (drawn at the left hand side of the sphere), as shown in the r.h.s. of the sequence in Figure no. 6 below.

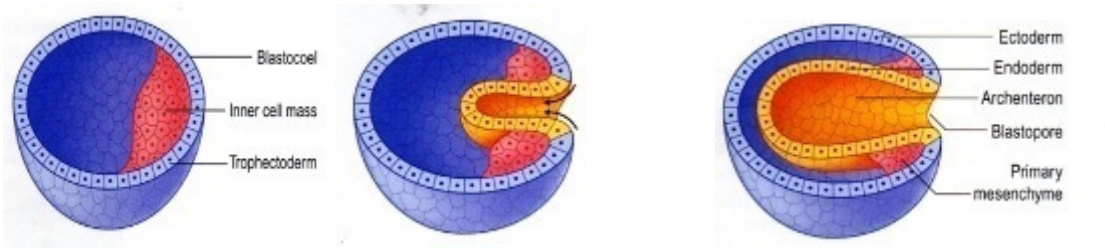


Figure no. 6: The Sea-Urchin gastrulation. The Exterior/Interior duality is clearly not the case through the in-formation of the double bag invagination which will produce the bilateral symmetry. This in-formation proceeds by shearing motions, i.e. torsion. The geometry of the gastrulation is self-referential : as a process the developed embryo is not contained in space as in the Cartesian take, rather self-contained.

This turning inside out is more than an abstract mathematization of gastrulation. Indeed, the X-ray microphotography series in http://www.brh.co.jp/en/experience/journal/39/movie01-r.html shows an eversion of the multicellular green alga *Volvox carteri* ovum is the case (Nishii et al), and notably the intertwining that realizes the eversion through two superposed KBs seems also to be the case; Volvox is currently considered the case study in embryology. It is a crucial biological example of multivaluedness: It was once described as "the first multicellular plant." Now it is generally thought of as a colony of algae cells that have made a sort of "long-term commitment"; thus, the Socius which we shall characterize by the HKBL, is the case for Volvox. It reproduces both asexually and sexually and the progeny always grow into the

colony. Parasites dwell inside it, so this behavior of turning inside out and its converse, is very much the being of Volvox, as well as the multivaluedness of its behaviour.

In the second stage of the blastopore invagination, more blastoderms cells ingress to form the primary mesenchyme and other cells further elongate along the sides of the archenterone. The final stage will produce the turning in-side-out with the formation of the mouth from the penetration of the ectoderm by the archenteron in the animal pole, we have the formation of the mesoderm by mesenchyme cells, and of the anus of the mature animal in the vegetal pole. This self-penetration by the ovum occurs through a secondary invagination. Indeed, through a surgery of the ovum, say in the case of metazoans which share with animals a bilateral symmetry, with the formation of a secondary invagination (a gut and a digestive system) which joins the original mouth of the blastopore, yet producing by this a duplication of the body that topologically is the so-called double covering of a surface, in this case, this double covering of the KB, is a 2 dimensional torus. Thus while this may lead to believe, as we do, that bodies are toroidal, this is in the failure of understanding that this (orientable) torus actually embodies the duplication of a (non-orientable) KB. Indeed, by this secondary invagination, the topology turns to be that of a torus by actually the retraction initiated with the blastopore invagination pinching the ectoderm and thus E and I becoming one as occurs in the rhs of Figure 6, in a final stage which we have not depicted.

The eversion results in the double bags of the amnion and yolk sac, and the manifestation of the non-dual logic is the appearance of the mesoderm sandwiched between the ectoderm and mesoderm. The ectoderm, in contact with the amniotic sac and fluid, will form the nervous system and skin (the neural net).The endoderm, in contact with the yolk sac, will form the linings of all our circulatory tubings (veins, arteries, capillaries, microcapillaries), along with the

glands; it is the primary source for the fluid vascular net. The mesoderm in between the two, which as discussed is a manifestation of the KBL of the eversion of the fertilized egg, will form the muscles and connective tissues, as well as the blood, lymph, kidneys, most of the genital organs, and the adrenal cortex glands. Hence, the eversion is associated with the formation of three in-formation systems of the matured embryo: neural net (ectoderm), the vascular system (endoderm), the connective tissues which form a unitary net, which has been largely disregarded (Oschman). All three systems contain the shape of the body as a whole: the body of shape (Varela and Frenk, 1987). Therefore, the KBL embodies the body's in-formation, yet this also extends to the codification of the sensorium (Werner, Rapoport 2012, Schwartz, Swindale).

The importance to the unitary bauplan for the body regulation, from the cell to the whole macroscopic integration through the fibrous fascia net, and its relation with the auto-origami folding and refolding torsion action of the embryo, is worth of further attention. It installs the initial cellular specialization within the embryo, and occurs at about two weeks' development. It installs the difference that produces the differences (Bateson, Johansen 2012), by the eversion and the torsion folding: Until the initial step of the eversion, in which E & I are the only mainly manifested two states, the formation of the mesenchyme heralds the in-formation of spatial relations in the egg, which in the egg were not evidenced. So the appearance of the mesenchyme brings the manifestation of anticipation since it is imperative that the spatial arrange-ments, in the background of the increasing specialization, be maintained while the bauplan' motions occur, so that the ongoing complexity and growth of the embryo, is the case. Thus, the process of in-formation of the connective tissue, as well as the processes of in-formation of the neural and vascular systems associated to the three logical states, need to

unfold according to the logic that sustained the eversion in the first place, and furthermore, it needs to keep the in-formation of the shape (viz.) of the whole body, since the logic is of integration. This turns out actually to be the case: Each of the three systems contains the shape of the body. The egg is a whole, developing by this logic, and the three states (ectoderm, mesenchyme and endoderm) and the three unitary shape systems (neural, vascular and connective) unfold from it. This will be crucial to the bauplan for the embodiment of cognition, self-cognition and the anatomy-physiology that is unseparable from them. In fact, the development plan of the embryo (the embryological bauplan) is through the physical agency of torsion folding (instead of curving as in General Relativity) which goes all the way to produce the self-invagination of the exterior of the ovum which is embodied in the self-penetration as the end result of the torsion field retraction. We must remark that before the eversion is produced, three *potential* spaces are formed together in this double-bag produced by the invagination:

A: The inner space of the inner bag; B: The space produced by the holomovement of invagination, a retraction of the environment that will finally pierce through the inner space; finally we have C: The environment, the outside of the ovum, whose fate is to move together with B to achieve self-penetration by piercing through the boundary of A. Remarkably, this parallels the KB as described in Figure no. 7:

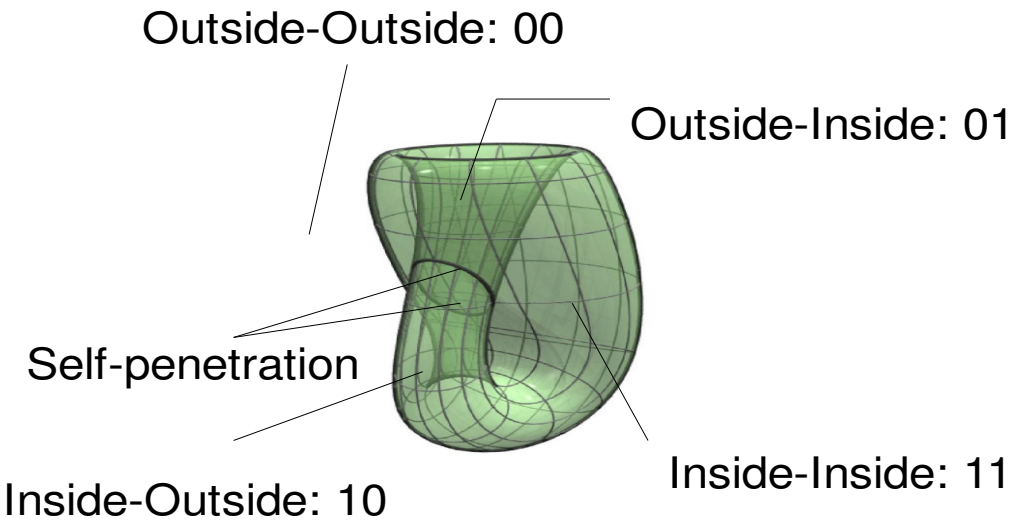


Figure no.7: A natural topo-logic of 4 states (the Klein Bottle Logic, KBL)which has two digits representtation: Inside-Inside (represented as 11), Inside-Outside (represented by 10), Outside-Inside (represented by 01) and Outside-Outside (represented by 00). The mediation states arise from self-penetration, absent in the merchanical-dual-membrane and in the Cartesian conception of object-in-space-before-subject, are paradoxical states associated to time waves. From the KBL appears the genetic code with its 64 elementary codons, and furthermore the genome and its association to the mathematical structure of the Dirac algebra of Quantum Mechanics (Rapoport, 2011c). An alternative representation for the KBL and still for the genetic code (where know the 64 codons will be identified with the 64 hexagrams (Schonberger), is –following Leibniz- to represent 0 & 1 by the Yin and Yang symbols, ⚊ , ⚋ , respectively, and thus produce, ䷀ ䷁ ䷂ ䷃, tai yang, shao yin, shao yang and tao yin, respectively of the I Ching, the Book of Mutations. The Tao Ji, ☯ embodies the interpenetration of Outside and Inside, yet with no perception of them nor conceptualization in terms of them, but their mutual interpenetration. The Tao Jin can be obtained by recurrent geometrical operations on the 2 dimensional plane image of the Analemma (private communication, Melanie Purcell).The KB used in this figure is a modification of Ttrung's .

Thus, before completion of the sphere-ovum eversion, the space A is paralleled by the Inside-Inside, the retracting space B coincides with the Outside-Inside, and the environment is, of course, the Outside-Outside. The latter, on completion of the eversion, by self-penetration in which space B becomes the Inside-Outside simultaneously fusing with Inside-Inside and Outside-Outside, completing the holomovement and states of 4-space-state KBL. Thus, eversion is only possible through the mediation of the environment E and the inside I of the ovum, by the spaces-states 10 & 01. We see very clearly that the physics (and other

systemics, say genetic, chemical, etc., must conform too) and the logic of this process are unseparable; the logic is clearly non-dualistic. Rather than a static reflection of the dualistic stance, this motion reifies the wholeness and the Outside and Inside states which are *locally* meaningful and signified by the dynamic connection that the transitional states 10 & 01 produce. The self-construction of the cell is not independent of the construction of the cell' environment nor of the holomovent that determines them as an in-between. Thus, we have a paradigm of space which does not comply with the Cartesian take of a structure/process-contained- in-space. Rather, the cell is self-contained, and still, it is this self-determination process which is and makes the cell, and thus the environment also is self-contained. This self-contained environment is no longer a mere container, as we may think of the extracellular matrix realized through the agency of the mediation by self-penetration, by the spaces-states 10 & 01, which in the KBL, are time-waves. They correspond to imaginary (in the literal sense, as well as in the sense of being represented by the square root of minus 1) logical states, which we recall that they represent the res cogitans, in distinction of the real numbers representing the res extensa. Further, we recall that the Time operator intertransforms one domain into the other. Thus, the cell's space is a realization of/by time, in fact by time-waves (Rapoport 2011). Therefore, the exchange of E and I as in Smale' Paradox, yet regarding the ovum as non-infinitely elastic, rather than being a purely theoretical construct is actually reified as a *non* linear eversion transformation of the ovum, actually visualized for the case of the germ cell of algae *Volvox carteri*. In other words, the infinite res cogitans elasticity allows the self-transparency of the intertwined KBs to actually manifest the bodyplan by creating singularities, holes, as res extensa embodiments.

