Dynamics of the Informational Interface

Edwina Taborsky
Bishop's University
Lennoxville, Quebec, Canada J1M 1Z7
taborsky@primus.ca
http://www.library.utoronto.ca/see

Abstract
Information is understood as a mediated construction, the Sign, which is an organized or encoded cohesion of energy/matter. The Sign emerges within measurements made by up to six predicate relations that operate within four spatial and three temporal parameters. Three predicate relations enforce states; three predicate relations enforce dynamics. A key relation is that of the 'interface', that acts as a relation of anticipatory decision-making. Six types of interface are examined.
Keywords: information, predicate relations, four spatial and three temporal measurements, interface

1 Introduction

I am taking as a basic premiss that our universe consists of energy. The definition of energy is not Newton's kinetic force, i.e., an external force applied to an inert body, but Einstein's equivalence of mass and energy (Russell 1948, Pauli 1951). Concomitant to this premiss is that energy does not exist *per se* without dimensions but is able to exist only as matter, as a 'congealed' or dimensional energy. Energy is not a substance despite its permanence, for, as Peirce pointed out, "independence of time does not of itself suffice to make a substance; it is also requisite that the aggregate parts should always preserve their identity, which is not the case in the transformations of energy" (CP 3.457). Energy is stabilized as a dimensional substance, matter, by being organized within codes of measurement. A code is a pattern of organization set up within referential perimeters of space and time. That is, "measurement is a material process" (Matsuno & Paton 1999:229); it produces matter and is not merely a secondary conceptual reference. As measured in such patterns, energy is operative as 'informed or interpreted' matter. The architecture of this transformation of energy into informed mass is semiosis or networked codification, which operates within a series of ontological and epistemological cuts that increase the asymmetrical gradients of energy/matter which are then mediated or 'sewn back together' by symmetry enforcing relations.

2 A Thought Experiment

Imagine a cohesive symmetry of energy, obeying the first law of inertia. As pure symmetry, it is indescribable and continuous. Then, with the Big Bang/The Fall and subsequent cooling, the symmetry was broken; the differential measurements of space and time appeared, and asymmetrical energy appeared as discontinuous matter. The second law of asymmetry had emerged, permitting domains that were organized differently from other domains. What can happen? Could our universe operate within

the random interactions of these separate 'bits'? It doesn't happen, we observe relations between these differences, and what emerges is a process of cohesion that establishes a new mode of symmetry. Why and how, does both cohesion and differentiation exist? Let us consider a number of options.

2.1 Aggregate Symmetry

This option considers that cohesion is a function of aggregation, where separate particles associate by means of *philic* or iconic bonds (like to like). Iconic symmetry reduces frictional entropy by its compilation of these bonded units into more comprehensive sets. Additional stability can be achieved by organizing the aggregates into scalar and serial classifications of sets. Cohesion is a 'top down' enforcement.

2.2 Indexical Symmetry

This option rejects philic bonds and focuses on the dynamics of *phobic* or opposite polarities. It relates differentiated matter by temporal/historical linearity. This theory considers that energy/matter exists in its pure state within symmetry, then, over time or history, energy becomes asymmetrical or degenerate and functions as separate bits of reactive matter. However, again involving history, it is asserted that this impure matter will return to a cohesive symmetry. This theory, found within Hegelian/Platonic analyses, considers that matter exists as a reversible disturbance, a degeneration of an original radiant energy, but that its historic 'revealed' destiny is a return to its original point of origin as pure energy. The transformations between these states of organization would be periods of chaos.

Another response is to state that there is no way, outside of mysticism, to return to the original unity. The third option is the theory that our universe established a different mode of symmetry, which I will label as *interpretive symmetry*.

3 Interpretive Symmetry

Interpretation is understood as the transformation by codified measurement of uninformed random energy/matter to informed or bonded energy/matter, known as 'information' and 'knowledge (Taborsky 1998). Interpretation operates within a *configurational network* of Relations or Predicates that measure energy within spatial and temporal parameters. These measurements set up 'informed matter', which we term 'Signs' that exist within a network. These measurements establish both a networked symmetry or cohesion, and at the same time, ensure a networked asymmetry or differentiation. Symmetry and asymmetry are fundamental properties of the interpretive network. Interpretive symmetry is a dynamic action that, as it establishes relational connections, is also establishing morphological actualities.

3.1 Measurement

There are four spatial values and three temporal values. These seven measurement values are non-commutative and independent. Additionally, these values are not artificial, i.e., constructions of the human mind, but are natural properties of our material reality.

