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Energy and evolutionary semiosis

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Abstract. This paper sets up a thought-experiment that examines the transformation of energy into codified mass. This transformation is understood as a semiosic action of interpretation. The semiosic action is analyzed within five "predicate" or "verbal modes" which establish different processes of transformation or interpretation. These "predicate modes", which are sign processes, take place in different areas of reality, the external realm and the internal realm. The external realm is composed of discrete objects and their interactions. Its processes are examined within classical mechanics and this paper posits a semiosic codification that is unique to these external processes. The internal realm is a holistic endoperspective with no recognition of discrete objects. Its processes are examined within quantum and field processes and this paper posits a semiosic codification that is unique to the internal processes. However, rather than promoting one or the other realm as a valid interpretation of reality, this paper suggests that both the external and internal energy-mass processes are necessary components of our universe.

Introduction

I begin with a hypothesis, a speculation, a *phantasia*, for it is "thought and ideas, not formulae, [that] are the beginning of every physical theory" (Einstein, Infeld 1961: 277). This paper outlines a "thought-experiment" on the semiosic nature of energy and mass.

I begin with a hypothesis that the basic reality of our universe is its nature as a dyadic spiral of energy and mass. The famous theory of relativity informs us of the transformative identity of mass and energy but it is a postulate of this paper that energy does not exist in our

universe ‘per se’ but only in its nature as mass, which is to say, within the restrictions and constraints of codification. Energy can be understood as a force of pure potentiality for the actualization of itself as mass. It is difficult to initially describe energy in any more detail than that, because as pointed out, energy in our universe, due to the asymmetrical force of the Big Bang, cannot exist by itself as that pure potentiality. It is doomed, in a sense, to an infinite process of constant transformation of itself as mass. But we must acknowledge this primal dyad because the transformative motion between the potential and the actual is the basis of all abiotic and biotic processes in our universe. Aristotle pointed out that our sensual experience provides us with one account of nature that focuses on the “immediate material substratum of things which have in themselves a principle of motion or change” (*Physics* Bk II, Ch. I. 193a30) and it is our analytic capacities that provide us with knowledge of this “principle of motion or change”, which is the other part of the dyad, the abstract “shape or form” of these material things, which “has not yet its own ‘nature’, for no universal attribute is a substance” (*Metaphysics* Bk VII, Ch. 13, 1038b35).

It is a further postulate of this paper that the architecture of this transformation is semiosis or codification, which operates within a series of ontological and epistemological cuts that initiate and increase asymmetrical gaps between energy/mass which are then mediated by increasingly complex semiosic relations or codifications. Codes, which are actions of measurement, organize energy into mass. They do this by establishing patterns of relations for that mass/energy, with the result that one encoded or actualized mass/energy is differentiated from other encodements of mass/energy. We can understand these processes of measurement as processes of interpretation. Therefore, energy that is codified should be understood in this constrained state not simply as “matter” which by itself is a meaningless term but more accurately as “information” because this energy is then capable of informing on and about other forms of energy-as-matter, by relating its codes, its organizational properties, to these other forms of coded energy. These processes of associative measurement do not necessarily involve a deliberative or conscious interaction. Mind, the logical and communal action of measurement, operates to transform energy to mass or information but it is not essential that Mind is human or conscious. There is a need “for mentality to be ‘ontologically

fundamental'" (Penrose 1997: 176). This process of the codification of energy to informed mass is known as semiosis. Semiosis is not confined within language or human or biological consciousness but begins at the primal level of energy

Codification and the asymmetrical cuts

What is codification? It is a referential system that measures energy. In this action of measurement, it organizes energy within patterns that enable that energy to exist as mass, as existential "stuff" within particular times and spaces, which means that this mass is both differentiated from and related to, other mass. The energy of a hydrogen atom is organized differently from that of an oxygen atom. Is the organizational pattern ontologically separate from the energy? This question has been debated for centuries. Platonism views the organizational code as a Form and sets it apart as an ideal memory. The materialized version of this pure Form can be a mimetic clone, a dialectical analogy, or even, a crafted symbol. But, the original Formal Cause, as ideal memory, remains separate from the Material Cause; the code is separate from matter. However, in disagreement, Aristotle said that "to reduce all things thus to Forms and to eliminate the matter is useless" (*Metaphysics* 1036b20). The Aristotelian concept of codes and energy merges them, for "matter […] is something that can never exist without quality and without form" (*De gen*. 320b15). To again quote Aristotle, "what desires the form is the matter" (*Physics* 192a20). This is not merely a classical conclusion. Modern researchers concur that "the cohesion between the measuring and the measured energy flows thus turns out to be a principal characteristic of energy dissipation and conservation" (Matsuno 1998: 67). However, the debate is by no means complete for there is still strong support for the Form, the primal code, to be considered as ontologically separate from mass. It is an axiom of this paper, that the Aristotelian relational architecture is more robust than the Platonic and that codification can never be separate from matter, and therefore, that mass can never exist as pure energy. Therefore, energy, as potentiality, can be understood to have "intentionality", it desires and requires measurement so that it can be actual. How does codification operate in such an architecture?