Having concluded the eversion of the ovum, the resultant of this process is the actual build-up of the body's bilateral symmetry through the formation of the canal going from the mouth to the anus; yet, we insist, it is a doubling of a KB-morphogenetic field, not the manifestation of the dual division between E & I. So, we propose for a theoretical organizing principle, that the blastopore invagination, up to the formation of the anum-guts-mouth invagination , is the manifestation of a *virtual* (imaginary) eversion of the elastic ovum with a crease. For a physicist this should be no reason for scandal, in thinking on the vacuum and its infinite virtual photons, electrons, etc. as the source for the world: Apeiron. Merleau-Ponty, in *Eye and Mind*: "… neither the drawing nor the painting belongs to the in-itself any more than the image does. They are the inside of the outside and the outside of the inside which the duplicity of feeling makes possible and without which we would never understand the quasi presence and imminent visibility which make up the whole problem of the imaginary''. This turning Inside-Outside into Outside-Inside mentioned by Merleau-Ponty, which is essential to the manifestation of the logophysics of embryological development, is also the perceptual interpretation and buildup which neuroscientists, in studying the topographic map of the sensorium, identified as the KB (Rapoport 2012, Swindale, Schwartz, Werner), in Figure no.7. In fact, this perceptual logical inter-transformation is the logophysics by which the double 3D, space and momentum coordinates of physics, required for positioning objects in space and still carrying measurements of dynamics, are generated (Rapoport 2011c).

Merleau-Ponty: "For the imaginary is much nearer to, and much farther away from, the actual—nearer because it is in my body as a diagram of the life of the actual, with all its pulp and carnal obverse exposed to view for the first time.''; page 4, *Eye and Mind*.

This imaginary diagram of life, is the bauplan, imagined and reified through the agency of the KB logophysics.

Returning to the issue of the crease, the imperfect (in the Cartesian sense of discontinuity, as having self-penetration holes absent in the half-way eversions) embodiment of the imaginary, as in Merleau-Ponty, is distinct to the Smale's Paradox which assumes an ideally infinitely elastic sphere which is not the case of the ovum (Volvox is not infinitely elastic and the eversion starts with the production of a hole), while keeping it as the virtual process of differentiation, since this requires a mutual penetration of the animal and vegetal poles through the intermediate agency of KBs. We can identify in the development of the ovum to produce the mature embryo, the four loci ontological system, and in particular, the operation of thought as a process through operational time, to produce the material world of Being, manifested in the developed embryo. We have seen that this is sustained by the subversion of the deemed reflective dual categories of E & I, through the KBL operating virtually to sustain this. Thus, the ovum is an ontopoietic system, but its logic is not dual as in the theory of autopoiesis, in which the operational closure of the autopoietic system is for self-preservation vis-à-vis the environment , the Other, but by subversion of its constitutive distinction through the KBL, disregarded in the theory of autopoietic systems (Maturana & Varela, Varela). Rather than the "unreasonable effectiveness of Mathematics'' claimed by physicist Eugene Wigner, we are presenting the lifeworld of Logos, in which the real world materializes from the imaginary world, by and through a self-referential logic of self-containment and its physical agents, which thus become embodied, both materially and operationally, the latter as physiology. In (Rapoport 2011, b,c, 2012) was introduced the conception that this logophysics is not exclusive to biological and chemical systems, but universal, in which even the natural numbers (Johansen

2010), evolving in the locus of thought as a process, have the same lifeworld, and are constituted from the potentia of the ontological locus of thought as a process and the KBL, unfolding from it as structures in toto.

9. The Klein Bottle Logic, Topographic Maps of the Sensorium and Physiology, and the Problem of Design in Biology

It is important to recall that the nervous central system, which includes the brain and the spinal chord, arises through development from the *ec*toderm. Thus, what is conceived in the Cartesian Cut framed neurosciences to be the anatomical basis for thought, as the deepest *interior* world of a human being, from the understanding which considers the body in terms of the embryological development which as we saw exchanges E & I, is not related to the interior at all, nor to the exterior, per se. Rather, the brain and the central nervous system partake of the KB morphogenetic holomovement of folding towards self-re-entrance that transforms and integrates both the world and the body through the nervous system that has been interiorized by the logophysics from which the embryo develops in the first place, and the embryo-logic (!) unseparable to this holomovement. It is through the KB that the sensorium appears as transforming Ectoderm into Ectoderm. Thus, it should not come to be perceived as a surprise that the topographic map of the sensorium, topologically is the KB, as already noticed.

Consequently, the topographic maps of the sensorium discovered by neuroscientists, are not related to what in the Cartesian Cut is believed to be representations of the exterior world - through the sensorium (having the skin as its ectodermal gestalt)- to the (ectodermal) nervous system, but rather representations that are constituted coherently with the logic of development which as we showed already, is not dualistic, exchanging the world with the interior of the body qua processes, not mere objects. In terms of the logophysics of embryological develop-

ment, this topographic map is the cognitive bauplan that is superposed with the embryological development, and in the sense of its history, stand for representations of E on E.

Consider the eye, organ of vision; it arises from the ectoderm just like the nervous system from which the retina stems from development, as an inside-out migration . The retina having for function the reception of light through its photoreceptors, is the first station towards the nervous system. Remarkably it faces inwards (but for few species), and thus it is said that the retina is inverted; hence, it is an embodiment of torsion folding and multivalued logic that allows for connecting the "outside'' and "inside'' worlds, through ectodermal turning-inside; thus, embryo-logically, the retina turns to be the last station of the nervous system .

Neo-Darwinist R. Dawkins, claims that this inversion is a proof of "bad'' design, if design would be the case at all (Dawkins). In the present work, it is a proof of the KBL logophysics and its actualization at all stages of a bauplan, which unifies anatomy with physiology, form with function. This is the design that both Darwinists and Creationists have failed to conceive.

Nobel prize awardee G. Edelman's response to *What is Life?* raised by quantum physicist Erwin Schrödinger (Schrödinger) is: ''This mystery remains embedded in the problem of morphological evolution, the processes that gives animals and their organs their functional shape and that yields the most exquisite product of all, the human brain. The properties conferred by these shapes determine the phenotype, and it is the phenotype upon which natural selection acts '' (Edelman). In the previous section we have departed from the ovum and traced its evolution to a differentiated embryo, already at the initial stage of the blastopore from which it will evolve, to find its origin in the logophysical principle and agency of pairs of KBs (actually a HKB;see Figure no. 8 for a more complex case in which holes are the case) which through their folding and unfolding create the basis for the appearance of functional shape and

still evolve towards the determination of invariant shapes in the fully developed organism, that are essential to the functional integration of the organism. This stage of in-formation of the body through unfolding of HKBs materializes as torsion-folding fields that actually embody the differentiation and organization manifesting the body's bauplan. It is the stage in which entropy decrease of the evolving embryo with its increasing complexity is transferred to the environment/mother's own reorganization instead of the entropy increase, which the second law of thermodynamics would claim to be the case for an environment which does not reenter the contained system as in the Matrushkas of Figure no.8A. This is a reorganization which is harbouring and sustaining the developing embryo in an interrelation which aims to their mutual expression, as entangled and separate selves, until birth and further, through heredity and the eternal Cycle of Life. Would we point out to the genome, as biologists of the molecular biology persuasion do, as the source for the inheritance and activation of the processes that we have found to be rooted in the KB logophysics, we shall find that the genome appears in a most simple way to be coded in this same logophysics. But what the all-in-DNA paradigm claims to be the case, the codification and unfolding of a 3-dimensional organism by a one-dimensional linear genetic code, is far from being the case. Instead, we have an HKBL for the body and the genome, thus both 2D, and both unfolding and folding as fractal recurrent gestalts (Rapoport, 2011b,c). We have also discovered that the evolutionary theory that is associated with both the genome, tissue and organ differentiation rooted in the KB logophysics, (as well as the existence of topographic maps of the sensorium that code for the environmental action reaching the skin that is further mapped on the brain), also points out to this logophysics as its roots, yet in a more complex logic which is the one that is at the basis of the embryo-logical

unfolding, since two intertwined KBs are involved turning inside out the ovum: The logophysics for this is rooted in the HKBL, which we introduce in the next section.

It is important to bear in consideration that the auditory system, originally a bony structure derived from the development of the embryo, is derived from the mesoderm, and thus, by embodying the non-dual embryological development associated to a KB , it literally transforms the outside into the inside. Yet, in distinction to the visual system, it does so without turning inside-out, unless damage to the cochlea or intensive stress produces this eversion, embodied in the disfunctionality known as Tinnitus, suffered by Beethoven. Instead, Tinnitus appears to construct an aural percept of self-sustaining brain firings loops, as if independent of the Out-side, thus suggesting that Outside has turned Inside, as if independent of the KB transformation of Outside and Inside and the converse (Zimmer).

This suggests that physio-logical hindrances to the full topographic representation, are metaphors of the natural holonomies that are formed when due to anatomical ruptures or deformations, or still emotional perturbations, that literally produce a Cartesian cut enhancing the inner world as if dominant. In these metaphors, the full KBL is transformed by internalize-tion to the ABL dual logic . The latter is physiologically wired to a novel anatomical/cognitive configuration that sustains the seemingly independence relative to the full natural phenome-nology, in an altered lifeworld. This is also the case of the so-called phantom limb effect, in which the loss of a limb is evoked as if still present through the built-up of alternative relational bodily networks for the sensorium's representation, and in a myriad of other physio-logical-anatomical distortions, that require for returning to the full non-dual logic, a cue given by an outsider (Eyskens), to the effect of contextualization. In some cases, the cognitive cut can be surmounted together with the physio-logical cut; in the case of amputated limbs this is not

possible, but in the mother cells of embryos, or still in full developed species as salamanders and more remarkably in the case of plants, the full being is reconstituted; we have related this reconstitution to the KBL of development (Rapoport 2011b). The fact that anticipation of the action by a new cue may appear to be effective, is that this resets a universal integrative loop (Klein bottle self-referential) prepattern, which is itself a stable but heterarchically embodied, whereby the breaking of integrity has produced a deformed pattern that recognizes the ''interior'' as if independent, and prevailing, instead of an integration. This habituated pattern of an ''illness'' while having a self-referential organization-process-selfperception gestalt, at its level in the heterarchy, acts according to the Aristotelian-Boolean logic of Interior and Exterior separated dual states.

This signal/cue from an outsider, the Other, has a semiotic intent, and for the cognitive aspects, may even reside in a verbal trigger, which appears not to provide the natural bau-plan description, but to evoke its severed integrity and its logic. The function of this cue is to indicate the correct truth value to the cognitively/anatomically/physiologically amputated subject. In other words, to provide a non-distorted representation of the universality of the natural phenomenology.