3.1.1 Spatial Values: internal, external, local, global

Space is not continuous and fixed but is dynamic and contextual and a result of measurement. The primitive spatial values of internal/external are defined by temperature, understood as the heat energy available to a system or domain. This first gradient differentiation, achieved within the first nanoseconds of the BigBang, can be called the ontological cut (Atmanspacher 1994, 1999, Farre 1998, Primas 1993, Matsuno 1999b) and is maintained by lowering temperature either by dissipation of energy or by increasing temperature by insertion of energy from another source. This elementary differentiation establishes relatively discrete domains of energy which operate as matter, i.e., locally stable or bound energy.

Matter, differentiated by means of temperature, establishes domains of internal and external space, within which measurements/activities can be carried out that are functional only within that domain. This elementary spatial differentiation means that measurement operations and the resultant network connections and complexity have, at a minimum, doubled.

Local and global spatial values are achieved by the addition of temporal codification to the internal/external spatial measurement. Local space is a morphological measurement derived from the addition of present or perfect time, and global space is derived from the addition of progressive time.

3.1.2 Temporal values

Time, like space is not a continuous absolute line independent of matter but is instead a composite part of matter. That is, its value is relative, as Einstein pointed out, to the other values with which it is entangled. Time has three values that act as differential codal measurements (Matsuno 1998, 1999a, Matsuno 2002, Taborsky 1998, 2002b). Using Matsuno's terms, these are progressive, perfect and present time values. [1]

Progressive temporality measures energy as a continuity of past-future, and as such, measures energy within a general or universal future propensity to, when actualized, express some value of that measurement. This functions as a strong anticipatory or focal constraint. Energy encoded in progressive time can be understood in itself as a generalization (Aristotle's *potentia*, Peirce's Thirdness). General/universal measurements enforce continuity and as such, are realities, and are not conceptual models fashioned by humans.[2] The universal is not a psychological but a logical reality. Universal measurements provide symmetrical, which is to say, distributed constraints that resist the dissipative forces of the asymmetric singular articulations that confront this resilience. The universal measurement is not invulnerable to alteration by its articulation within the concrete instantiations, and therefore, these codifying properties

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[1] See also Atmanspacher's analysis, using Whitehead's term of the 'specious present' for the 'extended now' of present time, and the 'actual occasion' for a somewhat comparable perfect time with its finite duration (Atmachspacher and Ruhnau 1995).

[2] This argument , between the nominalists who reject the reality of universals, and the realists, who accept it as fundamental, is a basic theoretical and scientific conflict. Realists include Aristotle, Plato, Peirce, Einstein; nominalists form the majority of modern and postmodern science.

of progressive time must be understood as reflexively evolutionary and dynamic. To preserve this capacity, it is never actualized 'as such' in full discrete concreteness but remains non-concrete; that is, progressive time matter remains non-local (Gödel 1961).

Present time measures matter within a value of unity, i.e., a measurement with no intervals. Matter encoded within present time has a high degree of freedom for it is beyond the perimeters of description, for description requires differentiation. However, energy/matter encoded in present time can be used, when linked with other energy/matter coded in present time, as a primitive yet powerful enforcement of symmetry by increasing the mass, such as raising the decibel level of a siren. It can be used, when linked with matter coded in perfect time as an emotive reinforcement, for example, as an adrenaline input to a skier or as a value to a politician's speech.

Perfect time measures matter as a fixed point value along an integer scale of plus and minus. Perfect time encodes matter as bonded to a local domain; as such, this matter is 'concrete' and morphologically differentiated as 'informed matter'. When linked with other matter encoded in perfect time, matter encoded in perfect time increases the kinetic force of that matter, as a kick propels a football. When linked with progressive time, such matter computes its next state in terms of its past states and acts as serial continuity.

A network of interpreted energy, which itself is understood as 'informed matter', emerges within the operation of these seven spatial and temporal measurements. The two key functions of measurement are the establishment of symmetry and asymmetry within a network of evolving complexity.

4 Function

4.1 Symmetry

Network symmetry is achieved, not as a result of the iconic or indexical association of instantiations (Sections 2.1, 2.2) but by a dynamic evolving interpretation of energy/matter that develops a general or universal code that reduces the asymmetrical power of singular differentiations and inserts the universal as a cohesive dominant or master constraint. Note that this process of interpretation is not supplied by reference to an observer but by the measurement architecture of the system itself.

4.2 Asymmetry

Given that matter exists within seven measurement values, this means that asymmetry and discontinuity is a fundamental property of our universe. Within the temperature and temporal tensions created by an actuality, gradients must be renegotiated and measured within relations that induce displacement of energy and then harvest and reconfigure the energy into other morphologies.