Information or "mass" is a codified microstate of energy; it is energy in a state of "informing" by means of measurement, which is to say, by means of a referential system (the Form) whose logical properties of ordering energy provides for the establishment of other relations with other forms of matter. Measurement or referential relations organizes energy such that it operates within systemic relations with other orders of energy/mass. This means that the transformation of energy into mass or information requires separate levels for processing. This does not mean that each level can exist 'per se' as in a Platonic architecture but that these levels (form and energy) filiated as they are, must be differentiated. Free energy, which is to say, energy with limited relations, must somehow be differentiated from the referential codes, which is to say, the habitual relations, in order for the two to even interact with each other. That is, metalevels are a basic necessity for coupling or relations of referentiality to occur, such that energy can exist as mass, as information. This requires a series of ontological and epistemological differential cuts that act to increase asymmetry of energy which is then mediated by semiosic relations. A "cut" is a process that, by virtue of measurement, separates energy/mass into different zones of relational capacities.

The first cut sets up an ontological reality of internal and external zones. This means that there is a "mass" that is differentiated in time and space from another mass. This sets up an external realm and an internal realm. These two realms, the external and the internal, operate within different modes of codification. Second, within both these internal and external areas, there will also be an epistemological codal cut that sets up formal laws, i.e., synchronic memory, which is differentiated from the short term singularities, the actualizations of this memory, which emerge within local or initial conditions. These differentiations of energy/mass into distinct zones of operations (internal and external; memory and instantiations) will also produce energy/mass whose interactions will evolve in hierarchical complexity. This is achieved by increasing the asymmetry of those cuts. The subsequent codal relations required to mediate the cuts will increase in complexity. The physico-chemical realm of basic semiosic codification is found within atomic and chemical processes; the biological is more complex and is found within organic processes; and the conceptual, the most complex, is found within human symbolic processes. Measurement or codification of energy to mass occurs in all three

realms and therefore, it is an axiom of this paper that semiosic processes are operative in all three realms (Taborsky 1999).

Semiosic zones of codification

Codification into discrete particles and their relations operates within a complex architecture that generates a series of increasingly complex cuts of energy/mass into asymmetrical sections. The most basic cut is ontological, the distinction between an instantiation and its environment. This cut measures mass into zones of the *external* and the *internal*. This has been defined as "the Heisenberg cut" (Matsuno 1999, Primas 1993, Atmanspacher 1994, 1999). This cut, with its distinction between an object and its environment, sets up a dualism that sees both the internal and the external as separate domains of codification.

Codification in the external zone ignores what is going on inside an object and considers that entity only from the ontological separation of an observer or other's stance. Measurements and interactions of mass in this zone refer only to these externally measured units as modular and impenetrable except by division into discrete parts. This sets up a basic mechanism "with matter and force as our fundamental concepts" (Einstein, Infeld 1961: 53). This is the familiar Newtonian mechanical exoperspective and it enables a world operating within interactions of electromagnetic attraction and repulsion. The internal codification, on the other hand, operates completely internally, with no recognition of otherness. This permits a holistic endoperspective, a state "prior to object-subject bifurcation, in which the so-called external world becomes totally deprived of its ontological solidity" (Atmanspacher, Dalenoort 1994: 1). Internal measurement and interactions of mass are uncertain and amorphous because they lack reference to a distinct "other" reality with the result that discrete descriptions and therefore avoidance, are impossible (see Matsuno, Paton 2000; Matsuno 2001, Atmanspacher 1999). Measurements within the internal zone permit non-local correlations, i.e., the non-local EPR interaction, while measurements within the external zone lose that holism "and objects and disentangled observers can be distinguished" (Atmanspacher 1999: 129). It is an error, I feel, to define these two zones as simply objective and subjective, for the

latter term introduces a conscious and personal, individual intentionality that my analysis rejects. Measurements within the external zone are made within classical mechanics and measurements within the internal zone are made within quantum field mechanics irrespective of the size of the system and the state of consciousness.[1] My point is that classical and quantum mechanics are not ideological and oppositional perspectives about our universe, with ourselves choosing between them, but are real processes of measurement of energy/mass and both are required within the ontological nature of a complete energy/mass codification.

