# Proto-schemas

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## Introduction

In this paper it is the objective to delve into the roots of General Schema Theory by looking at Mathematical Meta-models. A mathematical meta-model is based on the concept of the mathematical model. The mathematical model is a combination of universal algebra and logic. It looks into what we can say about our models of mathematical categories from the viewpoint of classical first order logic. We augment this by noting that universal algebra is itself the basis of meta-systems theory. A meta-system is the environment, ecology, situation, milieu, context or some such surrounds of the system. The system is in this case represented by the logic. A system is a social gestalt that is a whole greater than the sum of its parts. We note Godel's finding that Systems are always either incomplete or inconsistent, i.e. that there are statements that cannot be decided as to whether they belong inside or outside those systems. The logical system has its roots in our tradition as the core of Language that is understood as the unfolding of Logos. Language is one of our pre-eminent representatives of systems.

Another such representative is the Game. The game is a formalization of the play of children and by extension the play of adults. It is of interest that grammars in language are produced by communities of children who spend much of their lives in play situations learning and using language. Wittgenstein combines these two representatives of the system to talk about *language games*. A *language game* signifies an emergent discourse within a limited domain. It is the proto-type of the system schema. It is the systemic system. That is $system^2$. When we talk about the universal algebra *plus* logic, we are ultimately talking about a version of the meta-system *plus* a version of the system. That *plus* is a conjunction in the sense of conjunction found in complex number, where the *"+"* in *ax+bi* means to bring together holding apart that allows symmetry breaking, i.e. the differentiation between the real and the imaginary. Models are interpretations of set of true statements concerning the mathematical categories that approximate our ideas of the mathematical objects we have in view. It is assumed that the mathematical objects have some sort of reality we are attempting to approximate in our descriptions of them. It is also assumed that this language is static and final in some sense. It does not take language to the next stage, which is the unfolding of language where there is one statement after the other recognizing that language is inherently dynamic appearing as *parole* or speech which is abstracted into *langue* or gloss of language, as an illusory continuity above the fray of actual speech acts.

If we consider the algebra structures then we will notice that there is a hierarchy of algebras that goes from our real number algebra, to complex numbers, to quaternions, to octonions, and on to sedenions and other non-division algebras. This algebraic hierarchy is founded on a Pascal Triangle of algebras that passes on from the first non-division algebras on to an infinite number at

the various levels of the Pascal triangle of algebras. We have often associated the real numbers with the system schema and non-division algebras with the meta-system schema, and noted that the hyper-complex algebras in between represent three Special Systems called dissipative ordering, autopoietic symbiotic, reflexive social. The conjuncted system of logic is orthogonal to this hierarchy. We understand that the logos is the dual of physus. Physus is the genetic unfolding of living nature as opposed to the unfolding of thoughts of the living. It is intriguing that the order of things stands between the duality of physus and logos. It is because of this we can find mathematical representations of physical phenomena that we can then use to order our theories of phenomena. This makes science work. The universal algebra stands between physus and logos. On the one hand the logos unfolds into pervasion and syllogistic logics. On the other hand we see the build up of the "laws" of nature. Universal Algebra stands at the non-dual center of this dichotomy between physus and logos where the laws of physis are seen as analogous to the laws of language. When we bring the mathematical categories together in theory with the phenomena then there arises the distinction between the ontological schema and the ontic ordering discovered in nature. The ontological schema is a projection by us onto nature. Where as the ontic emergent ordering of phenomena that we discover is something quite different from our projections. The ontic emergent layers are thresholds of ordering of phenomena independent of our projections, like string, quark, particle, atom, molecule, macro-molecule, cell, organ, organism, social group culture. On the other hand there are the ontological emergent schema such as pluriverse, kosmos, world, domain, meta-system, system, form, pattern, monad, and facet. We project the schema and their failure reveal the intrinsic structure of the physus that we see as emergent ontic levels.