As an interpreted, negotiated symmetry, rather than a holistic or serial symmetry (aggregate or indexical), equilibrium and order co-exist with innumerable asymmetric gradients or 'clumps of diversity'. Each informs the other. For example, the production of an embryo requires transforming compressed data in progressive time/global space (the DNA) to fixed point information in perfect time/local space (the embryo). This requires the use of energy measured in present time/local space (heat, etc.) plus the

release of compressed energy from progressive time/global space, along with the release of energy values from fixed point information in perfect time/local space (RNA, proteins, etc). A co-existent property of the network, given this diversity, is the evolution of new morphologies within the temporal and spatial parameters, such that the multiple opportunities offered by a network may result in innovative interpretations. The other two types of symmetry, aggregate and indexical, are unable to generate innovative interpretations and resort to, in the first case, revelation and in the second, accident, to explain the appearance of new morphologies.

5 The Displacements

I'll describe the development of gradients of information or matter within what has been called the Cartesian and Heisenberg cuts (Atmanspacher 1994, 1999; Farre 1998, Primas 1993, Matsuno 1999b).

The Heisenberg cut measures matter into separate ontological domains of codification, the *external* and the *internal.* This bifurcation is achieved by temperature gradation and establishes a basic differentiation between an instantiation and its not-self, a distinction that is real no matter how fuzzy and indistinct the differentiation. In the initial scenario of the universe, gradients of matter developed with the loss of heat as energy/matter expanded beyond the capacities of temperature codification to maintain symmetry. What could result? An obvious result would be a frictional 'adversarial' dissipation of the energies operative within these different gradients with a resultant return to symmetry. Why didn't it happen? After all, such a scenario has been the ideal of many a theorist, including Plato, Augustine, Hegel, Rousseau, Marx and et cetera. The reason is the introduction of irreversibility.

The Cartesian cut is achieved by temporal codification and sets up an epistemological differentiation of one mode of codification, the formal or universal, from another mode of codification, the local instantiation. The introduction of temporal measurement separates matter into, not merely two instances, but two morphologies. One mode has the capacity to act within a continuity of redundant measurements in past/future or 'progressive time' (Matsuno 1998, 1999a, 2002; Taborsky 1998, 2002b). The other mode operates within either a present or perfect point-temporality. Time is an integral property of matter rather than an external referential measurement. The addition of temporal codifications increase the complexity of spatial codification. In addition to internal and external spatial domains, temporal codification defines two further spatial domains, the local and the global.

The formal model operates in progressive time and global space, while the informal instantiation is encoded in present or perfect time and local space. This means that some energy is encoded into matter that has the operational capacity to act as long term general and universal models and some is encoded into matter with an operational capacity to refer only to unique actualities.

This process of the codification of energy to informed mass is known as semiosis (Taborsky 1998). Semiosis is not confined within language or human or biological consciousness but begins at the primal level of energy/matter processing. These processes of interpreted measurement do not necessarily involve a deliberative or

conscious interaction. Mind, as the logical and communal measurement of symmetry, operates to transform energy to matter or information but it is not essential that Mind is human or conscious.

6 The Network and The Sign

From the first instant of the BigBang, our universe operates as a 'complex adaptive system' which means that it must deal with the contradictory processes of symmetry and asymmetry.

The only way to deal with the introduction, by virtue of differences in temperature and temporal values, of description or asymmetry and prevent the chaotic isolation of these descriptions, is to develop a symmetry that does not function as a reductionist unity but rather as a distributive network of relations. The network develops connections between energy gradients. The focus is on the relations. "Where ordinary logic talks of classes the logic of relatives talks of *systems*. A *system* is a set of objects comprising all that stand to one another in a group of connected relations" (Peirce CP 4.5).

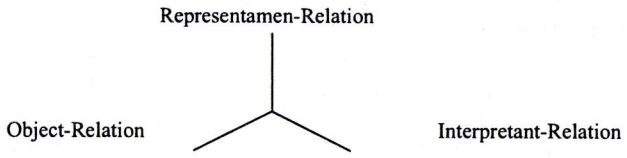
The first idea to understand is that semiosic relations are not non-evaluative connections of two things, for if that were the case, "all things would be connected" (Peirce CP 3.464) and this would "reduce relations, considered as simple connexion between two things, to nothing" (ibid). Instead, "these different modes of relation are different modes of connexion" (ibid) and as such, the 'things' or clumps of matter emerge as unique end points of these different relations. Furthermore, since there are seven modes of measurement, this results in complex relational morphologies. Let me take the reader through this development of measurement.