In this issue of the Other's verbal cue, we here retrieve the issue of the externality of language assumed by purporting that it is a mere descriptor, as in Heraclitus' rendering of process, built from the cut between inner and outer representations. Instead of the externality of language, and of the claim that science is imprisoned by this externality (Matsuno & Salther), we argue for a fundamental cognitive and futhermore holonomic function, both of language and science, which the broken sciences have denied themselves to allow for its surgence, due to the absence of an ontoepistemological stance to be able to do so. This

holonomic function may be used to reinforce the holonomy of either the broken dual logic as a projection of the KBL, or used to the effect of the re-establishment of the full lifeworld. This occurs whenever the cut can be reconstituted functionally, on the basis that there is a natural anatomy to sustain it or an artificial one can mimmick it , as in bionics, or whenever memetic fixations can be removed. The logic of this cognitive co-operation between the Other and the fractured subject, and in particular between Nature and humankind through events of historical import, is the Hyper Klein Bottle, to be introduced below.

10. The HyperKlein Bottle: A Paradigm for Heterarchical Self-Referential Interelations, Life, Cognition & The Socius

Let us return to the issue of the surmountal of the dualistic paradigm ascribed to the membrane to further elaborate a conception on biological organization and functionality. The dualistic membrane is related to the idea that the interior of cell is bulk water which requires an enclosure to contain it. Thus, water in the cell is considered to be unordered and a passive medium for the elements in terms of which the cell organizes. In the sense already mentioned of the Cartesian dualism take for space as a container, the cell's water is a container for the processes and elements in the cytoskeleton, and the membrane is necessary for containing water, and thus it cannot leak, unlike the leaking Apeiron, that alike the KB, it cannot be contained, but is self-contained (Rosen). Thus, this dualistic paradigm is identical in conception to the notion of continuous spacetime which does not leak, as in Einstein's theory, and thus it can contain other systems that act accordingly. The systemic paradigm for this is the set of Chinese boxes, or still the Russian Matrushkas; see Figure no. 8 A . This is the iteration of the Cartesian notion of space, each box being an object containing another box-object, and the subject qua subject, nor subjectivity are nowhere to be found, neither in manifestation nor in

ideation. In this paradigm there is no place for a conception of integration other than defined by the iterated containment as the primary relation and the so-called "emergence of complexity''. Thus, in this paradigm, there is no place for the cooperation, nor for synergy, nor for identity transparency, nor the symbiosis we find in Life, nor the hypercontextuality that we have repeatedly encountered in our previous phenomenological considerations.

A

Figure no.8: Two possible paradigms of interrelation systemics. In the lhs we find the Matrushkas,: Recursive containment without self-contention nor reentrance of the Whole on the Parts; this is the current paradigm, recursive dualism. In the rhs we have a completely different conception. Three examples of the HyperKlein Bottle-HKB (courtesy of the Science Museum, London; Creative Commons ©). The systems reenter on themselves and may also reenter in others, as is the case of the far r.h.s.; this latter reduced case is casually suggested in the antiverbiage –and verbose- manifesto in (Serres). The Matrushkas paradigm is a reduction of the HKBL by erasing all reentrances. Static Mandalas (Sanskrit for circle) are usually perceptually structured alike Matrushkas.

The logic associated to the HKB (henceforth, HKBL, though the logic and the HKB are one and the same, as is the case of the KB) is richer than the KBL embodied in Figure no.7. Each member of the heterarchy has an associated 4-state logic *if* it considers all the systems it "contains'' and is "contained in'' as a *single* one. This is generically not the case, it is

impossible to discern, in principle, for any system its final interelations with its Inside-Inside states, nor with the Outside-Outside states. The HKB is a logic of heterarchy missing in the KB.

Therefore, the HKBL appears as the actual systemics of any process, and in particular, would we take the cell as defined by its membrane as the primeval distinction, then we would find "inwards'' other self-contained systems that are essential to its functioning/organization (the tensegrity structures, the nucleus, etc), and "outwards'' we find the extracellular matrix in which is the cell is "contained'' and which further relates it to an organ, the body, etc. (We notice here that our language does not have a *word* for describing this without reducing to the dualism framed by containment, although language is inherently self-referential, as already discussed.) Thus, we find here the signature of the marriage of the Macrocosmos and the Microcosmos, where plurality is the case for both, a Unity-in-and-through-Diversity. In particular, the HKBL and its multiple Outside-Inside and Inside-Outside states is a natural setting for a phenomenology of time and space foldings and unfolding, mutual and self-penetrations and their perception, and the phenomenologies of interelated lifeworlds. Thus, we have returned to an issue that we have found in our phenomenological considerations.

For the HKBL the "outmost'' system in the heterarchy, re-enters in all systems which also exteriorize as the outermost Outside-Outside state as well as in a myriad of intercommunicating systems. The former motion *exemplifies* the physical action of the Universe in all systems and itself as vacuum fluctuations; it exemplifies also the interaction through other than physical forms of causality of the Universe in all systems, algorithmic: meta-algorithmic, meta-meta-algorithmic, etc. proposed by Johansen in his differential ontoepistemology based on the notion of distinction (Johansen 2012), and in the present ontoepistemology.

Thus, the Universe has no inner nor outer frontiers, nor in space nor in time, which are mere reflections of the dualistic notions . Would we consider the Planck length (10^{-33} cm), for the final inner frontier for the manifestation of physical causality, the algorithmic causalities correspond to a zero-time physics, so that the physics is not exhausted by this interior boundary, since actually the physical realm is a temporal manifestation of them and the higher-order HKB in which they are incorporated as the most basic element of the heterarchy.

In the previous characterization, a particular KB of the heterarchy can be further incorporated in an outerworld, where the exteriority is relative to the previous element, and still can be extended innerwise, where the descent is identical to the previous ascent, relative to itself and the interrelations that are evoked into manifestation and cognition, by the act of considering a primeval distinction that determines the final element brought to-the-heterarchy phenomenology, by posing this distinction. Due to the re-entrances, the heterarchy is weaved by and through holonomy, not Bottom-Up nor Top-Down hierarchy of Boolean Matrushkas-like systems. Yet, this search of the elements and their interrelations in the heterarchy, is not a mere epistemological recourse that the infinity of infinities poses to us, or to any system in regards of determining their ontopoiesis and self-preservation in keeping this boundary distinction that sets the ontopoiesis. It sets the operation of the heterarchy as an overarching system in which novelty, embodied by the interrelation web of Interior-Exterior states, plays an essential organizing role as the unknown yet everpresent operation of Will acting on wills, and its converse.

Thus novelty, either perceived or structurally defined by this cutting off the Other, manifests through the unexpected, undetermined, non-mechanical, a supracausality that is manifested self-referentially (to the heterarchy). Thus, Darwinian natural evolution presumes a random

change (which we can thought as clinamen), which the environment as a supradeterminant Other is to validate or unvalidate in a Boolean way the persistence of its existence. Hence, it suggests a metaphysics with observable effects in time and operated by the Time operator, whose logic of determination and constitution can only be understood in terms of the HKBL. Darwinian natural selection completes the HKBL ontoepistemology of the heterarchy in a most paradoxical manner, erasing the previous complexity. Indeed, it can be interpreted as a negation operator (which, as we discussed before, obliterates signification, and thus in particular, to speak of selection in this setting is outplaced), obliterating the many branches of Nature that could have reified, but were rejected through a superselection mechanism, which is the systemic context here presented , is no more than a "outmost'' negation operator acting on a HKBL, reducing to one reified species. Thus, Darwinian selection is teleo-logical, yet in a way of denial. In the reduction to a single reification, Darwinian selection acts like the so-called many-worlds interpretation of Quantum Mechanics of Everett, in which one state is reified, the infinite non-manifested others pertain to parallel inaccessible worlds. Darwinian selection obliterates the complexity of Nature, that it claims to purport.

An example of the HKB is the fetus/mother complex. Through the umbilical chord the mother reenters into the baby, a differentiated unseparated -until individuation starts with delivery- extension of her mediated by the amniotic sac, the vascular system, etc.; the act of naissance is clearly a turning inside out –albeit partial- of the fetus/mother complex. This HKB is extended to the environment nurturing the fetus/mother. Another generic example is the seed of the plant that bears it through the roots, branches, vascular system, flower, etc. The plant is related to the Sun by photosynthesis (so that the "outermost'' member of the heterarchy, would we preclude the Universe at large, acts already at the microphysical level

and upon the overall metabolism, and warmth induced hormone synthesis crucial to development and adaptation. Furthermore, water which is crucial in determining even the shape of the plant in a changing environment without genetic modifications (Lima de Faria), altogether with Earth's nurturing, constitute a HKB of formidable complexity in which a myriad of cyclic processes operate, as appears to be the case of Earth's stratigraphy and climatology and of the growth patterns of invertebrate skeletons, embodying a complexity of signification in which different planets , Moon and Sun, leave their signature, in the form of the Analemmas. It is impossible to conceive of ecology in terms of the Matrushkas, and all to natural the necessity to do so in terms of the HKBL.

Another universal example of the HKBL is the subject ,operating in relation with the environment through an agent, either an instrument (a device which incorporates through its use or design the fusion of subject-with-object) and/or a cognitive framework (an opinion, a system of belief of any kind or purpose, of ruling or prescriptions, etc.). This is the world of culture, of Otherness and of the Socius, which the Matrushkas paradigm reduces to the dualistic top-down and bottom-up interrelationships, while Hegel and Marx conceived culture in terms of dialectics. Would we think of culture as a constituent of the environment, then we immediately realize its crucial effects on fundamental metabolic, genetic and even anatomical aspects in terms of the introjections of nurture (diet, sunlight, climate) and of extensions of the self that embodies the particular culture and the extensions of the participants/creators of this culture through technology and belief systems, creating and recreating themselves, their kin and the world. Thus the HKB transcends the theory of autopoietic systems, whose authors also rejected its applicability to social systems . Since a most complex web of interrelations in which the heterarchical environment and the selves in their "own'' heterarchy and diversity, embody

a HKBL in which Socius and Nature are intermingled. None of them neither can be reduced to dual operators acting in mutual negation or in purely synergetic superposition, but rather acting through complex logophysical operators, of which the economics is but one of them, with its own operators interrelated to nurture (and thus to genetic and biological factors), and extending to the belief system, and in particular to the material and virtual extensions of the Socius. While the theory of autopoiesis claims that "cognition is construed as interaction between and mutual definition of a living unit and its environment'' (Bitbol & Luisi), the non-dual logic is replaced, as we already said, by the dualistic assumption on the membrane being semipermeable. Remarkably, Varela introduced the three-valued logic of reentrance, through compacting the two re-entrant waves into one single operator, the Ouroboros, yet overlook its implementation in autopoietic systems (Varela). The re-entrances of the system in itself embodying cognition, were replaced, as we said, by a physicalist dual assumption, and thus the KB was replaced by a dual logic through a physical assumption, which belies its thesis of integration. Furthermore, while cognition is construed as interaction between and the mutual definition of a living unit and its environment, the KB logophysics, given by metabolism itself, which necessarily implies exchange with the environment and therefore a simultaneous coming to being for the organism and for the environment through association, the second level of cognition is recognized in the adaptation of the living unit to new foreign molecules, by way of a change in its metabolic pattern; this hypercontextualization and hypercognition is the being of the HKBL, with the creation of a new distinction embodied as a new functional organization. We identify here the essential minimum threeness –as in Peirce- of this hypercontextualization embodied in the HKBL and the first two modes of Life, since the KBL (a single boundary rather than the minimum of two for HKBL that is threeness) already identifies content and context, in which

both adaptation and accommodation are the phenomenology of the logic of two unified worlds, exterior and interior, yet common to both living and non-living systems (with the already provided qualifications of them).