In this case we have seen that the systems

(real algebra), special system (complexion quatenion, octonion), and meta-system schemas (sedenion and above) as based on universal algebra is between the logos and physus. At each stage of the unfolding of the algebras there is a loss of properties, first losing unity when moving from real algebra to complex algebra through the introduction of conjunction. Then there is the loss of the commutative property, then the loss of the associative property, and finally the loss of the division property. This move from system to meta-system within the algebras is echoed in the difference between the logos and the physus. The logos has in it the core of logic that represents to us the system. When we project this system onto nature, even the nature of our own acts, we call that reason. The physus on the other hand is meta-systemic in nature because the physical world surrounds and supports us. Yet on the other hand we project systems onto the physus when it is treated as nature. And again we can consider the myriad speeches of the multitudes of human beings as a meta-system of discourse. So on one hand we see the core of language as the system of logic while the varieties of speeches under the auspices of language as a field of variety production that gives us some feel for the meta-system of not the house of language but the village of languages that exist in our world. On the other hand the physus is a surrounds for us and thus reminds us of the meta-system, but we treat the individual aspects as systems in order to understand them in isolation from the meta-system of nature as a whole. The central model of the relation between system and meta-system through the special system layers of emergent unfolding are the specifications of universal algebra that stands in the non-dual space between these dualities.

When we say *language games*, we combine the system of the universal algebra with the system of logic. We can also talk about the system as the gestalt that is seen in nature, the perceptual system is the gestalt. We

might talk about meta-language meta-games instead that would combine the model of the meta-system in algebra with the understanding of the meta-system in the physus and logos. There are three sorts of system and three sorts of meta-systems in what was pointed out above. There is the gestalt as system in nature, i.e. in the unfolding of the physus. There is the system of the real algebra which is a systemic ordering. There is the system in the logos that we see as logic. On the other side there is the meta-system or environs of nature that we live within. There is also the meta-systemic model of the sedenion and beyond in terms of non-division algebras. There is finally the field of all possible speeches that we abstract various glossed languages out of in order to stem the confusion of speech understanding by bringing it under the control of abstracted language.

If language is considered a meta-system then opposite it in the physus is the projected system schema. If nature is considered ecologically and environmentally then on the other side is logic as the final arbiter of theories. When we shift our vector of motion from the system to the meta-system on the sides of physus and logos then we get a chiasmic highlighting of the non-dual region between the physus and logos, i.e. the realm of order between them. In this realm we also get models of meta-systems (sedenion and beyond non-division algebras) and systems (real unified, commutative, associative algebras). What shows up in this chiasm of system and meta-system in three ways are the special systems.

There are three kinds of algebra.

> Any law for linear algebras that is homogeneous and of degree 2 and does not hold trivially is equivalent to either **xy=0** or **yx=xy** or **yx=-xy**.[1]

These three types of algebras have very significant differences from each other. One says that opposites cancel. Another says that commutative elements cancel. Another says that commutative elements cancel with reversal of one, i.e. anti-commutative elements cancel. *We call the first regime logical because it is based on tautologies and in it opposites cancel. We call the second embodying because it is based on commutation, reversible action of the body itself, and in it reversed actions cancel. We call the third regime non-dual because in it duals (reversed and negated elements) cancel.*[2] This interpretation of the kinds of Algebra lead us to see that one is aligned with the Logos (xy=0) another is aligned with the Physus (yx=xy) and a third is aligned with the non-duality between physus and logos (yx=-xy). Now it is clear that the theory noted above also sees meta-systems and systems in these same three algebraic realms. In other words there are three different realms of possible unfolding of the system/meta-system differentiation. We will refer to these three realms in terms of exotics.

In our reasoning when we are forced to talk about Being itself, i.e. the core concept in Indo-European language, we discover it to be a paradox, even worse a field of vicious circles, if not a source of absurdity. If we apply Russell's concept of the theory of ramified higher logical types to this paradox at the heart of our language then what unfolds before us is a series of meta-levels of Being and a series of types at each meta-level that we associate with the aspects of Being. The aspects of Being are truth (x is y), reality (x is), identity (x is x) and presence (this is x). These aspects of Being take on

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[1]

http://www.maths.utas.edu.au/People/dfs/Papers/GrassmannUAlgpaper/node4.html

[2] See Nietzsche's Madness by the author.