7 The Triadic Energy Infrastructure of the Sign

There are three basic transformative codal relations within an interpretive action. There is the 'this' which is an undescribed glob of matter; there is the model understood as the referential standard, and there is the 'that', which is the glob of matter transformed by reference to that model, into a discrete interpretation or description. In Peircean semiotics, these are the object, the representamen and the interpretant. These three relations comprise the Sign. The sign should not be thought of as a dyad, which would merely be an Interpretant signifying an Object. Rather the sign includes the function of the Interpretant presenting itself as a truthful representation of its Object and this requires a reference to a logical continuity of experience, the mediate Representamen (Peirce CP 8.378).

The mediate relation, the **representamen** promotes symmetry or cohesion. The two processes that measure instances, the measurement of the input energy, known as the **object,** which then becomes measured as the **interpretant,** provide asymmetrical actualities. The fact that there are two, rather than one, asymmetrical realities, object and interpretant, within the Sign, permits both iteration and also the diversification from, rather than iconic re-presentation of each other. A sign can be imagized as a triadic windmill of relations.

Figure 1: The Semiosic Sign: a windmill



Let us dispense with two invalid models of the sign. First, the Sign is not a line; it is not a linear equation of two points in a one-dimensional mode ('this' means 'that'). Such discrete points, operative in local or self-referential space and measured against Newtonian absolute time, implies both a universe of particles and a progressive scale of development. With this model, interpretation requires the addition of kinetic force from external agents operating in scalar and serial hierarchies. The triangle is another frequently used yet invalid image of the sign. The triangle acts as a polygon line that moves through three phases that, in a Hegelian fashion, links its end point with its point of origin. That is, the line is reversible or recursive and this would mean that the Interpretant would eventually merge with its Object, a return to pure symmetry.[3]

The best model of a Sign is a parabola, which is able to move out of the nominalist fixation on the particle, understood as an end-point, and concentrate on the relations between these three end-points. The x and y cuts (ontological and epistemological) establish spatial gradients but the line establishes an irreversible temporality. We can understand the sign as a conic mass, made up of triad of interacting measurements. There is (1) an eccentric or chance-driven asymmetry generating force, (2) a focal symmetry generating force, and (3) the insertion of an irreversible point of attention, a direction that generates a measured asymmetrical closure. In Peircean terms these are the Object-Representamen-Interpretant. These must be understood as relations plus end-points.

We therefore have three relations or codifying interactions: that between the Object and Representamen O-R; that between the Representamen and the Interpretant R-I; and the Representamen R-R in itself. Interpretation is understood as the transformation of uninformed random energy/matter to informed or bonded energy/matter. The initial condition is an intersection of two energies/masses (the ontological cut); this intersection, also called 'preparation' [4] instigates the formation of a sign, which essentially means the development of a triadic morphological 'event' of energy/mass.

7.1 Energy Dynamics of the Sign

The *energy dynamics* of the Sign, viewed as this triad of energy-relations, operates as Eccentrix-Focus-Directrix or Object-Representamen-Interpretant where energy

[3] See critique of line and triangle, in Peirce 1.429. The line model is Saussurian/Structuralist; the triangle model is a foundation of the work of Morris (1938) and Ogden & Richards (1923)..

[4] The relation between Object and Representamen is referred to as 'preparation' by Christensen; the relation between Representamen and Interpretant is 'detection'.

moves from left to right. That is, the Representamen is a process of measurement that mediates between the Object and Interpretant; it is "the medium or connecting bond between the absolute first and last" (Peirce CP 1.337). However, the *energy content* of the Sign, viewed not as a dynamic action but as an informed mass, is: Directrix-Eccentric-Focus, or Interpretant-Object- Representamen, with the energy/matter increasing in codal content or mass from left to right.[5]. The Interpretant connection has a lower capacity to encode matter than the Object, and therefore, an interpretation requires dissipation of energy. The Representamen, acting as the mediating reference, encodes the most energy.[6] Temporality increases from left to right, which means that the Interpretant codification has less longevity than the Representamen codification. The codification of energy operates within three codal modalities or categories, each of which functions within dissimilar spatial and temporal values.

8 The Semiosic Categories

There are three basic Peircean modalities of codal organization. They are a Firstness of possibility, a Secondness of individuality and a Thirdness of normative habits of the community. Measuring or codifying energy in these different modes means that our universe has a robust capacity to form complex relations of energy/matter. There are ten basic triads or signs (Peirce CP 2.264), that rely on six predicates or relations. It is again important to note that the infrastructure of the triadic sign must follow a dynamic linear energy set-up, where the energy-content of the interpretant-object-representamen architecture must be maintained as $\leq$ in that order.