A second cut, the epistemological, divides both the external/ internal, or classical/quantum measurements into "both *facts* and *models*" (Atmanspacher 1994: 15, emphasis in original). Using other terms, this is the familiar mind/body distinction and has been described as "the Cartesian cut" (Matsuno 1999, Atmanspacher 1994, 1999, Primas 1993) although we remember its identity from the Platonic/ Aristotelian arguments on Form and Matter. These measurements establish material singularities and a formal or mental model of cohesive identity. That is, "the elements of *res cogitans* are non-material entities like ideas, models, or concepts [and] the elements of *res extensa* are material facts, events or data" (Atmanspacher 1999: 128). The formal model, as a mental (again, not necessarily human) process, is encoded digitally while the informal singularity is encoded analogically. Mental computation provides holonomic or synchronic constraints of communal norms that resist the dissipative forces of the non-holonomic atomistic expressions which confront this synchronic resilience.

What we have set up is an architecture for a dynamical measurement operating within a series of ontological and epistemological cuts. If we postulate a universe that began in a pure symmetry of mass/ energy and moved into asymmetrical gaps between mass and energy, then, what are the interactions that are made possible by the concomitant requirement for mediation of these cuts? In order of extremes, a

[1] This zone should be more accurately understood to operate within aspects of relativity or field theory rather than totally within quantum mechanics. My model does not use Bohr's concept of the elementary particle as measured by a macroobserver on micromatter but uses the concept of the elementary nature of the relational interaction. However, it denies the relativity view that matter is independent of measurement. These details will be examined in a forthcoming paper.

relational interaction will be iconic, indexical or symbolic. An iconic or mimetic relation is operative where the differentiations in codification established by the measurement cuts are slight, where there is "a mere relation between the sign and the thing signified" (Peirce 1.372). Indeed, the relation subsequent to the cut is "a mere quality" (Peirce 2.243) for the separations have been amorphous and permeable. A wider or more intense cut will enable a discrete separation and a subsequent indexical relation which must be, to acknowledge the actual physical separation, itself an "actual existent" (Peirce 2.243). In an indexical relation, the two discrete entities are linked by a "direct physical connection" (Peirce 1.372). The most asymmetrical cut will enable a symbolic relation, involving an "imputed character" (Peirce 1.558) which is a relation linking these discrete entities that requires a conscious and referential intentionality. The symbol has no links, either mimetic or physical, with its interpreted meaning, other than a consciously assigned relation. As such, the symbolic relation permits the most plastic and innovative relations for such relations exist entirely by "the fact that it is used and understood as such" (Peirce 2.307). I am postulating that symbolic semiosis is only operative within the human realm. On another point, it should be noted that asymmetry increases the reaction time to establish a relation. Iconic measurements can establish relations rapidly for there is little to differentiate and recognize; the indexical requires the establishment of a physical bond and increases the reaction time; the symbolic, which is arbitrary and learned, and implies subjective intentionality, requires the longest reaction time. These temporal discrepancies cannot be overlooked in a consideration of the entire semiosic architecture.

The semiosic categories

I will introduce the three basic modes or categories of codification. The semiosic process should be understood as a dynamic and relational rather than a nominalist action; that is, the sign should not be understood as one image substituting for another image. The sign is a relational process and acts as a full sentence. The sign, whether acting as an icon, index or symbol, is to be understood not as a "thing" or noun, but as a "thing-in-relation-to-other-things". The noun-part and the predicate-part together make up the sign (Taborsky 2001) and

the sign establishes both particle-mass and relational-mass. Let us now consider the basic modal categories in which this sign, as an action of establishing relations between mass, operates. These modal categories are a Firstness of holistic possibility, a Secondness of individuality and a Thirdness of normative habits of the community. These are only the basic modes; in the interpretive actualization of energy to mass, these modes will readily combine and become more complex.

Firstness is a relation of feeling, quality, chance, immediacy, "an instance of that kind of consciousness which involves no analysis, comparison or any process whatsoever, nor consists in whole or in part of any act by which one stretch of consciousness is distinguished from another" (Peirce 1.306). Any experience that is codified within a state of Firstness is completely internal and has no capacity to refer itself to an external object/model for comparison. As an experience it is in a continuous state of emergence, lacking the capacity to move itself into discrete singularities. It should be clear that "the internal perspective is fundamentally distinction-free, i.e., no object can be distinguished from anything else" (Atmanspacher 1994: 15). Mass encoded within Firstness is obviously so elementary that it is both noun and predicate, particle and wave at the same time. Its properties are homogeneic and operative within coupling bonds that set up reversible and symmetrical links that tend to maintain an equilibrium of energy to mass transformation. This mode of codification is unable to implement recording or descriptive systems, which are referential codes that integrate random sensory-motor stimuli to provide the stability of a synchronic memory. As Gödel pointed out, a system cannot prove its own consistency but requires a formal reference. Can we imagine our early universe in such a random state? Unlike energy in a state of Secondness, if not picked up by more stable codal processes, the energy in this amorphous indeterminate state does not dissipate to a less complex mass; it simply remains in this isolate internal zone as an infinite "potential", which is continuously distributed throughout the cosmos. Without the constraints of definitive measurements and a referential memory to stabilize any relations, this mode of codification enables energy to saturate its internal phase space, which we might describe as a state of pure feeling. Therefore, Firstness, as a codal process, sets up rapid non-reflexive relations with no descriptive capacity but with a capacity for expansive exploration, i.e., a radiant energy.