different meanings at each meta-level of Being. The Meta-levels are Pure Being, Process Being, Hyper Being and Wild Being. There does not appear to be any higher meta-level of Being in existence. The meta-levels of Being represent what we might call the multilith of Being, i.e. the mobile of the interaction of the kinds and aspects of Being that Reason can deal with and comprehend. But when we question how this multilith of Being came into existence then we see it is possible for the levels of Being to be displaced in relation to each other. We note that it is possible for the multilith to split from the unilith of paradox into a bilith in three different ways. That splitting in three possible ways we associate with the three kinds of algebra and the arising of the difference between logos, physus and non-duality between them. A further splitting of the bilith produces the fourfold multilith. Thus we see that there are twenty-four different ways that the multilith of Being can arise from the paradoxicality of raw paradoxical, unkempt vicious circles and disheveled absurdity of Being. These twenty four different ways of arising of the multilith can be seen as the multiplication of the tetrakys of 1*2*3*4. The one is the fused multlith. The major discrimination is imposed at the level 2. This causes the three different exotics to arise as the realms of differentiation. Finally each of these realms are further discriminated to produce the various versions of the multlith that can exist, twenty four in all. If we talk about the aspects instead of the kinds of Being the same thing may be said to occur. We call these various permutations of the aspects esotics instead of exotics. Likewise there are twenty four possibilities to the arising of the esotics. In general the form of these esotics and exotics in relation to each other appears as the 24 cell polytope. It has 24points, 96lines, 96triangles, and 24tetrahedrons with a lattice 1-24-96-96-24-1 that is self dual. This polytope exists as the core of four dimensional space. We can imagine the 24 points as exotics and the 24 tetrahedrons as

esotics or vice versa. The 24 cell polytope gives us a rational picture of the interchange between the various permutations of the dual tetrakys of Being.

The point of all this is that the arising of the three regimes called logos, physus and non-dual is built into the basic genetic structure of Being itself as it unfolds into reason. We may think of reason as the way we use the four aspects and four kinds of Being together to understand our world in which we live in terms of Being.

Now let us return to the idea of the three realms each of which supports an image of system and meta-system. Here I wish to advance the hypothesis that each of these realms has a different picture of the non-dual core between meta-system and system within their realm. Thus in Physus that non-dual core is seen as the dissipative special system. In Logos that non-dual core is seen as the reflexive special system. In the non-dual realm that non-dual core is seen as the autopoietic special system. This means that the special systems have a dual role. They exist in each realm as the transition through stages from system to meta-system. But in each realm there is a special relation between the special systems and particular ones of these realms. That special relation causes different special systems to be the pivot in each relam. Thus in the realm of physus it is the dissipative special system that gives us negative entropy that is key. In the realm of logos it is the reflexive special system that gives us the prototype of the social that is key. In the realm of the Non-dual it is the perfect balance and symbotic complementarity of the autopoietic special system that is key. This is to say that balance where the whole equals the sum of its parts, rather than the imbalance where it is greater or less than the sum of its parts, is different in the various algebraic exotic realms.

Now let us ask why this hypothesis is important. We are not saying that the various

kinds of balance do not exist in all three realms. Only that one sort of balance is emphasized in one realm in relation to the others. This explains why there are three balances instead of one. There are three possible balance points one adapted more perfectly to the variations in the algebraic exotics giving an emergent character to the non-dual balance in each case. In the realm of physus that balance has to do with the appearance of negative entropy, that is an exception to the general rule of increasing disorder. Notice that the increase of disorder means that the non-dual of ordering needs to be emphasized over and over again. The upwelling of order into the world is a rare event that is marked by its anomalous character in the realm of physus. In fact physus itself is the genetic unfolding of nature which we see as the uncoiling of order into the world in terms of the appearance of the developmental stages of animals. This degenerates later into physics where we hold the dead universe up as the measure of all things rather than the living universe of animal life. This is a fundamental shift in our way of looking at the world which is captured in the difference between physus and physics. When we look instead at the realm of logos then it is the social reflexive nature of language use that is the key characteristic. Reflexive means here not just non-commutating but also non-associative. Who sits next to whom at the dinner table does matter in the social world that is made possible by language. So the reflexive is the key balance point between system and meta-system in the realm of logos. This is the hallmark of the arising of social consciousness[3] and social unconsciousness[4] spoken of by Jung as the *collective unconscious* or by Marx in terms of material alienation as well as social awareness[5].