8.1 Firstness

Firstness is an internal codification that measures mass without reference to gradients of space and time, and "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 CP 1.306). This measurement cannot produce discrete values (i.e., in perfect time, with duration) and cannot produce mass that is able to interact (because it does not have membrane closure or discrete property). This state of energy/matter has no access to other states and its energy remains in a continuous state of excitation, in present time, lacking the capacity to move itself into discrete instantiations or measurements, i.e., descriptions. Mass encoded within Firstness, is "a mere sensation without parts" (Peirce CP 5.289). Firstness, as a codal process, sets up rapid non-reflexive relations with no descriptive values but with a high degree of freedom and a resultant strong capacity for expansive iteration, i.e., a radiant fractal (Christiansen 2002:350).

8.2 Secondness

Secondness as a measurement collapses the expansive symmetrical capacities of

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[5] This analysis is based on the work and theories of Peder Christiansen.

[6] The nature of the Representamen as using a digital code, and the Object and Interpretant as using analog codes is discussed in Taborsky 2002b. See also Hoffmeyer 1996. It could also be seen as a black hole or 'dark matter'.

Firstness, by providing spatial and temporal parameters that act as proximate referential values to inhibit and constrain the energy encoded in Firstness. Secondness acts within the selection of a specific path, where a choice, random or intentional, is made by virtue of the attraction of another mass. A particular instantiation of mass emerges as differentiated, externally, from this other mass. Secondness refers to "such facts as another, relation, compulsion, effect, dependence, independence, negation, occurrence, reality, result" (Peirce CP 1.358). Matter encoded within Secondness is oriented and intimately linked to this local context, and we can assign a definite quantitative and qualitative description to its identity. This is an externalist mechanical measurement and these discrete instances are brittle, contextually bound to those referential initial conditions and without, themselves, the stability of a memory.

8.3 Thirdness

Thirdness is a mode of mediate measurement that we have 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 CP 6.322, 6.585), or more simply, the tendency to 'take habits', where that original random act that established discrete Secondness becomes habitual. Thirdness is a process of distributive codification, operative both externally and internally, that sets up a general model that works to glue, to bind, to relate, to establish relationships and connected interactions. It extracts descriptions from the diverse instantiations of experiences and 'translates' them into a syncretic diagramme such that subsequent local instantiations can emerge as versions or representations of these general morphologies. Thirdness is a "matter of law, and law is a matter of thought and meaning" (Peirce CP 1.345). We must, however, insist that this force of symmetry-making, of generalization, has nothing to do with the human mind but is a natural force of symmetry within the universe.

9 The Predicates or Relations

Predicates are dyadic measurements; they organize energy/matter to establish matter-in-connections or entwined matter. They are actions of relating x to y, understanding each node or endpoint (x, y) as a spatiotemporal domain of discourse, actual or potential. In that relation, the predicates, as processes of decision-making, also form both x and y. Predicates, as dyads, are actual 'facts' in themselves and are not conceptual abstractions. However, no predicate exists *per se* but only within the triadic Sign. 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 is a law of statistical probabilities.
Thirdness-as-Secondness [3-2].	This is a law of propensities.
Thirdness-as-Thirdness [3-3]	This is pure imagination.

The sign as 'informed matter' is a triad of three predicates, which is to say, of three relations: Interpretant-Object-Representamen [7] . We could posit a sign in the code form of: 1-1-2, with the numbers referring to the semiosic category of measurement (Firstness-Firstness-Secondness). An example of such a sign would be an individual diagramme. This sign is a result of three predicate connections, for example, of 1-1, 2-2 and 3-1. This means that this actual sign, 1-1-2, must **displace** energy/matter from those three dyadic relations and **connect** and transform its resultant energy/matter, to arrive at a single triadic topology of 'informed matter', the individual diagramme.

1-1 Firstness as Firstness	Internal Local	Present Time	Possible
2-2 Secondness as Secondness	External Local	Perfect Time	Discrete Actual
2-1 Secondness as Firstness	Borderline Interface	Perfect-Present Time	Attractor Phase
3-1 Thirdness as Firstness	External Global	Progressive-present Time	Statistical Average
3-2 Thirdness as Secondness	Internal Global	Progressive-perfect Time	Future Propensity
3-3 Thirdness as Thirdness	Aspatial	Atemporal	Imaginary

Figure 2: The Six Predicates

9.1 Elementary and Derived Predicates

Elementary predicates include 1-1, 2-2, 3-3. Derived predicates include 3-1, 3-2 and 2-1. Elementary predicates encode matter as states, i.e., re-presentations of formal models in a state of equilibrium; derived predicates encode matter as dynamic, i.e., actualities in a state of non-equilibrium. The elementary predicate's dyadic nodes are in a symmetrical relation with each other; the derived predicate's dyadic nodes are asymmetrical.