Still, a HKBL higher-mode of contextuality, surpassing adaptation and accommodation of the first and second levels of cognition, such as "…*representation-like* types of behaviour (namely types of behaviour that *evoke* the use of a representation *from the standpoint of an external observer*, but that do not necessarily involve the possession by the unit of actual "pictures'' of its environment, let alone of an "external independent world''…'' is, as identified in (Bitbol & Luisi), the existential mode which we identified as higher-order cognition. It requires 4-ness that is already the case of metaphorization, as is the case of Language, yet it does *not* deprive this existential mode of universality, as methaphysicists may perhaps construe metaphorization and anthropomorphizations, as an evidence of the lack of first principles, as is the case of dualism which is not independent but a projection of the KBL; at the level of language, 4-ness brings to the fore the second and third person, both singular and plural. Rather, anthropomorphizations are resignified in terms of higher-order logic that accounts for their relativism, which is thus not erased, but rather contextualized, thus allowing for novel articulations, some of them quite surprising, which we shall discuss further below.

The ABL projects the agents-devices to the exteriority of the subject as if belonging to the material world, or dually as material extensions of the subject (say an operator of a device) fused with its self (while there is also a myriad of in-between cases between identity transparency and alienations, which both have an unseparable cognitive aspect). Indeed, this is also the case of the agents' cognitive frameworks, which thus are deemed to be transparent to the subject if he construes them as unseparable of his self, or dually as belonging to the

Other. This is also the issue at stake in self-immune diseases,and cancer in which some systems of the body's heterarchy, act *as if* independent of the integrity (and thus diseases are metaphors for the loss of HKB integrity). The actual case is never of complete transparency, since subjects are aware -and may act to ensure self-integrity in denial of what may be perceived as different to their system of beliefs- when they construe these differences as if exterior to them, so we use the metaphor of "closed minded persons''. The crucial notion is that of primeval difference, or boundary (Spencer-Brown) constituting the domain, which is embodied by the particular element of the HKB. We have presented the HKBL by considering more than a single KB, as the logophysics for interrelations which the KBL only sustains the interrelation of a system with its environment, a fused being, created by the re-entering of all elements in themselves and the others. As we have seen, the development of the ovum towards the embryo requires the action of four pairs of KBs, which each produces an HKB, and thus the eversion of the ovum is produced and materialized by the torsion folding of the embryo and the ensuing appearance of the KBL embodied in the formation of the embryo and the shapes systems. The HKBL is thus an embodiment and dynamics of a richer contextuality than the KBL, which we have called as "hypercontextuality'', in which more than two elements of an heterarchy are fused and interrelate.

Returning to the hypercontextualization of the living systems, by the second law of thermo-dynamics, they disorder the environment increasing the positive entropy while increasing their own order by storing energy that can be used for work, i.e. negentropy (Ho), which Schrödinger ascribed to Life (Schrödinger). This self-control vis-à-vis the environment is the action of the Time operator of the KBL logophysics, through a learning cycle to reach for an identity, establishing thus the system through a self-reentrance in parameters of self-

organizations, self-determination and self-control; the Time operator as well as distinguishing logical states, it is a universal phase rotation in the imaginary component of the complex numbers, that builds up the coherence of the system, and as in the case of coherent light (laser), holograms are holonomic virtual representations produced by this action of the Time operator (Rapoport 2012). For the KBL logophysics, the total entropy is conserved and null; it is no accident that the KB was called by the ancients the *Horn of Cornucopia*, or *Fortunato's Purse,* representations of ever ending abundance (Purcell). Mathematically, non-linear systems have an increasing entropy until they suffer a transition, a "blow-up" (Wu and Yi Lin), in which they go through an infinity (the KB re-entering) after which the entropy is lowered, instead of the thermodynamic death that the Big-Bang mythology claims for the Universe.

The standard physicalist paradigm already considers an asymmetry of causation between the living and the environment. Remarkably, although it stems from dualism, from those deep intuitions that allow the sciences to reach for meaning, it yields a characterization of living systems which is not the Cartesian framework, but the multivalued hypercontextualization that 3 and 4-ness of heterarchic system posses. Indeed, this plurality of monads requires a time structure and still a space structure, the actual ontopoiesis of the organism as a multi-structured autopoietic system, and thus a HKB constituted by each of the KB ontopoietic subsytems, whose physiology is defined by the concept of *coherence*, of deep holonomism signification, which already is basic to Physics, say of condensed matter and superconductivity. " Coherence in a space-time structured system is *a transparency* of energy and information transfer throughout the entire system'' (Ho). We recall that coherence as just described (and more generally in holograms which are formed by the KBL logophysics), appeared in condensed matter physics, as in superconductivity, as the transformation, under

special environmental conditions of low temperature; nowadays, it is known that superconductivity does not require those specifications, by which fermion particles forbidden to occupy a single state by the Pauli Exclusion Principle, coalesce to become bosons, and thus the logic of coherence is not the ABL. This transparency of energy and in-formation, and its inherent three-ness, can be associated with the conservation and exchange between the components of the harmonic decomposition of the rotational torsion energy (unconsidered by Newtonian and Einsteinian physics, in their attachment to dual forces) of vortical structures of any kind, and in particular in the HKBL re-entrant nesting of the Analemmas of the Earth's crust and atmospheric dynamics, and still the circulation of any system of fluids (Ou Yang).

Coherence in this physical sense, is thus the unification of opposites, the KBL in brief, if not the HKBL. In this latter sense of coherence, the self-action of recurrence, say, as in the formation of fractals, or in the recurrent unfoldment of the Fibonacci sequence towards the Golden asymptotics, Φ , which is a primeval meta-operation of self-reference, in which operator and operand are fused, towards the establishment of coherence ruled by Φ. Thus it is no surprise its reappearance in biological systems (and in geo-astronomical systems such as Earth's stratigraphy and climatology), for which this identity transparency requires an integration of the multidomains of the organism, in which the holonomy is re-entering into the different domains, i.e. the HKBL which we have associated with the organism. To resume, this integration is embodied further in the Time logophysical rotational operator of the elements of the heterarchy, which embody self-control/ determination/Will at each self-re-entering domain as if independent of the others, while the synchronization of the Time operators of the elements through a Time operator of the heterarchy as a whole, produces the overall holonomic coherence that itself is a self-control by the last domain on itself and the other

domains, or conversely, the Time operator of the HKB wholeness decomposes into the Time operators of each domain. This coherence is a fractal time-gestalt of subjective time awareness of the organism, and still a rotational energy exchange of the (reducible to three) harmonics of vortical re-entrances that we already discussed, establishing the logophysical holonomy, unaccounted by dual physics.

11. Metaphors, the Lifeworld and the HyperKlein Bottle

Metaphorization (anthropomorphization) is the very operation on which communication through comparison can be produced in the need to establish a particular (human) refe-rent to which the world wlll be referenced to. Yet, it was noticed that this semiotical act by a referent introduces an infinite regression, unless there is a fusion of referent and referenced, which is already the case of the KBL, indicated in *Radical Recursion* (Rosen).

Julian Jaynes claimed that metaphorization is the fundamental operation of consciousness, the realm of the subject qua subject which unfolds by and through Language (Jaynes). Yet, the mereological fallacy indicates to metaphorization as an essential operation of language, and also to a higher-order cognitive function of the *interpretation* of languages, as if its use could be made independent of context: The higher-order cognition appears in terms of the use of metaphorization for constructing representations, and still the lower level cognition is in terms of the dual logic associated with this construction. We find here the superposition between both levels, not the dualism of top-down and bottom-up. Hence, language and metaphorizations are the domain of hypercontextuality, i.e. of the HKBL, even when it is reduced to the designative value of the ABL, as already discussed and encountered in the usual dualistic take on Life, and in the mereological fallacy.

The bicameral mind (the two functionally integrated brain hemispheres) is a metaphor for characterizing a subject, for whom the volition of his non habitual acts are not recognized *as if* his own but of an *outer* subjectivity identified as a god/dess, similarly to a self that has suffered an amputation (the phantom limb effect) or brain damage, and cannot longer integrate experiences of his own bodily and unseparable cognitive realm (Damasio). For such a subject, the higher-order subjectivity of Will is deemed to be exterior to himself, breaking the world to Exterior and Interior, and we retrieve the lower cognitive level. It corresponds to a subject which defers integration by living a cut that poses a distinction, thus embeding his KB in a further KB, an HKB, whose reentrance in/on the subject is deemed to be the action of Otherness. While psychiatrists take this to be a symptom -common to many individuals- of schizophrenia, Jaynes claimed that the Greeks of Homer's epoch, lived this phenomenology. The evolution of language and of the collective, integrated this dichotomy, unifying the Ego with the introversion of the Super-Ego, by identifying their will with a *reduction* of Will, in what we can now understand as an HKBL. The distinction of our epoch is different to Homer's; it amounts to the inability to integrate Will in a greater identity transparency to *our* will. The current barrier, is the inability to perceive the identity of both will and Will, as the re-entrance of the outer KB of the heterarchy in ourselves.The life-world of surmounting this distinction is a Theophany.

Let us further discuss a characterization of metaphorization, crucial to language, in terms of an HKBL. Indeed, to metaphorize requires a subject to establish a comparison (a distinction generating distinctions, as in (Bateson) between A (we called it, the metaphoron) and its alleged substitute B. In metaphorizing, there is an identity transparency of the subject with the elements of the relation, and the relation itself. So we are in the presence of three KBs, the

subject, the elements of the relation of the metaphor, and the metaphor, and still a fourth one, language, as a bind and vehicle that enacts the relations between the three previous elements. In fact, for the phenomenologist, perception is intertwined with all of the previous lifeworlds, and as we mentioned already, it is a KB embodiment, the source for the metaphorization. If this metaphor is to be found valid, then others will find meaning and sense in the metaphor, that is, in the relation established by the subject. This commonness of logical value, is the logical state of a KB that contains all subjects and the elements of the metaphor, and the relation itself between the elements, so it is in fact a KB interpenetrated by other KBs, and still the lifeworld of perception, embodying and reentering all of them, in short a HKB shown in the three examples in Figure no.8. Some subjects will not necessarily assent to the meaning of the metaphor, may place it in doubt, suspending judgment, or reject it in the first place. (We know that the modes of sense of humor as a lifeworld of complex hermeneutics and hypercontextualizations, are culturally bounded, while a sense of humor is a personal, ethnic or social trait and all of them together). So here we have a case of another logical value associated to the KB that contains the subjects, the metaphor, and the elements of the relation. This corresponds to the HKB. Anthropomorphizations are functionally similar to metaphors. As in metaphors, subjects will establish a relation between an element of certain phenomenon and will describe it in terms of another phenomenon which corresponds to their domain of action as human beings, thus the anthropomorphization, a metaphor in which a subject places one of the connected worlds as if lived by him. It has been claimed that mathematical concepts are anthropocentrically derived from embodiment (Lakoff & Nuñez). We extend this to science; this is indeed the case through the KBL & HKBL, which has a

universal being, or still the heterarchical self-referential logic of embodiment is universal, rather than a disembodied idealization, a contradiction in species.