Individual awareness[6], and consciousness[7] as well as the personal unconsciousness[8] spoken of by Freud is a reification of these. Finally in the non-dual exotic realm we see the possibility of perfect balance of symbiotic complementary opposites that is the sign of life. Different balances are key in each of the exotic algebraic realms.

Now this has implications for our conception of the trade-off between system and meta-systems between realms. We noticed that if we see the system in the logos that might be against the background of the meta-system in the physus, or vice versa. In such cases it is the balance point of the third realm that is left out that becomes the balance point. So in this case the antopoietic special system takes that role in both cases. In other words by looking at meta-system/system relations across realms is a way of accessing the non-dual balance rather than the dissipative ordering or the reflexive social balance that is operative within a realm.

This is hard for us to think about because the exotics and the esotics have slipped from our attention over the milenia. However, if we want an example all we need to do is look at the Laws of Manu which distinguish the life of the Brahman which was meant to go through each of these realms one by one. First the Brahman entered the realm of logos studying the Vedas. Then they entered the realm of the Physus becoming a householder. Finally they entered retirement with their wives and that marked their entry point into the non-dual realm between logos and physus. Eventually they shed all possessions and entered the fully ascetic life leaving even their wives. This last phase takes us out of the realms of the exotics to the primal state of Being prior to the first distinction that produced the three realms. It is a return to

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[3] Intentional by the social group
[4] counter intention of the otherness within the social realm
[5] unintentional by the social group

[6] unintentional by the individual
[7] intentional by the self
[8] counter internationality of otherness within the individual

origins which complemented the appearance into the world in their birth and childhood.

*Vishnu sent a messenger to king Dasaratha with payasam, a sweet made of milk and rice, laced with a special potion.*

*The messenger said, "Give each of the three wives this drink. It is a boon that will bring sons." Then the messenger disappeared.*

*The king gave each of his wives part of the drink. No sooner had his wives finished, than each shone with the glow of a divine being in their womb.*

*There was great rejoicing in the city when four sons were born to their king. Their names were Rama, Lakshmana, Bharata, and Satrughna.*[9]

This scene is repeated in the Ramayana where we see the four sons of three wives with various mixtures of divinity. The mixture was Rama ½, Lakshmana ¼, Bharata 1/8, and Satrughna 1/8. There is the two races of mortal and immortal from different fathers and the single source of everything which is Vishnu who is the deity of Bheu, or Being. This is the Tetrakys in the form of the generation. It shows that there is mixture at the level of the multilith which arises from the various levels of engendering, i.e. from the distinction between divine and human, and the appearance of the three wives each of whom takes a different amount of the elixir, thus producing human children that have different amounts of divinity within them. The women could have drank in a different order and different amounts

[9]

http://www.maxwell.syr.edu/maxpages/special/ramayana/RAMA.html

producing different offspring. But in general the quanta of the elixir is in eights with differences of 4, 2 and 1 (twice). When we add in the fact that there are three mothers then we get the tetrakys structure which is 4, 3, 2, 1. The myth has a very specific structure that keeps reminding us of the inherent structuring of Being as it unfolds to produce the wholeness of the world.

What we find here that is important is the fact that the three exotic realms support both system and meta-system which define within each realm the intermediary special systems emergent layers that signify static and dynamic balance. In each realm a different special system has a key role to play in defining balance in that realm. But we can go on to consider relations of duality between system and meta-system across realms, in which case the various types of balance play a different role. Across realms it is the balance in the non-dual realm that is most important rather than the subsidiary balances within the realms of physus and logos. The autopoietic balance, doubly non-dual, i.e. the non-dual balance point within the non-dual realm, is the point of departure into the source prior to the arising of the difference between the exotic realms. We can call this source meta-Being or existence because existence is the context within which Being arises. We see it both in the fact that the there are no meta-levels of Being beyond Wild Being. But also in the fact that existence is embedded in Being in the form of the special systems that are models of existence. These three key balances within the various exotic realms are the signs of existence that is the origin from which Being itself arose prior to the primary distinction between heaven and earth or mortal and immortal that generated what Heidegger called the fourfold of the world. The fourfold is the mythopoietic mirroring partitions of the World. In the meta-physical era these were transformed into Logos/Physus and Infinite/Finite. Anaximander is the key figure in the transformation from one era to the