9.1.1 Elementary Predicates

Firstness-as-Firstness [1-1] is an interpretive measurement that rejects differentiation, and sets up matter in a continuous state operative in present-present temporality and internal-local space. The relations established by this measurement are iconic, short term and short lived. Matter formed within a present and internal codification is a qualitative 'felt' experience operative outside the capacities of description, which requires the differential closure of external space. Our universe could theoretically stay this way in a mist of Avalon eternity. The reason it does not do so is because

[7] The Interpretant measurement identifies the Representamen-Interpretant relation of detection. The Object measurement identifies the Representamen-Object relation of preparation. The Representamen is a relation as itself.

temperature fluctuations established gradients and therefore, an inevitable differentiation into internal and external domains.

Secondness-as-Secondness [2-2] is an interpretive measurement which we are familiar with in classical mechanics as a discrete crisp, closed instance of matter in perfect-perfect time and local-external space. Our everyday experience of matter in this form leads us to say that the classical realm is mechanical, lacks emotion, subjectivity, imagination and all the other complaints we have against this mode of reality. There are only two possible interactions with matter encoded by this predicate, the brute force of physical or conceptual action-reaction, and aggregation by the statistical central tendency. Both are dyadic actions without interpretation. Matter encoded within this predicate interacts randomly without knowledge of its identities beyond an electromagnetic attraction or repulsion.

Thirdness-as-Thirdness [3-3] is an interpretive measurement that is completely aspatial and atemporal in the sense that it operates in progressive time and global space. As a symmetry, it is a state of pure knowledge but without descriptive informational capacities, which require relations in perfect time and local space (Peirce CP 8.361). Being aspatial and atemporal it exists only when connected with such actualities, i.e., with predicates operative in local space and time.

Are these elementary predicates sufficient for our universe? They operate as isolate non-evolving states rather than interactive functions. Predicate 1-1 acts as a qualitative monad of energy. A metaphor would be unadulterated Desire or Will. Such a pure state has never existed outside of metaphysics. Predicate 2-2 operates as a closed dyad of discrete quantitative properties that interact by random kinetic electromagnetism. This predicate provides the ground for classical mechanics and all nominalist theories and despite its explanatory successes, has often been critiqued as inadequate. Predicate 3-3 operates as an idealism of laws, as pure Logic; however, the origin of this Design remains unsolved. [8] I am suggesting that these three predicates, as symmetrical states, are insufficient and uncritical explanations of the dynamics of a complex universe. An interpretive symmetry uses all six predicates.

9.1.2 Derived Predicates

The derived predicates insert dynamics into the network. A derived predicate is a dyadic relation in a mode of non-equilibrium, being made up of asymmetrical and even incompatible codal properties. As such, the derived predicate acts to reduce its own asymmetry by activating and connecting with other predicates that increase symmetry.

Thirdness-as-Firstness [3-1] is an interpretive measurement that operates in progressive-present time and global-local space. This measurement inserts the properties of an external model of the statistical average into the emerging instantiation, and constrains and inhibits any deviations from that normative template. It acts as a normalizing action, rejecting and effectively starving deviants into dissipative extinction by not recognizing them as 'connectible'. As Kauffman said "in sufficiently complex

[8] If this ideal or rational state is denigrated to a material spatiotemporal reality; that is, if mind is equated with spatiotemporal material dynamics in a mode of Secondness, this predicate functions, dangerously, as axiomatic truths, usually of physics and religion.

systems, selection cannot avoid the order exhibited by most members of the ensemble" (1993:16). This referential model functions as a kind of 'attractor-glue' (Paton & Matsuno 1998) to which the emerging nascent instantiations are attracted, and which they then take as their guide for their adult development. Does this cohesive process require a human agent as its collator and enforcer; that is, is aggregate measurement a referential concept governed by an external interpretor? 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.

Thirdness-as-Secondness [3-2] is a measurement, operative in progressive-perfect time and global-local space. As a relation, it sets up a measurement that connects, in an inclusive indexical manner (its Secondness), all propensities (its Thirdness), even in embryonic fuzziness, that are now existent (in perfect time-local space). This ergodic inclusiveness of unformed and non-habitualized propensities permits an emergent instantiation to bring with itself multiple alternative models of itself as a measurement 'offering' to the development of a new instantiation. I would compare this measurement with the theory of propensities as outlined by Popper (1982/2000), where the normative force is understood to enforce the viability of a "potential but unoccupied state" (2000:197). Another comparison could be with the spin networks of quantum geometry, where matter operates in line diagramme graphs (Smolin 2004). Emergent matter in this measurement is not stabilized by being referenced to a normative or similarity-inducing top-down metamodel as found within the predicate of Thirdness-as-Firstness. In contrast to Thirdness-as-Firstness, this process of symmetrical cohesion is indexical, a 'bottom-up' process, physically linking without discrimination or judgment all and every potentiality in its internal domain.