Neuroscientists and physicists enthused with the notion that the brain is the new frontier of scientific knowledge claim that ‘‘brains think’’, which, of course, is not the case. A human child thinks. No one has been able to isolate a living brain and certainly less to find the attributes of the whole thinking individual in this impossible to isolate brain; to apply the Boolean negation to the statement that a body substracted from its brain is dead, is no proof that thinking has the brain for its locus, only of its necessity, without which there is no integrity. This is an instance of the mereological fallacy that reduces the whole to a part (Bennett and Hacker), yet obliterating the whole and its projection to the part, as well as the wholeness of the part, as the implicit logic is the dual ABL. So this metaphor is about self-reference, yet a disintegrated one. It is centered in the thinking individual, with its embodied thinking and socially thought body (as the embodiment of tradition, culture, economics, etc.) which cannot be separated (Rapoport, 2011b,c). This grounding of the source for metaphor in the individual (with the Socius' determinations) is the case of the subject that establishes a metaphor, and thus, the elements of the metaphor have been transferred to the human existence, and in particular, its truth value assessment. The metaphor is not independent of self-reference which is prior to it, and so it is the all engulfing re-entering perception, be that of the single subject and still of his fellows that find value in the metaphor. So is the case of scientists that will metaphorize a certain scientific domain as if it would be universal. The latter will call it with the name that reveals its self-referential origin: the Anthropic Principle. (Another such a metaphor is "natural selection'', where the self is the Universe, in an undetermined claimed-to-be-biological sense linked to the negation operator of the ABL, as discussed already). Yet, to transfer this to claim that the state

of the universe is determined by a certain metaphor, say a "fine tuning'' of universal constants so that the Universe and we exist simultaneously because *we pose the metaphor* in the first place, is a somewhat contorted and *reductive* way of expressing nothing but a HKBL in which the commonness of the metaphor is found valid, yet which requires in the first place the universality of the family of KBs that make the HKB and the interrelations, and the metacognitive action of metaphorizing even prior yet not independent of the others. The realm of these actions is the meta-metacognitive dimension and its lifeworld is by and through meta-meta-algorithms, proposed in (Johansen 2012) yet unrelated to the HKBL, is the one in which time, self-reference, signs, language, space, the processes of the mind, emotions, sensations, ideas, archetypes, etc., are interwoven in an unseparable way, rendering the Cartesian cut a disjointed analytical dissection , which leaves out much of the richness of this tapestry of which we are woven into and weave ourselves, by the very act of being, of which thinking is no epiphenomenon, but woven into this meta-meta-lifeworld. In this, language (in its manifold renderings) is the semiotic life-world of the subject-blended-into-object. Thus, unless we would reintroduce the Cartesian Cut, we can say that the world indicates itSelf through ourselves, which by doing this we indicate our-selves (and the Socius) and the Self of Nature, and, as in Escher's pictures, there is a synthesis of this which is the meta-meta-algorithmic lifeworld.

Returning to the hypercontextualization of the physical realm by anthropomorphization, while this certainly establishes a relation between Microcosmos and Macrocosmos and all the interwoven-in-betweens, yet not the trivial embedding of the Matrushkas kind but with self-re-enterings of a HKB, other different "fine tunings'' might be also the case for those who cannot find any meaning to the metaphor, just because their language is not the same as ours, and thus communication if not in terms of universals, is not possible. Hence, these universals

return us again to the HKB. The "fine tunings'' stand for the universals of some of the elements of the HKB, but seems impossible to state that they are valid for all elements of the heterarchy. This would require the claimants to be in a state of identity transparency with the *whole* heterarchy of elements of the HKB, and this is impossible to verify to be the case. Being the latter the case then we are left with having to establish back the KBL and its ontoepistemology, as a first approximation, or still to take a KB containing an undeterminable number of related interwoven KBs, to elucidate the world in which content and context are unified. This is already our human condition and the condition of all systems. Thus, the "universals'' cannot be other than context dependent, and this is what has lately has empirically discovered. Physical (deemed) constants, say atomic weights, or the so-called fine constant, may turn to be context (locus) dependent (Webb 1999, 2010; Brax, 2010). This is already the case of Newton's gravitational "constant'' on Earth's geoid, its non-ideal real non-spherical deformed shape, due to a HKB of interactions –primarily- with the Moon, Sun, and the non-homogeneneous crust, for which the Newtonian conception of gravitational attraction as if acting on ideal points, rather than on res extensa (the crust), is misconceived (Yong Wu & Yi Lin). To conclude, the HKB which we have found to be the topology of the genetic code (Rapoport 2011c), is the case of all systems, the archetypical form of the world, of systems which are interrelated in heterarchies with re-entrances of all elements on themselves and other selves and the whole re-entering in the elements as well, sustains a world in which for a certain subject of the heterarchy, the world seems to be with an outside determined by this subject, and yet re-entrance is maintained to be the case. Consistently with this, say other inhabitants living in another area of the Universe, will find themselves another "fine tuning'' to their self-centeredness, and could verify instead another context dependence in their own

neighbourhood. Thus, physical laws requiring "universal'' constants already embody this hypercontextualization and thus they are universal not because they are inpervious to contextualization, but rather because physical laws actually embody their actual reification as laws of contextualization invariance, an hypercontextualization which is the manifested realm of a HKB logophysics. This is not Newton's mechanical world (nor of Einstein, in those regards), but the logophysics of the alchemical world he searched for so intensely. Certainly, it is atuned with his quest for a philosophy of Nature (a quest shared with Pascal, Descartes, Leibniz, Goethe, Kepler, Spinoza, and their Renaissance predecessors), which in the present onto-epistemology has been fused with the phenomenological tradition, coherently with the alchemical quest and the time-honoured cosmogony, to integrate us harmoniously to the Cosmos, both created and metamorphosed by Time, as partners in response to ourselves and to Wholeness.

12. Forewords: Evolution, Creativity, Time Waves, Semiosis, Interpretation and Religious Hypertexts.

In this article we have produced a temptative archeology of the uses of dual logic in the sciences, for the introduction of a logophysical paradigm that unifies the sciences, in terms of self-reference. This paradigm is embodied in the KBL, and further extended to the higher-order HKBL of interelations, in which Otherness is brought into the world, yet not by fracturing, but by introducing more than two distinctions in the undistinguished environment of the KBL. Instead of the dualistic hierarchics in the top-down and upper-down linear interconnections, these distinctions extends the single distinction that generates the self-re-entrant KBL (instead of the dualistic negation operator), in the form of re-entrances of self-referential heterarchies. These re-entrances physically associated to self-containment, rotational motions and energies, are

impossible to conceive nor realize in the Cartesian mode of existence by containment, which is all too pervasive to the sciences at large, and not least to philosophy. The latter have failed to realize its all encompassing actions, that includes the world of language, consciousness, the physical world, its embodiments, and still the domain of Life, yet not as a separable from the inanimate by a mysterious quality, but one which can be clearly be discerned through the manifold operations of self-referentiality, rather than the unending saga of a world, trivially and brutally divided into interiors and exteriors. While the KBL re-entrance blends the environment and the system introduced by a single distinction, and as such installs the first and most primitive form of contextualization which we associate with cognition and thus Life can be understood as the logophysics of the KBL, the latter does not separate the inanimate and living worlds. This understanding does not require to introduce the HKBL, but rather the realization that the KBL already is the fundamental logophysics operating in such diverse systems as physical open systems, chemical reactions and in particular the case of minerals exposed to the environment, geological landscapes, occurring in the real world of open systems (not the abstracted separate world of a test-tube). This logophysics is characterized by contextualization, which already plays a fundamental role through the self-referential being of the photon, through the fundamental processes of emission and absortion of quanta, establishing thus primary differences that generate higher order differences. Concretely, these are modifications in atomic and chemical compounds that manifest in chemical reactions, a name that overlooks the fundamental contextualization that chemistry embodies, elaborated in (Boeyens). This author, further established a quantum theory of chemistry, by unveiling a hitherto unacknowledged KB that embodies the Periodic Table of Elements extended to include the stable nuclides, which we have argued that extends to the mineral, and biological

(including genetic and biochemical) realms, and still to geology and climatology. The fundamental contextualization of molecules through and by the self-referential action of light, is also crucial to the organization of the cell (Rapoport, 2011d). In fact, it is the tensegrity architecture of the cytoskeleton, which is no less than the cell's cognitive system, that integrates with the environment through the membrane, which rather than being a dualistic barrier to be violated by physical-chemical processes (as in the mechanical paradigm of the cell and in the theory of autopoiesis) by penetrating the membrane, acts as the integrator of the cell with the environment. Thus, by sheer logical coherence, we have proposed that the cell's membrane follows the same KB (Klein Bottle) logophysics that we have encountered in embryo-logical development, by unifying the cell's interior with the exterior extracellular matrix, by acting as Moebius Band or still a KB operator. Hence, through the loads of the chemical elements, the membrane may accommodate, by locally transforming itself from a orientable to a non-orientable configuration; since elasticity singularities and photons can be identified, this integration has both a quantum and a classical physics,which is not assimilable to duality. This establishes an holonomic integration of the cell and its physiology, that extends far from the extracellular matrix through the connective tissues of a body, which itself has a quantum structure, its collagen. Thus, this integration is produced through and by a web of re-entrant interconnections of all in all, the physiology of the body and its organs, already embodied in the body of shape that is produced by the KBL of embryo-logical development. But also this contextualization of the physical/chemical realm is also the case of the neutron, the fundamental particle of the atomic nucleus, which in the theory of the nuclear interactions known as Hadronic Mechanics, has been claimed to have the KB topology (Johansen 2006); as we already mentioned, this topology is that of the neutron acted upon by an electromagnetic

field precesses alike Earth by the interaction of its own torsion field and the Sun; hence, this phenomenon is universal and independent of scales. Furthermore, we have argued that since the physical parameters that were considered to be universal constants appearing in the physical laws, have appeared to be contextual rather than universal constants, and thus the physical realm is also about contextualizations in which physical laws embodies them. Therefore physics itself is a form of cognitive embodiments of contextualities, apparent in rotational re-entrances of vortical systems, in distinction of the context-free Newtonian and Einstenian dual physics, based on linear motions (Yong Wu & Yi Lin). Already the behaviour of a photon in the Apeironic vacuum (not to be confused with the Void) and in an inhomogeneous media is different, thus showing that contextuality is already at the very basis of the quantum of action. Thus, it is the actual self-referential being of light that is unseparable of the KB itself (Rapoport 2011, 2012, Rosen) that is the very logophysical basis of contextuality for the physical world, yet unseparably from physis (as embodied nature). Hence, we have placed quantum action as the fundamental operation and distinction that produces the logophysics that has allowed us to integrate the inanimate and living realms, and subjectivity. The role of the extremality of the action (due to Fermat) principle of physics, that is verified by light rays, in biology and consciousness, was presented in (Grandpierre), and embodied as expansion and contraction morphogenetic waves, crucial to embryological differentiation (Rapoport, 2011b,c), yet associated to the Time operation and its 180º twist forming the Moebius Band.