Secondness is the basic mode of our sensate and conscious experience, in the sense that it describes both physical and mental awareness of evident differentiations in our external environment. Secondness is the collapse of the expansive symmetry of Firstness, it is the compression of the energy of Firstness within asymmetrical constraints which transform this energy to insert mass with observable differences. Secondness acts within the irreversible selection of a specific path, where a "choice", random or intentional is made, and that particular instantiation or fusion of mass emerges as differentiated, externally, from another mass. With its focus on proximate cause and effect, energy coded within Secondness acts as the "mutual action between two things regardless of any sort of third or medium, and in particular regardless of any law of action" (Peirce 1.322). Secondness refers to "such facts as another, relation, compulsion, effect, dependence, independence, negation, occurrence, reality, result" (Peirce 1.358). The key to mass codified within Secondness is its discrete closure, as operative within the Heisenberg cut, and this cut is ratified as a closure by a link, a predicate relation – whether it is an iconic, indexical or symbolic link — to another object. Therefore energy encoded as mass within the semiosic process of Secondness "is a real thing or fact which is a sign of its object by virtue of being connected with it as a matter of fact" (Peirce 4.447). Therefore, this mass is contextualized to its local context and we can assign a definite quantitative and qualitative description to its identity. With an obvious reference to classical physics, Peirce states that

> there has been during the nineteenth century a decided leaning of scientific opinion to discredit any other sort of action in the external world than that of dynamical force; to understand a dynamical force to be a purely brute force with no element of inherent reasonableness in it, but merely to be the only force that scientific research could discover. (Peirce 6.329)

So too, Einstein gives an example of a simple mechanical view, of "two particles with forces acting between them" (Einstein, Infeld 1961: 53). In Newtonian mechanics, the inertial mass operates in an inertial frame. This is an externalist or non-interpretive mechanical interaction and we should remember that these discrete instances are brittle, contextually bound to initial conditions and without, themselves, the stability of memory.

Thirdness is the key mode. Thirdness is a mode of mediate measurement that we have, as a result of the Cartesian and Newtonian focus on the immediate physical orientation of discrete elements ignored and indeed denied for years. However, "there is some essentially and irreducibly other element in the universe than pure dynamism or pure chance [and this is] the principle of the growth of principles, a tendency to generalization" (Peirce 6.322, 6.585). Thirdness is a process of synchronic codification, operative both externally and internally, that transforms the multiplicity of diverse sensory-motor data into cohesive "habitual" diagrammes of communal knowledge. Thirdness works to glue, to bind, to relate, to establish relationships and connected interactions. It takes descriptive codes of mass from the diverse instantiations of our internal and external experiences and "translates" them into a syncretic diagramme or Laws of relations of these descriptions such that subsequent local instantiations, within Firstness and Secondness, can emerge as versions or representations of these communal Laws. Thirdness is a "matter of law, and law is a matter of thought and meaning" (Peirce 1.345). It is therefore, a process of the mind, the other side of the Cartesian cut, *res cogitans*, it is the process of assimilating, the "power of taking habits" (Peirce 1.390). Paton calls such a process of developing this epistemological coherence "glue" (Paton, Matsuno 1998). This is a succinct image of its powers as a resilient dynamics of a force enabling evolutionary cohesion.

The Architecture

We now have the basic codal categories of Firstness, Secondness and Thirdness. However, as examined by Peirce (for example, in 1.365–367; 1/383; 1.413; 1 526–544) these basic modal categories will operate as both "genuine" or pure and as "degenerate" or mixed. This will increase the complexity of relations and therefore interpretations that the sign is able to produce. I am going to set up a dyadic architecture that incorporates both the genuine and degenerate semiosic processes. I will further differentiate these semiosic actions into those that can take place in the external realm and those that can take place in the internal realm.