10 The Key Predicate: the Interface

The key predicate of the six is Secondness-as-Firstness [2-1], which is a connection encoding matter within perfect-present temporalities and, importantly, external-internal local space. My term for it is 'the Interface'. This relation, an absolutely vital process, has properties that are external, i.e., Secondness, and properties that are internal, i.e., Firstness. As an explicitly local measurement, it introduces spatiotemporal distinctiveness (Secondness) to potentiality (Firstness). It operates as an attractor between the two realms, the internal and the external, and as such, as a mode of prescission. It is a highly charged electromagnetic relation that focuses "attention to one element and neglect of the other" (Peirce CP 1.549). That is, it is a mode of anticipation, setting up a phase where decisions are made by the emergent entity, as to how to organize itself in actuality, how to transform its energy-input, as referenced to a model, to an existential actuality. Essentially, the interface forms and connects the internal domains of codification with the external domains of codification.

This is not the same as, for example, a Markov process, an exclusively external mechanics which moves in a strict linear manner to "the consciousness of one thing, without the necessary simultaneous consciousness of the other"(Peirce CP 1.549). The interface, as a dyadic measurement operative within the external physical actualities of local time and space, and yet bonded to the vagueness of internal measurement, is

profoundly dialogically conscious. As a derived predicate, its two modes of codification are continuously entwined in their attempt to induce symmetry within actual asymmetry, and therefore, external actuality is always exploring the new potentialities of internal vagueness, and vice versa. "Prescission is always accomplished by imagining ourselves in situations in which certain elements of fact cannot be ascertained" (Peirce CP 2.428).

The interface predicate of Secondness as Firstness [2-1] can operate as an isolate connector or it can guide emergent matter on a particular path by means of additional connections with the other five predicates of 1-1, 2-2, 3-1,3-2 and 3-3 (Peirce CP 8.353-363). This is an anticipatory mode, enabling the semiosic process to 'select' the future orientation of this transformation of energy to matter, and therefore, to select its actual ontological mode of existence. I will briefly outline six interface typologies. The question of which interface is 'selected to act' and thereby link the internal and the external spatiotemporal domains, and produce an actuality, is a topic for another paper.

10.1 Interface typologies

10.1.1 Chaotic or strange attractors

The predicate relation operates purely as 2-1 with no links to other predicates, in which case the measurement acts as an initial condition (Secondness) in a state of high excitation (Firstness). It is highly volatile and expansive (its present time nature) and short term (local space). If it doesn't find/attract symmetry-inducing measurements from other predicates, its operations will rapidly dissipate, which is why it is known as chaotic and 'the butterfly effect'. It can be understood as a relation of pure freedom, linked to innovation, and frequent in more complex systems.

10.1.2 Similarity

This situation exists where 2-1 links up with 1-1. This relation enables the system to compute its next state referenced only to the terms of its immediate present state. This means that the resultant Sign will be similar to its current physical neighbour. Examples: the formation of crystals, mitosis, mob dynamics.

10.1.3 Historical Serial

This situation exists where 2-1 links up with 2-2 by a physical connection. The system computes its next state in terms of historic links or irreversible temporality. The resultant sign will operate as a physically-connected effect of a proximate cause. Example: a cigarette lit by a match, meiosis, hereditary government.

10.1.4 Peer Pressure

This represents the will of the majority. This situation exists where the energy/matter available is constrained by the 2-1 predicate connecting it to an external global space/progressive time measurement of the statistical average of instantiations, 3-1, which acts as a fixed point attractor in progressive or future time. The resultant sign will operate as a representative of the majority of actualized entities. Examples: a child as it

develops to adult in a particular society, an individual flight plan referenced to a schedule of normal routes, Natural Selection.

10.1.5 Population dynamics

This represents the community as a network. This situation exists where 2-1 brings with it physical connections to the multiple propensities of the internal 3-2 connections of global space and progressive time. The formal model, the 3-2 network, is not acting as the statistical average of a population of actualized entities, as does the 3-1 predicate. This 3-2 predicate acts as a graph corresponding to all possible quantum or non-realized states of space. During the 2-1 phase, the emerging instantiation 'selects' one of these quantum modes to use as a referential model guiding it in its emergence. The selection is not necessarily done only with this 3-2 reference; it can refer to other predicates (for example, 3-1, or 2-2, or 1-1). In addition, these propensities of the 3-2 relation can be subdominant or repressed within the emergent Sign. Example: a child brought up in a relatively closed community, and taught within another community might still retain inclinations of behaviour functional in the first community; an inherited propensity to a disease, which disease is repressed by the developed immune system relations of 3-1 or the actual drugs of 2-2.