As concluded in (Rapoport 2011b,c), ‘’This idea of time waves generating patterns in *wholeness* as presently envisioned for embryological development is surprisingly universal’’ and we described that this is the case, as already discussed of the Mendeleev table of periodic elements, the system of natural numbers, the case of the development of sunflower as the

vivid example of the fundamental Fibonacci algorithm'', to which we have further added to this in an holonomic paradigm that goes from Physics to Geology. The present paradigm of a world, that in the ideative realm exists in toto. It manifests in terms of self-referential folding and unfolding through self-penetrations as the physical manifestations of the KBL with the imaginary states that realize these self-penetrations through logophysical time waves, is far from the usual mechanical world, both quantum and classical. In terms of biology, it is far from being reductible to Darwinian selection nor to the creationists dogmas, since these manifestations are permeated by hypercontextualization, as in the HKBL, and thus an open and simultaneously closed evolution which is a development. The latter eventuates with the incorporation of environmental interactions through hypercontextualization, which is keenly anticipative, due to the non-linear topology of time, the chronomes that pervade Nature, as we have repeatedly unveiled in the course of the presentation of this paradigm. As for the question of the ultimate completeness of this unending development being complete or not, the response to this mystery perhaps is, that though novelty is the case and is embodied, metacognitively the HKBL appears to be complete, despite it is impossible to any creature of the Universe, to discern nor the completion of the heterarchy, nor all the elements that appear as novel, since there is no cognitive completeness to any particular element of the heterarchy, unless to Wholeness itself, as appears in the HKBs in the Figure no. 8, which is already the case of the KB. Yet, this Wholeness is not to be lived nor asserted from the inexistent Outside that the ABL claim, nor through the inexistent Inside for that matter.

Therefore, while the KBL contextualization of system and environment embodies the primitive form of cognition which we propose to be the basis of Life (transcending the dualistic mechanicism of the theory of autopoietic systems), this has not rendered the animate world as

the alter of the living systems , but rather has integrated both by the same self-referential KBL logophysics. We have further seen that this logophysics is also fundamental to the organization and development of biological structures, already from the ovum to the embryo, and still the mature body. They appear to unfold as structures-processes that exist in toto in an ideative realm, in which the turning inside out of the ovum is already the fundamental ideative operation that is accompanied in the realm of manifestation by recurrent torsion folding of two dimensional surfaces. Yet, this establishes not only the differentiation that leads to the full developed embryo and still the mature organism, but also the logophysics of its integration through the bodies of shape, and the connective tissues. Also we have seen that this holonomic unfolding, has a superposed physiology in the form of the KB topology of the topographic maps of the sensorium in the brain, mapping thus the exteriority of the ovum to itself, which in the unfolding of the bauplan, appears to be the brain and the nervous system. Thus, the ovum membrane's which we claimed to have the same self-referential topology that produces this turning inside out and the unfolding of the bauplan as the recurrent operations of two dimensional shearing of surfaces, has a representation in a two dimensional map of the sensorium, as the functional physiological bauplan, that has been anatomized in superposition to the sensorium's representation. Thus, organisms appear as unfoldings and folding of two dimension self-referential surfaces, namely the MB, the KB and HKB, both anatomically and physiologically. Thus, we see that rather than ontogeny being the recapitulation of ontogeny, as first proposed by Darwinist biologist Haeckel, it is the case that ontogeny produces phylogeny as already proposed by Garstang in 1922, and thus phylogeny also is an historical unfolding of the same self-referential logophysics. The organism rather than being the product of the coding/decoding for the transformation of a supposedly one-dimensional (genetic code)

into a three-dimensional organism, is fundamentally a two-dimensional logophysical embodiment, in which both the genetic code and the bauplan are embodiments of HKBs and thus, the folding of two-dimensional surfaces re-entering on themselves (Rapoport 2011c): If the genome is to be somehow related to the phylogenetic coding of this ontogeny, then it turns to be the history of a transformation of the representation of a two-dimensional self-referential and fractal genome into a two-dimensional fractal self-referential organism, rather than the intractable mapping that the traditional model of a one-dimensional genome is mapped into a three-dimensional organism. This is also the case of proteins, that rather than being three-dimensional structures controlled by a one-dimensional linear (genetic) code, it partakes its two-dimensional self-referential structures, as the torus and KB constitute the protein domains (Penner et al) and thus the same morphologies crucial to the genome appearing from the KBL, appears to be the case of proteins (Rapoport 2011c). In fact, embryologists critical to the all-in-the-genetic-code credo for biology have stressed that the (purported one- dimensional) genome, of which only a few thousands genes appear to be related to development, have pointed out that this does not account for the information/bits (in distinction of information, as morphology induction, as we have used the term in this article) is far too small to account for bauplans (Nijhout); yet, this may be a backdrop of the wrong assumption that only the protein coding DNA (about 2%) operate, disregarding the (appallingly called) ‘’junk’’ DNA. Other embryologists (Gordon) have instead associated development to the Aristotelian-Boolean logic, claiming a one-to-one genetic coding of development through mechanical forces, to induce the appearance that there is a complete mapping between developmental steps, Newtonian forces and genetic coding, that exhausts the genetic code. In (Rapoport 2011b) it was shown that instead of Newtonian pushes and pulls in the cellular architecture claimed to

produce the developmental stages of differentiation, light torsion fields in the cell and the rotational action of the Time Operator of the KBL produces this differentiation, and that only two aminoacids of the 20 in the genetic code are related to coding this development. Rather than the genetic code being a blue-print self-operated through the cell, with its multiple HyperKlein Bottle nested topo-logic and still a toroidal topology, the informative role is weighted to anticipative coding for the relations with the environment rather than development, it also provides with its hyperfolded informational topo-logic (we remark, in terms of bits) for the complexity which regulation requires. Therefore, due to the topo-logics of the genome, the genomic information (i.e. bits) is in-formational (i.e. morphological)- This characteristic is recognized by molecular biologists who have discovered that the genetic code ascribed to regulation of, say the production of proteins, the coordination of segments of the alleged one-dimensional code, are required, and topological operations such as cutting and pasting appear to be fundamental to the regulation of the genome and its self-action; this coordination shows that the genome is a context for itself. Also self-referential toroidal segments, as closed loops, or still palindromes, appear to be crucial for biochemical regulation (Caporale). To resume, the complexity of the informational HyperKlein Bottle coding of the genome, produced from departing from the KBL (Rapoport 2011c), already embodies what current molecular biologists claim to be a cognitive capacity of the genome. Hypercontextualization is the case of the self-referential topo-logic of the genome, not an acquired capacity claimed by molecular biologists, even for those critical of the vulgar version of the genome as a linear code. Yet, this is not exclusive to biological coding, but a far richer lifeworld.

Indeed, this overlaying of self-referential folding, introduces depth, which perceptually creates the representation of the body as if three dimensional, and is unseparable of Time, as

the logophysical operator of the foldings. It is undissociable from the perception of bodies as if inmmersed in three dimensional space, by creating the representation of the latter, yet doubled, as in the self-referential syntactic generation of Physics (Rowlands) which we identified to be based on the intertwining of two KBs (Rapoport 2011c), which is also the case of the turning inside-out of the ovum, as described in this article. One such three dimensional space is for placing objects as in the Cartesian mode; the second three dimensional space of momentum representation which brings velocities to the fore, allows for the recreation of the Time dynamics which creates these unseparable pair of three- dimensional structures through KB invaginations and evaginations. This is embodied in the so-called bistable perceptions in which a body (say a cube) represented in the two-dimensional plane, literally moves out of the plane to generate two perceptions –violating thus the Principle of Non-Contradiction- through depth, the primeval dimension superposed to time, as the physical dynamics of the bodies that the first three dimensional space allows for the placement of beings as if contained in space, i.e. the Cartesian mode, supplemented by the physics of becoming, in which one percept transforms to the other one. Rather than the dicothomy of choice between either Parmenides's statics and Heraclitus' dynamics, this establishes their joint foundation in the logophysics of the intertwining of two KBs, a HKB, as their common ontoepistemology, as well as that of the embryo unfolding from the turning inside-out of the spherical ovum. As for the universality of the eversion, turning inside out a sphere, this generative process that guides self-creation and self-determination, we have found it to be omniacting in Nature, as Anaxagoras would have it, yet so estranged to the current broken sciences, and to Philosophy as well.

Quite remarkably, we have unveiled the role of dualism and its epistemics to define and control the ontology that the sciences have for its study of the world at large, including that of

subjectivity. In doing so, it has been quite amazing to discover the pervasive role of dualism, that produces a rather poor world in its representation by the scientific method, that, as claimed by Popper, it indeed appears to rest in a swamp of hidden presuppositions and hypothesis, which unfold in terms of dualisms. No less remarkable, it appears to be that Imre Lakato's claim that "scientists know not more of science than fishes know about hydrodynamics'', can be substantiated in the unacknowledged uncapability of the ABL to give account of the world if not by fracturing, which already the working scientist embodies, as detachment if not alienation. Indeed, as Günther's first call in the desert, yet a rather shy apologetic call in justifying it on the need of cybernetics of giving account of subjectivity in its aim to mimick it through technologies, subjectivity is estranged to the working scientist. Artificial Intelligence has failed completely to stand to its declared aims, and the so-called technological singularity, an" intelligence explosion" by which humans will transcend their biological buildup presumed to be lacking a logic, is any world but more of the same triumphalism and alienation. As we found in the current phenomenology, it ignores the essential bauplan that is common to Life and the inanimate, together with the blatant preaching that the broken sciences are a basis for such trascendentals, a quite popular exhilarating activity amongst scientists (Kurzweil).

Artificial Life has somehow fared better, since the first form of cognition that introjects the environment to the point of establishing a homeostasis is assimilated to cognition. As noted in (Barbieri), "Life is essentially about three things: (1) it is about manufacturing objects, (2) it is about assembling objects into functioning structures, and (3) it is about interpreting the world. The discovery that these are all semiotic processes, tells us that life depends on semiosis…''. Here the interpretation is done by the living system, for which the world is the Other. As we have already established, the interrelation of the system with the Other is embodied in the

HKBL in which we have an heterarchy of re-entrances of the systems on themselves and the others, so that a very complex logophysics is operating. As for the manufacturing objects it is believed that this is embodied as a code in the genome, which we have proved that has a very complex fractal HKBL topology and furthermore isomorphic, at the most basic level of the codons, to the algebraic structure and symmetries of Quantum Mechanics, that are at the foundations of Physics, so that the quantum symmetries and fields play a coding role in the genome for the logophysical self-referential principle, as de Faria would have physics and chemical symmetries at the basis of the form/function complementarity, proper of the KBL, which molecular biologists are prone to predicate its absolute determination by the genetic code. Yet, we have argued that this coding which stems from the KBL, is such that the genetic code must be, partially, an environment to itself, so that instead of the first-order cybernetics (a controller and the controlled) of the Standard Dogma of molecular biology by which DNA is the controller of the cellular factory, a second-order cybernetics is the case by which both DNA and RNA (both having the HKB topo-logics as derived from the KBL) and proteins, mutually act and still may self-act (Pellionisz).