The external realm operates within two semiosic realities, two different ways of measuring/codifying energy. One measurement produces the singularities; this is discrete mass in a state of inertia independent of any motion. And, there is kinetic energy, the "energy of motion" that is separate from the inert mass. The first two laws of thermodynamics, conservation of mass and conservation of energy, operate separately in this realm. Mass and motion are separate. However, if we consider the singular mass, and locate ourselves within it, then, a very different mode of energy/mass relations becomes evident. The internal semiosic processes are the inclusive mass/energy relations that take place within a singular mass. Because these processes are completely internal, we must understand them as operating not within a singular entity but within a unity. Mass operates very differently within a unity rather than as a singularity. Internally, we have, not two separate processes, that of the external rest-mass and kinetic energy, but a unity of processes within relativistic mass-energy, where energy and mass are both understood as relative to each other and are therefore, constantly transforming into each other. Therefore, the two thermodynamic laws operate together in this realm. What we must also consider is that this dyadic architecture of two realms, the external and the internal, is not adversarial and dispensable but indispensable, because the codal actions within each realm provide different properties and enables the entire system to develop a dynamic flexibility and adaptive capacity.

Based on the Peircean complexity and interdependency of genuine and degenerate modal categories, I suggest six basic codal predicate operations; that is, six different semiosic processes that encode energy to mass, within these ontological and epistemological cuts. They are:

Firstness-as-Firstness [1-1]	This develops a pure possibility.
Secondness-as-Firstness [2-1]	This develops a probable existent.
Secondness-as-Secondess [2-2]	This develops an irreversible existent.
Thirdness-as-Firstness [3-1]	This develops a law of probabilities, of possibilities.
Thirdness-as-Secondness [3-2]	This develops a law of actual existences.
Thirdness-as-Thirdness [3-3]	This develops pure massless Mind.

The point is, these six different predicate codal processes are not all found within the same zone of operations. They operate, quite

exclusively, in either the external or internal realms. In the external zone, the operative codes are: Secondness-as-Secondness [2-2] and Thirdness-as-Firstness [3-1]. In the internal zone, the operative codes are: Firstness-as-Firstness [1-1], Secondness-as-Firstness [2-1] and Thirdness-as-Secondness [3-2]. The final semiosic predicate, Thirdness-as-Thirdness [3-3] is pure Mind, which is massless, and I will leave its complex examination for another paper.

A brief point that will also be glossed over in this paper, is that epistemologically, Thirdness will always be encoded within a digital measurement and Firstness/Secondness within an analog measurement. Temporally, the digital code operates in past/future time and acts as a future-oriented cohesive pattern of habitual interactions. The analog code sets up a local and irreversible once-only mass. The haecceity or contextualized "thisness" in current time is the essential demarcation of an analog code. The digital abstracts information from the local contexts and sets up an interpretation that is general enough that an analog instantiation can replicate that interpretation, as a "this", but as related to another place and another time. However, mass that is codified within a digital mode cannot, in its nature as a formal abstraction, ever be completely articulated within these analog instances. This "blind spot" provides the analog with an expansive freedom of exploration. The two sides of this epistemological cut, the digital and the analog, mind and matter, together provide important features for a complex system.

Let us now move to a closer examination of the semiosic architecture. The ontological cut has the physical consequence of differentiating mass/energy into external and internal zones.

The external zone

This is the realm of individual experiences, the world of distinct boundaries, filled with objects and the actions that go on between objects, that is, "the ideas of causation and of statical force" (Peirce 1.325). We are familiar with its classical mechanics, with the action and reaction of units whose properties are separate and independent of the properties of other systems. How can we semiotically describe this external zone? We have three categories of codification to work with: Firstness, Secondness and Thirdness. And, we have two asymmetries

that must be mediated with semiosis, the asymmetries developed by the ontological and the epistemological cuts.

Ontologically, in this realm the semiosic sign process must produce a clearly differentiated noun and a predicate. In this case, in the external realm, the noun to be produced is inert mass, a "thing", and the predicate is the classic Newtonian electromagnetic force of attraction and repulsion between these noun-objects. Epistemologically, the semiosic process must provide a synchronic formal set of rules governing the operations of these objects and their interactions. There are two sign processes in this realm. These can be described, semiosically, as that of pure Secondness or "unalterable fixity" [Secondness-as-Secondness: 2-2] and the stochastic average [Thirdness-as-Firstness :3-1].

Codification of energy to mass within the category of pure Secondness produces inert mass, a mass that is differentiated into discrete closures, whether micro or macro objects, all operating within the famous law of non-contradiction, as either "similar" or "dissimilar". The differentiation is so distinct that there is no need for a "time gap" of reflexion and analysis. This is why we say that the classical realm is "mechanical", lacks emotion, subjectivity, imagination, connection, freedom; it is entirely predictable, and the universe, if understood only within this realm, concludes that "all phenomena can be explained by the action of forces representing either attraction or repulsion, depending only upon distance and acting between unchangeable particles" (Einstein, Infeld 1961: 65). Obviously, our world cannot operate only with these random objects flying around; there must be rules for their interaction and their continuity.