10.1.6 Pragmatic dynamics

The ethics of the future. This situation exists where 2-1 is linked with 3-3, the aspatial and atemporal global-ness of measurement. In this interaction, the localized actualities and local propensities are required to also operate within the global future-oriented or pragmatic network.

The Six Predicates, operating to induce both symmetry and asymmetry, within an architecture of triadic relations, permit innovation, for "matter entirely foreign to the premisses may appear in the conclusion" (Peirce CP 3.641), and, as relations, involve the 'informed matter' in a networked or pragmatic cohesiveness. [9]

11 Conclusion

Interpretation is understood as the transformation of uninformed random energy/matter to informed or bonded energy/matter, the Sign. I am advocating an architecture somewhat like a moebius strip, where energy/matter is set up to operate as asymmetrical gradients filiated within a symmetry-inducing network. Both asymmetry and symmetry are achieved by spatial and temporal measurements of six predicate connectives. The resultant 'mass' is understood as 'informed matter', which means that it exists by virtue of its relations. It is a Sign. Uninformed energy/matter can be understood as existent within a near-symmetrical state,[10] which essentially means that it

[9] The sign must also organize itself within an energy dynamics of Interpretant-Object-Representamen Relations, where the energy content, as mass, is either equivalent or increases from left to right. That is, the Interpretant cannot encode more energy than the Representamen. Christensen 1997, and personal communications 2002.

[10] I am claiming that pure symmetry or pure energy, as aspatial and atemporal, does not exist.

is 'uninformative'. The transformation must reduce this symmetry to asymmetry, which means that such matter will then endure by virtue of relations with, established by its morphological differentiation from, other matter. This transformation is achieved by measurement, carried out within six predicates that by their diverse measurements, dissipate, add, and connect energy/matter within specific spatial and temporal perimeters or codal patterns. Since each predicate provides different properties, the resultant computation is a networked dynamics. An interpretation or Sign, whether actualized as an atom, a molecule, an organism, a thought, a society, is a triadic dynamic of three predicates. A predicate is itself a dyadic configuration. The Sign is not a cumulative set of three dyads but is an interpreted computation, a topological reality, of their properties. This means, as pointed out, that interpretation requires transformative actions [dissipation, addition, organization, connection] to reduce the multiple dyadic measurements to one triadic form.

For example, let us consider a set of three dyadic relations: 2-1, 1-1 and 3-1. We'll begin with 1-1 as a spontaneous action that could rapidly disappear. Let's say it is a spontaneous street gathering when news is heard of an athletic victory. It would actually be, as a sign in itself, 1-2-2, but I will focus on the relation of immediacy, 1-1, enfolded within that sign. 2-1 is an interface that can move that spontaneous act to a stronger reality by recognizing its crisp physical existentiality in time (its Secondness). That celebratory action is clearly differentiated from actions of other days. What could happen is that this predicate links the day to a calendar. This is an act of normalization within the 3-1 predicate. The result could be a sign of 2-2-3, a regular event in that community, that has moved from a spontaneous yet unique event (1-1 and 2-1) and been referenced to a normative template (3-1) and has ended up as an annual event. In so doing, the process had to completely dissipate spontaneity (Firstness) and move behaviour into physical links to a specific calendar date (Secondness) that became normative habits (Thirdness). The spontaneity and high excitation and emotion of the street party would be lost as it becomes a regular event. This is a common transformation, and when people despair of the loss of spontaneity, and the 'commercialization' of an event, this is the explanation. But, if that interface relation of 2-1 did not connect with 3-1 but with 2-2, and instead, the set remained at 1-1, 2-1, and 2-2 (that unique day), then, we could end up with a Sign of 1-2-2, which is a unique spontaneous day that does not become a habitual event, such as the outpouring of emotion at Princess Diana's death and funeral. The same predicates could be applied within the biological realm, where 1-2-2 would be a random mutation that could become a normative 2-2-3 pattern.

The process of interpretation, a process requiring an interaction of at least three dyadic predicates that reduce to one triadic sign means that dissipation and reorganization of mass is a vital component of interpretation. This view of an interpretive symmetry also rejects the common conclusion that information is equivalent to 'negentropy', for this sees both energy and information as symmetrical states. Instead, interpretive symmetry posits that a complex universe rejects the separation of energy and matter, rejects pure symmetry and pure asymmetry and operates instead as a dynamic, interpretive, entangled architecture.

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