Indeed, the hyperrecursive HKBL of the genome, is the recurrent folding of the quantum symmetries, and in particular the non-protein coding sectors of the genome, has the structure of a universal language, (Maslov & Gariaev, Mantegna). Thus, as argued above, indeed the genome is –as all languages are- a partial environment to itself ! Hence, indeed semiotic interpretation is the case, yet it does not exhaust the semiosis to hermeneutics, since the HKB topology sustains a logophysics associated to light (extending thus the case of the KB) and thus the signaling and interpretation has a self-referential light interpreter/interpretand logophysics, which has been found to be the case of the genome, emmiting and receiving both

coherent light and sound waves (Gariaev). Yet, we have unveiled in the course of this work, that the same principles of coherence that sustain the physical world, are also crucial to music, and harmonics and its KB perceptual interpretation of musical pitches, is the very core of signification as showed exquisitely to our senses by the stratigraphy of Earth. The latter is produced by the harmonics that arise from the precession of the equinoxes, the cyclicity of the eccentricity, and the interaction with Sun, Moon and the other planets. Altogether, as a single orchestra following an HKBL partiture in which the director resides in the partiture no less than in the instruments and musicians, that on playing itself as a self-operating language, drifts the continents (as instrument and musician) apart, establishes cleavages, tremors climatological and oceanological cycles, molds the crust of Earth alike the oceanic tides under the main action of the Moon, carving the beaches coasts and estuaries, all into harmonic configurations, which are no less essential to music and to holography that rests on coherent light, and to the Periodic Table of Elements, all cohering through the Fibonacci sequence as it tends to its Golden Φ limit. This coherence is embodied in the KB, as we have repeatedly shown to be case.

With respect to Barbieri's second condition for Life, the emplacement of assembling objects into functioning structures, it already starts with the embryo-logical development, that through recurrent folding of the turning inside out of the embryo through its membrane (the semiotic operator, as we discussed, yet not in associated to the dual ABL negation operator as proposed by Hoffmeyer, Lacan and Wilden), it unfolds the bauplan for the organism as logophysical process through torsion folding as well as its physio-logical integration and the embodiment of the sensorium , and still operates this display through what appears to be genomic light and sound signaling arising from the language in the genome whose topology is

that of light, as the KB embodies light. Yet, the mandatory function of genetic language in commanding what is to be done in terms of signals at the right time and the right place, which is nothing else than the self-validation of the topo-logics through their Time operators cycles returning eternally to their initial configuration as in the Myth of the Eternal Return, is superposed to the function of learning through interpretation (unseparable from perception). Here lies the lifeworld of creativity. The Problem of what is Evil, in terms of the re-entrant logophysics and interpretation of the lifeworld, was presented in (Rapoport 2012).

The architecture of a text, say of DNA and RNA, is an embodiment of the logic of its conception and of its content. Hence, almost all texts are layed out as Heraclitus' river/logophysics, in which dual logic is rendered sequentially; these texts appear to be linear. Yet, too many scientific texts are layed out as if the written body of the sciences would be authored by few individuals. It is not only a matter of content, since the logic of the broken sciences is one, the Aristotelian Boolean dualism. Inasmuch as, say, a man is man because, to some extent, of the breeding by the Socius that made him the man he is, the issue of doxa is an homogeneizer of content and intent, either for scientists, religionists, artists, grocers, etc. So all scientific texts are, by default, the lifeworld of the Socius, a HKBL lifeworld, and especially laid ontop of the "shoulders" of the ancestors, as physicists like to refer to the "giants" that made of Physics the science as we know it,unseparable from mythopoiesis. In the case of hermetic and religious texts, either written by Revelation or created from the process of individuation of the author-to-be, or by the group who kept the secrets to be revealed by one of their brethren, yet only partially, since the text is claimed to be layered and encrypted. Indeed, a second unwritten text which is transmitted orally, or embodied in the commentaries of other texts, is claimed to hold the key to the semiology of these texts and alike a KB interpretation of

the biochemical recognition of two molecules, the two texts are just one. No such religious (or hermetic) text is such without this one-ness, and still the three-ness of considering the reader that applies the key. Without the text-key, the reader might misinterpret the text, and even be doomed by this, or simply live the text through partial signification; this is alike the story of Kabbalistic origin of three sages entering to a lifeworld of communion with God, into Pardes (the paradisiac garden of knowledge). So, in the hermetic and religious texts, the HKBL of the making and reading of the text is in compliance to a dual key: if it is the indeed the key, true is the case, and then learning is the case, or in the contrary, only the individual interpretation is left, since the demise eventuated by the false interpretation is assumed to be no interpretation at all, it is the Nil, not the continuity of Life after Death.

Thus, alike Darwinian evolution collapsing (by Natural Selection) the be or not to be of a species, the final outermost operator-key of the hypertext that is meant to re-enter all the layers of the religious text, to manifest their meaning and also its own meaning and those of the interconnections, is a dual operator, alike the dual model of the cell's membrane: To interpret or not to interpret, and a third-party might in some instances be called to assess which is the case, as the disputes between scholars surge. Alike the master and his bestowal of a koan upon his disciple, there is no third party other than Tradition to assess the assessment by the teacher of its disciple's lifeworld, and we are left to the action of infinite regress, which Tradition cuts short by determination of the lifeworlds that merit a true value, self-referentially (to Tradition). The KBL is different to this, since no cognitive infinite regress is the case, while the HKBL that considers the Socius, resolves this by considering the re-entrance of the Outermost element as the Whole in the others, with due consideration of the impossibility of complete discernment of this element if not the universe at large. Yet, the determination of this

Outermost element requires a consensus for its establishment, and thus this consensus is the one establishing the domain for the cognitive-logical values. These values reached by consensus (in the etimological sense, of sharing a feeling, i.e. a perception and the lifeworld that accompanies it) might not be the True (False, etc.) value, but only projections where the Outermost lifeworld established consensually identifies the true value relative to itself as the True value for the heterarchy, and thus a finite boundary limit to cognition has been established. If not questioned by its upholders, this may produce an ideological fixation, which the history of humankind has recurrently evidenced its powerful destructive effect. Yet, this boundary can be changed, eventually, when perception/cognition of its limitations is started to be felt by one and increasingly more individuals. This is also the lifeworld of the broken sciences' scientists, and perhaps of the human condition developing with a unified cognitive framework, since partiality of the perception of Wholeness, is always the case, as already explained.

In the Torah, Tradition (the Talmud) claims that its writer by Revelation, Moses, wrote down the text and his own demise in it, and continued writing after perishing, so the writer is superposed with the text, and a mutual embodiment is the case, in which the text has a life lent to it by the author (in the lifeworld of Relevation) and the converse is also the case; Escher captured this in his *Drawing Hands*. Yet, if for Tradition, the self-referential Normalizer/Judge of Truth, Moses-the-character-in-the-text is to survive Moses-the-writer, then they have to live in different times and spaces, and thus Moses-the-writer has created Moses-the-character-in-the-text as a figment of his imagination, an eternal Archetype. Of course, this is what imaginary or real excellent writers do, create archetypical characters to survive them in texts, and no one but Shakespeare appears to have matched the excellence of the author(s) of the Torah. As

the Ancient Greeks created their myths with archetypes for their characters and identified them with sidereal configurations, likewise de Santillana and von Dechend in the invariance across cultures of the Myth of the Eternal Return and other myths, found the evidence for archetypes as textured in the skies, as later alchemists would emplace the self of the chemical elements, while the Alchemical Flask, the Pelican, or still the Pelican Christus of the Christian representation of the Redeemer, was the Klein Bottle. Also the Mythraic Cult, related to the Phrygians, placed its cosmogony in terms of the planets and the precession of the equinoxes (Beck,Chapmann Rietschi), and capped Mithras with the KleinBottle-Phrygian cap, so that in these cosmogonies the reentrance of the Form in itself, was the very core of their semiology. The latter, as we very briefly indicated is related to the Tao Jin, while the phenomenology that we unveiled in the HKBL appears to be central to Tantrism (Schonberger). The major difference with the present ontoepistemology, is that the Tao Jin starts with the trigrams, while the four-states of the KBL as in Figure no.7, which generates the Book of Changes, are given no consideration. Remarkably, Tantrism claims the same phenomenology than the HKBL introduced in this article, while the Yantras, the mandalas of Tantrism, show no re-entrances of the whole in the parts nor the converse. These might be manifestations that the deeper roots of both Taoism and Tantrism, may have been lost, or perhaps a taboo was imposed on them.

An alternative to the previous interpretation of Moses surviving himself in the Text demanded by Tradition, is that Life After Death and Life, are so closely connected, to the point that they merge to a single lifeworld, alike in the present ontoepistemology, in which the ideative world manifests cyclically in the material one through time waves, as organisms and processes; of course, this idea is also central to Marx's Capital Logic determination of the material world from the ideological superstructure in a second-order cybernetics proposed by

Johansen. Whatever may be the truth of the conclusions we have reached through an interpretation of the (religious) Text through the HKBL ontoepistemology, and considering that Tradition can do no better but request a petition of principle based on Faith, these conclusions show that in distinction to the key-texts required for the interpretation of religious Texts, these texts themselves may hold the key, which is none other than the HKBL, whose lifeworld these Texts already might embody, unbeknownst to our linear dualistic, and in some instances nominalistic interpretations.

The present hypertext is and is not different to the hermetic and religious hyperTexts, (the Text, the key-text and the body of oral Tradition) in that no key-text is required to interpret it, but an initial cognitive key was required for the reader to be able to attemp to interpret it: namely, to relinquish dualism, which again is not an all or nothing transformation. As in the KBL in its Matrix Logic form, nor true nor false, and still, true and false, are cognitive states of the learning process. Yet, indeed the current hypertext is the embodiment of the HKBL, by which the integral conception re-enters to unveil its bearing in the different domains and layers being presented, while the domains re-enter themselves to their relatives and to the wholeness of the logophysics that the hypertext proposes for universal signification, with the limitation already explained. It is a revealed text by the logophysics, not by the action of an exterior/ interior Agent being manifested; furthermore, it is the same logophysics by which the reader has been created as a manifestation of the Eternal Life Cycle, and hence no exterior key is necessary. As the delta of a river with its affluents, the present hypertext has appeared as the partiture of a theme, which may transform its rhythm and inflection in accordance to the context, while the hypercontext of this unified lifeworld dictates the details of the contextualization to the meanders, affluents and of the great river, to which the partiture

provides the re-enterings of the hypertext on itself. This has been experienced by this author, the I creating and assembling this hyper-text, as most unevitable. It is *as if* the hypertext would have a lifeworld of its own, which is the lifeworld of the author. To resume, the logophysics of the architecture of the current text is the one of its content as well as of its writer , the discrepancy resides in that the perception of its writer stays short of being able to embrace the Wholeness of this identity, inasmuch his social-cultural breeding may act as a limitant as well as his own lifetime experience also paved the way; this applies to any other author of any text. Alike the genetic code, this hypertext is its own architect, operator, interpreter and interpretant, environment and content, unseparably of the author, which in the case of the genetic code stems from the HKBL evolution of the Apeiron to unfold as the logophysical structure of the genome.