The epistemological cut, acknowledging a differentiation between immediate point and progressive time, must provide a set of formal measurements to act as a descriptive memory, to provide a synchronic continuity of reproduction. In the external realm, this synchronic force is provided by the statistical average, which develops as an objective abstraction from the discrete events, to provide a "habitual commonality" that enforces continuity of reproduction by its enforcement of habits, routine characteristics of interaction and organization. This Thirdness-as-Firstness process sets up a prototype model, an "association by resemblance" (Peirce 1.383) to provide a normative overview which acts to inhibit random interactions. The generation of normative habits in this zone is a features-extraction top-down process. This

cohesive memory, a statistical probability, constrains instances by its exclusion of the marginal instances from its normalizing template. Essentially, this overview collapses or crumples discreteness into a flat generality. A question to answer is — does this cohesive process require a human agent as its collator and enforcer? The answer is, no, for a process such as natural selection achieves the same result, with its focus on the average and its indifference to the marginal. What is missing from this particular process of generalization, this Thirdness-as-Firstness, is the ability to insert deviations into that cohesive normative set of habitual relations; that is, deviation is not incorporated into the cohesive ontology but is entropically dissipated. A codification that acknowledges only habitual relations, that rejects divergence, is unable to evolve that blueprint and accept entirely new entities. Evolution is not possible using codal relations that are only external.

These two classical mechanical forms of measurement, however, are vital. What they provide is, first, the integrity of mass, encoded in its crisp "thisness". These instances interact without knowledge of their identities beyond a physical attraction or repulsion. The cohesion, the normative glue that sets up the laws by which these discrete entities interact is, as noted Thirdness-as-Firstness [3-1], which is to say, it is an overview, a blueprint, a statistical average which flattens differentiation and ignores deviations. Given these two codifications of mass-as-particle and mass-as-blueprint, what can we conclude about this external realm? This realm operates with a clear separation of the two thermodynamic laws, that of conservation of mass and conservation of energy. The inert mass, the discrete entities, are going to increase the asymmetry between energy and mass because of the electromagnetic frictional property of avoidance. Entropy, a dissipation of mass to energy, will increase. How can the system deal with this? Second, the external mode of cohesion acts as a "negative habit" (Peirce 1.390), where the law, that statistical average, will forget and flatten (by ignoring its relevance) peripheral behaviour. These two negative relations increase the asymmetry of the energy-to-mass ratio and the system will struggle to rehabilitate itself, it will dissipate as much energy as it can to decrease this asymmetry, reduce uncertainty and attempt to increase its mass. The escalating entropic release of energy by the external zone could be called "the principle of forgetfulness" (Peirce 1.399), for it is here that the external realm actually

loses its rigidity, its closures, its self-absorbed isolation. It begins to "dissolve in doubt" and works rapidly to resolve this fuzziness by, as noted, increased reproduction of its mass-to-mass by rapid regeneration and an increase in diversity of mass forms. It's a relentless battle. However, the external realm's battle between the two laws of thermodynamics is assisted by the internal realm.

The internal zone

Internal measurements, which take place within a unity, cannot use the same semiosic measurements that are used by the external realm, for those measurements refer to singularities and pluralities, which are collections of singulars. Internal measurements operate within the processes of quantum theory.[2] This zone is richer in relations than the external zone for, as noted, an identifying factor of the internal realm is the lack of singularities, of mass encoded as inert in Secondness-as-Secondness [2-2]. Energy is operating, in the internal realm, within a complex entanglement of relations rather than the Newtonian electromagnetic attrraction-repulsion between discrete particles of mass. There are three types of measurement and therefore, three types of relations: two are analog, Firstness-as-Firstness [1-1], Secondness-as-Firstness [2-1] and the digital is Thirdness-as-Secondness [3-2].

The first action of codification is an inclusive sweeping "take-all" gathering of energy, a relation that establishes this internal unity, within the code of pure Firstness-as-Firstness [1-1] as a state, "not an event, a happening, a coming to pass" (Peirce 1.307) but a pure state "which is in its entirety in every moment of time as long as it endures" (Peirce 1.307). This sets up an iconic codification of inclusion that accepts as simultaneous in space and time all forms of mass/energy. As noted, in the internal realm, energy and mass are not distinct, but are transformative versions of each other. Mass could, theoretically, stay this way in an eternal mist of cosmic energy/mass potentiality. The reason it does not do so is because the first ontological cut has established an asymmetry of energy properties in our universe, an asymmetry between mass and energy, and this has resulted in a dyadic reality of external and internal realms. Because of this complementary

[2] This includes quantum field theory and quantum mechanics.

co-existence of energy/mass as both external and internal, the internal energy/mass will be contextualized, its properties will "be conceived in a relational way as they depend on a changing material context" (Kampis 1994: 103). That is, the internal energy/mass *must* be moved into an external existence as inert mass, distinct from kinetic energy, because of the co-existence of the external realm. How do the two realms meet?[3] The second codification in the internal zone is a borderline, a membrane codification, one that operates as the mediation between the internal and external zones. This borderline measurement, an absolutely vital process, has properties that are external, i.e., Secondness, and properties that are internal, i.e., Firstness. It is an action of Secondness-as-Firstness [2-1] and operates as a mode of prescission, a highly charged force of attraction, which focuses "attention to one element and neglect of another" (Peirce 1.549). It operates as an attractor funnel, ready to attract, bond and confine itself within the precise existent codes of the external realm and yet also exploratory due to its internal vagueness. We can certainly say, because of this indexical link with the external realm, that this borderline codal process will also be affected, in some way, by the external cohesive central tendency of Thirdness-as-Firstness [3-1] as well the internal cohesive codal properties of Thirdness-as Secondess [3-2]. It is probably one of the key codal relations.

As for the internal synchronic code, we find that it operates by a process very different from the external cohesive process. Mass, in both its vague amorphous forms of 1-1 and 2-1 is not stabilized by being transformed to inert mass, with crisp forms referenced to that "higher-being" representational codal system as found within classical mechanical codification, but is stabilized by being actually physically linked, as mass/energy, as a network of plastic relations encoded as Thirdness-as-Secondness [3-2]. These relations operate as an indexical rather than a metastatistical intentionality of synchronicity. Internal synchronic continuity sets up a network of physical relations that link each mass-energy interaction to another mass-energy interaction. As we saw, within the external zone, Thirdness acts as a normalizing memory, a judgmental descriptive agent, rejecting and effectively starving deviants into dissipation. Internally, Thirdness is holistically

[3] A key means of enabling internal and external co-existence is by means of temporal disparities; that is, the codifications take place in different modes of time (See Matsuno 1998).

inclusive, physically linking without discrimination or judgment all and every action of codification. In this internal zone there is no such thing as the peripheral and the irrelevant, no such thing as true or false. They are all "part of the operative community". Unlike the external, it cannot dissipate energy outside its boundaries. Internal wave/particle processes may reduce to less complex forms but they remain within the holistic network. Without the capacity for discrimination, it cannot select its future and therefore it too, like the external, is unable to evolve**.**

The complex semiosic architecture

There are therefore, two realms by means of which energy is measured as mass or what we may consider "informed mass", i.e., information. The external classical mechanics measures energy to mass within a process that views matter and energy as two realities, and references the bits of matter to an abstract template that describes and thereby constrains how these bits interact. The functional units are the singular unit (along with kinetic force) and a developed blueprint of the "most common" of these collective instances. The capacity of this external zone of measurement to provide a predictive stability, to "describe all natural phenomena in terms of simple forces between unalterable objects" (Einstein, Infeld 1961: 54) is unparalleled. However, we are well aware that the mechanical view is incomplete. The internal quantum process sets up an inclusive network of emotive ties but is incapable of providing analysis or reflexion on these processes. The functional units are amorphous excitations and a spatial pattern of the actions of these excitations that spreads across a field, i.e., the functional units are a spatially distributed activity pattern, not the individual instance or the number of instances. The capacity of the internal zone of measurement for inclusive acceptance of all variations is equally unparalleled.

These two realities, the external and internal zones, are antithetical to each other. How does one deal with contradictory worlds? Some have rejected the one in favour of the other. One level is real and the other a figment of our imagination — and which is the real and which the fictive has been a matter of intense debate, whether between the symbolists and connectionists in artificial intelligence or the moder-

nists and postmodernists in social theory. What if, rather than the one or the other of these zones, we postulate that our world necessarily requires both? How can we have one world operating with processes that are contradictory to each other?

The solution to the "problem" of the two worlds may be an endorsement of both their differential separation along with their associative filiation. Together and only together, they provide the capacities for a generative and exploratory transformation of energy to mass, creating closures as actual "bits" of informed, i.e., contextualized mass, dissolving these closures and generating new closures, not haphazardly, but within the workings of an exploratory and evolutionary logic and pragmaticism. If we accept that "the emergence process is itself the result of the binding of two dynamical regimes, the endo-regime which is synergetic in nature, and the exo-regime of complex interactions" (Farre 1998: 685), then, we must both insist on and aggressively research the nature of this binding. What new understandings would be required to break with the established view which sees these two worlds as separate and non-dialogical? We advocate an architecture somewhat like a Möbius strip, where the boundaries of these two realities or worlds are filiated, as in a double-helix, without denigrating the integrity of each string. The external provides relations that generate discrete entities and a cohesive metareference that focuses on the strengths of the majority and dissipates the nonessential. The internal provides relations that promote expansion and exploration and a cohesive network that enables an unrestricted inclusion of all variations. What is of interest is that the external becomes another system's internal; the internal becomes another system's external. This means that the external and internal, the classical and quantum, are not exclusionary but are co-existent.