Any of the elements of this phenomenology, is a metaphor of the other ones. This hypertext was assembled as a partiture through and by language and concept (of the logophysics that we have presented), and still by aesthetics if not ethics. I can not thus apologize completely for my (?) mistakes that I have avoided to be the best of my (!) capacity, or perhaps for chosing a cadence that the reader may find inordinate, or an argument too much polished or still abrasive; the hypertext being too extensive and the human preoccupation of setting this right and clear, the argumentation has literally flowed to carry the reader and the author to levels of signification as the content and context search for their relatives, since it is the living individual who is being written and writer at the same time. But then, Perfection is not the lifeworld of the finite, if not the metaphor for the end of learning, and thus for the end of Time, an unsustainable myth for finite beings, if any others, since Infinity is no different than Re-entrance.

To conclude this article, signification has shown to be universal. We are being signified and signifying the world, in a such a complex beautiful weaving, that the feeling of the naturality of some anthropocentrism is validated, as undissociable artists of Wholeness. Weaved in and by wonder and creativity, we look at the world for action, to return to ourselves and to reach out and inbound to Otherness, so we can conclude with an assertion, perhaps an act of Faith, that there is a Will that weaves our lifeworld, to which we return in wonderment to weave Will as unseparable of our own will, unbeknownst to us or not, and both at the same time.

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Note no. 1 Vrobel introduces the KB, to neglect it subsequently, choosing instead the "inner representation’’ (Vrobel). The hypercontextualization we are phenomenologically unveiling,is not exclusive of a being with a central nervous system. Recent evidence demonstrates that plants are able not only to perceive and adaptively respond to external information but also to anticipate forthcoming hazards and stresses; R Karban, Plant behaviour and communication, Ecology Letters, (2008) 11: 727

Note no. 2 The bottomline is that the cell is a liquid crystal organized as a tensegrity structure by a quantum-like-light geometry, which extends to its environment, the extracellular matrix, providing for for the unification of the cell to the body at large. The membrane rather being a barrier to be surmounted by holes and mechanical pumps that assure the flow across it of the necessary elements, it has locally the form of the Moebius Band or still the Klein Bottle, integrating the cytoskeleton with the extracellular matrix into the living matrix (Rapoport 2012).

Note no. 3. The so-called Standard Dogma of molecular biology claims that the information passes from the DNA to the proteins but not the other way round, making of the genome the Code of Life. One of the most surprising outcomes –to the followers of this faith- of the Genome Project, is that the rejected converse is also the case (Pellionisz). Thus, would we choose DNA as the source for Life in Dyson's Dual-Hypothesis , instead of metabolism/proteins, we find that the duality spelled by Dyson is not the case. Would we choose metabolism, as is the case of DNA-free protocells displaying lifelike behavior, since DNA is a code associated with quantum mechanics (Rapoport 20112), then the idea conceived by molecular biologist Lima de Faria, that DNA is only a canalizer for metabolism in the course of a continuity which runs from spacetime symmetries, to chemistry and the Mendeleev periodic table of the chemical elements applied to crystals (we recall that the biological cell is a liquid crystal), gains credence.

Appendix: The Self-referential Torsion Geometry

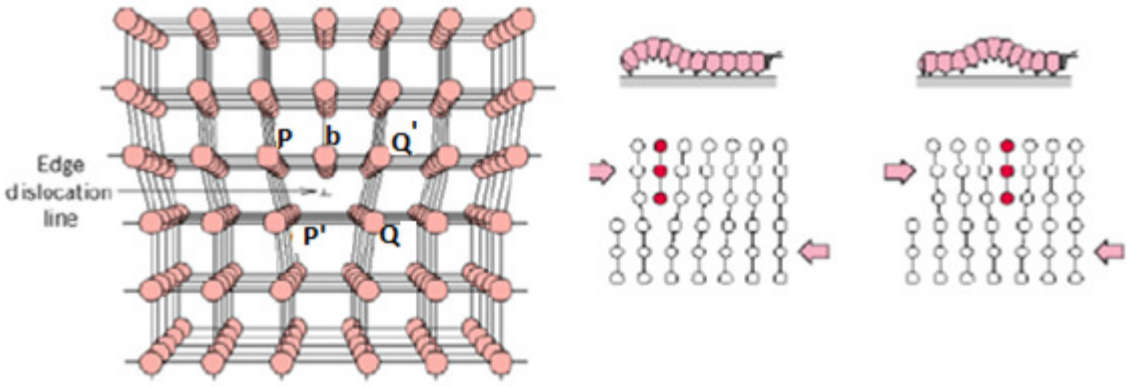

Figure no.9. Torsion introduced by shear in a lattice; in the rhs by a caterpillar moving in the surface of a perfect crystal. In the lhs we have a perfect lattice, as is the case of a discrete spacetime rendering of the homogeneous spacetime of General Relativity, but in the central area in which a dislocation is the case. We see then the transition from parallelograms that close (null torsion as in General Relativity), to non-closing and the formation of a fifth side, the torsion field.

Figure no. 9 shows the meaning of torsion. In an otherwise perfect crystal (whose vertices are described in red), i.e. one free of inhomogeneities (in practice, difficult to achieve) an edge dislocation is produced, either by removal (i.e., introduction of singularities) of atoms of the crystal, as the figure shows, or by introducing extra material, in short, both inhomogeneities. Torsion can be introduced by shear (i.e. the relative motion of two planes) as Figure no. 9 shows. Think of a caterpillar which moves a lattice a step at a time, and the shear produces the torsion of the crystal; this shear produces a vortical motion on the vertical plane to the shearing plane under the .mixing of layers for small that in can be; we shall assume, to keep to the essentials, that these motions are planar, i.e. layers do not mix under shear to retake the issue later. Another analogy is that of a rug, which moving in the perfect background of the homogeneous crystal; local changes affect the whole structure; the analogy strikingly applies to the crease (the folded rug) formation in the gastropore invagination we encountered in Figure no.6. It can also be produced by a hole in the surface, producing an embryological expansion wave. Thus, it is an action-dependent participative geometry introduced in terms of inhomogeneities by the subject, say the caterpillar, or more basically the photon. This stands in stark contrast with the homogeneous situation of a Cartesian ideal geometry exterior to the subject, which corresponds in the continuum limit in which the atoms of the crystal approach indefinitively, i.e. the continuum hypothesis of Einstein, which due to the lack of a singularity, it corresponds to the zero torsion metric-based geometry of General Relativity. In short, to have loci, self-referentially *dis*locations are needed; these are the inhomogeneities that make a geometrical locus. The most basic dislocation is produced by a photon, a quantum particle, a singularity of an electromagnetic field. The parallelograms

where inhomogeneities are present do not close ,while in the perfect crystal do close, indicating a self-referential trivial loop: by default is indeed a loop, i.e. closed without mediations. Instead, in the former case a pentagon is produced. The fifth newborn side at the upper right side of the center, joining **Q'** with **b**, is the torsion –the self-referential mediator; it is necessary and sufficient to the effect of completing the self-referential closure of the otherwise closed parallelogram; we shall explain this further below. As the figure shows in the center, the torsion appears producing a trapezoid with vertices **P**, **Q**, **P'** and **Q'**, since the upper side is now longer than the lower one. Yet trapezoids are themselves Moebius Bands cut transversally, say along the line on the Moebius Band below joining **P** (**P'**) and **Q** (**Q'**) below, and laid open on a plane, which by identifying the opposite lateral sides **PP'**, **QQ'**, on a previously 180º twist of the trapezoid, re-establishes thus the Moebius Band, as shown below in Figure no. 10.

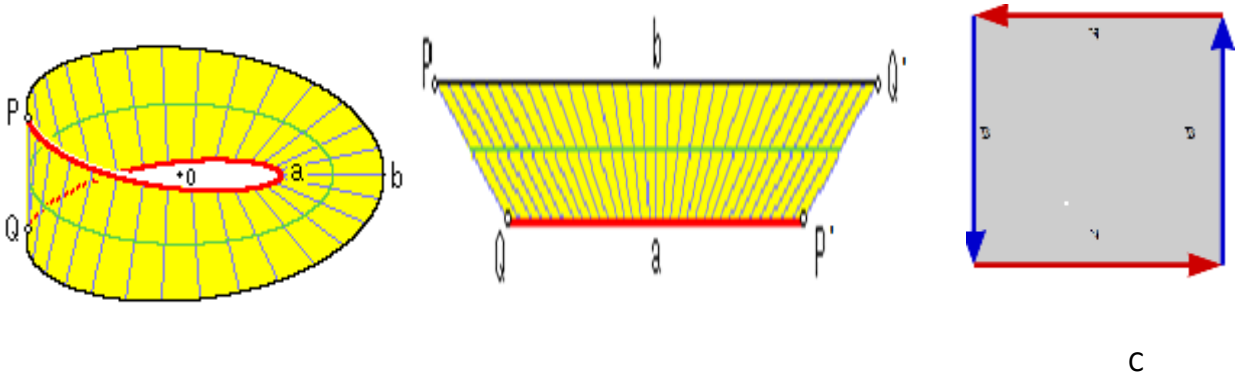

Figure no. 10: The Moebius band cut along PQ unfolds to the trapezoid in the middle with **P** on the Moebius Band connected to **Q'** =**Q** (the upper side), and Q to P' =P, the lower side, respectively. On the rhs, C depicts the identifications that produce the projective plane, a non-orientable surface.

This completion (actually a mediator with respect to self-reference), the torsion, establishes a loop, say starting on **Q** goes to **P'**, continues to **Q'**, further to **P via b**

(changing thus the direction of this side contrarily to the direction of the shear) to finally reach back to **Q**; we depicted these directions on Figure 10C.Thus, it is a non-trivial self-referential action, to return to the identity, either on the sheared plane or out of it by the vortical twist installing the Moebius Band, depicted by the blue vectors in Figure no.10c.. As a **loop** yet with its upper and lower sides (drawn with red) now being considered as the edges of the Moebius Band, it establishes the characteristic **uniqueness** of edge of the Moebius Band, since the seemingly distinct edges **PbQ'** and **QaP', which are transversed with opposite directions relative to the shearing motion, become parts of a single cycle; otherwise stated, this is the 2:1 resonance**. Thus, would we finally identify them topologically with their opposite directions as in Figure 10C with sides drawn on red, we get the **projective plane**, rather than the Moebius Band. In the case of Einstein's General Relativity, the closedness of the loop is by default, since zero shear is assumed and thus, the torsion **Q'b** does not appear if not the **null** vector, and thus the trapezoid collapses to a parallelogram. Would the fifth side **Q'b**, be equal in length to the other four, we would have the five-fold symmetry typical of quasicrystals and thus the Fibonacci sequence is embedded in this symmetry and a fortiori, the Golden Mean, Φ.

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