Additionally, this architecture operates within a world made up of three different semiotic realms, the physico-chemical, the biological and the socioconceptual (Taborsky 1999). Each realm operates within both ontological and epistemological cuts and, at the least, five different modes of codification operate within each realm within a constant dialogical discourse. This means that, in total, we will have a complex "buzz" of semiotic complexity within the cosmos. In the physico-chemical realm, the codal relations are primarily iconic and therefore encodements are unable to clearly differentiate type from token, or template from instance. The physico-chemical realm operates

smoothly, with limited temporal or spatial gaps. This enables a universal spread of these physico-chemical properties but prevents variation and evolution. In the biological realm, the codal relations are predominantly indexical, and therefore, tokens are variations of types. Temporal and spatial gaps appear. This enables the biological realm to produce diversity and variations according to the local ecology and evolution, as historic irreversibility, appears. In the socioconceptual realm, the relations are symbolic and the tokens are metaphors of the types. This enables the social realm to create its own types and tokens, its own relations, and permits an explosion of innovation, while at the same time, it inserts the requirement of conscious and ethical choice.

There is one further mode of codification that we have so far neglected, and that is pure Thirdness, genuine Thirdness-as-Thirdness [3-3]. Does it exist? “There is no absolute third, for the third is of its own nature relative” (Peirce 1.362). I see this as pure mind, without mass. However, pure mind does not exist per se but as a cohesive logic of relations, a force of mediative attraction focused on the future and on final causality. Pure Thirdness is Final Cause, a “sense of learning” (Peirce 1.387). The community of users will acknowledge that its analog instances will of necessity “be pragmatic”; that is, they will be “ethical”, they will be “right” over time. This also means that the community acknowledges that there is no final state for the world is constantly collaboratively both “flexing its muscles” and interpreting the ethical feasibility of its actions.

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Энергия и эволюционный семиозис

В статье ставится гипотеза о массе как о кодированной энергии. Соответствующий процесс превращения рассматривается как семиозисное действие интерпретации. Семозисное влияние анализируется в пяти “предикатах” или “вербальных типах”, которые создают разные процессы превращения или интерпретации. Эти являющиеся знаковыми процессами “типы предикатов” имеют место в разных ареалах реальности, как во внешнем, так и во внутренном. Внешний ареал состоит из дискретных объектов и связях между ними. Происходящие там процессы изучает классическая механика, и в данной статье отмечается их уникальная семиозисная кодифицированность. Внутреннее пространство является холистической внутренной перспективой, в которой не различаются дискретные объекты. Эти процессы изучаются в рамках понятий кванта и поля, и в этих процессах также отмечается их уникальная семиозисная кодифицированность. Вместо предпочтения одной

части другой в качестве единственной интерпретации реальности, в данной статье советуют рассматривать как внешние так и внутренние процессы энерги/массы в качестве необходимых составных универсума.

Energia ja evolutsiooniline semioos

Artiklis püstitatakse mõtteeksperiment, mis vaatleb massi kui kodeeritud energiat. Vastavat muundumisprotsessi käsitletakse kui semioosilist mõju — interpretatsiooni. Semioosilist mõju analüüsitakse viies “predikaadis” või “verbaalses tüübis”, mis loovad erinevaid muundumisprotsesse või interpretatsioone. Need märgiprotsessideks olevad “predikaadi tüübid” leiavad aset reaalsuse erinevatel aladel, nii sisemises kui välimises alas. Väline ala koosneb diskreetsetest objektidest ja nendevahelisest seostest. Sealseid protsesse uurib klassikaline mehhaanika, millele käesolev artikkel omistab neile omase unikaalse semioosilise kodeerituse. Sisemine ruum on holistlik siseperspektiiv, milles diskreetseid objekte ei eristata. Neid protsesse uuritakse kvandi ja välja mõistete raames ja käesolev artikkel näeb ka neis unikaalset semioosilist kodeeritust. Selle asemel, et eelistada üht või teist ala kui reaalsuse ainukehtivat interpretatsiooni, soovitab käesolev artikkel nii väliseid kui sisemisi energia-massi protsesse käsitleda universumi vajalike koostisosadena.