next. He is the one who first produced a picture of the structure of the kosmos, a map of the earth, a prose written book, and an astrological calendar of the times of the heavens in relation to the earth. The cosmology and the map of the earth are opposites. The written book and the astrological timing are opposites. Writing takes time on the human scale which is reckoned in terms of the movements of the heavens, i.e. outward time. Each of these are encompassments. Cosmological time encompasses our lives. The Cosmos as an architecture of the heavens encompasses us in heavenly space. The map of the earth encompasses us in earthly space. The writing encompasses the whole theory within its narrative of the relations between things. Each is a kind of meta-system, a global environment. First there is the environment of the cosmos, then the environment of the earth, then the environment of heavenly external temporality and finally the environment of written culture. Writing signifies our finitude while the heavenly bodies seem to have infinite duration against which our brief lives are measured. Writing is an embodiment of logos which is distinguished from the physus of the cosmos and the earth. Heaven and Earth are seen as two aspects of the Physus. Against that background there is the building of the temples to house the gods which are distinguished from the houses of mortals. The temples give the background in techne for the philosophical and scientific work of Anaximander. What we see here is that the mythopoietic categories are askew from the metaphysical categories but that the two form an interlocking set. In our development we moved from the poetic speech to prose. From the vision on the shield of Achilles to the vision of the heavens and the earth in terms of Map and Architecture of the world. In the mythopoietic culture spoken language was dominant while in the meta-physical age written language has become dominant. This movement between mythopoietic and meta-

physical is like the movement from the realm of logos to the realm of physus.

The four inventions of Anaximander are signs of an emergent event that is related to the fundamental restructuring of our world into the meta-*physical* realm from poetic the realm of the mythologos. The inventions circumscribe our approach to our world. That these four inventions appeared together at the dawn is no accident but is fated because they show the incipient ground plan of our world. That world includes systems and meta-systems in each of the realms of the algebraic exotics. Heidegger talks of the fourfold that Socrates mentions. But this is really the world of the Mythopoietic rather than the meta-physical that Socrates describes. The meta-physical world has a different structure. It is one in a long line of world transformations described by Hesiod in his cosmological myth. Prior to the mythopoietic world of Zeus was the world of Kronos which was the golden age when Titans ruled the world. Prior to that was the time of Uranus which was the time just after the fundamental split between heaven and earth. Each of these periods had its emergent event. For instance, Uranus himself emerged out of Gaia and was the emergent event of his time. Then Kronos cut off his genitalia and Aphrodite rose from the sea as the emergent event. Finally there is the meteor of the Delphi oracle that was the emergent event for the reign of Zeus. After that there began the rule of man in which man created laws for himself instead of taking them from the gods. Anaximander's book and his creations were the emergent event that began that new man centered view of things. Many say that we are on the verge of a new era in which the worldview is transforming again. Some say that it was the view of the earth from space that took us into this new era. It is hard to tell what will be the decisive moment of transformation in the future. But now it behooves us to attempt to understand the worldview that we have inherited and its emergent transformations. Part of that is

understanding the three algebraic exotics and how each one of them expresses itself as system and meta-system. And how in each one there are the special systems that transition between system and meta-system based on the deformation of algebras as they loose properties. Each exotic algebraic realm has its own non-dual balance state between system and meta-system that is most appropriate. We have seen that the dissipative special system is most appropriate for the realm of physus, while the reflexive special system is most appropriate for the realm of logos. Finally we see that the autopoietic is the most appropriate for the realm of the non-dual. We can use the emergent inventions of Anaximander to generalize this finding, because these inventions stand at the cross roads between mythopoietic and metaphysical eras. That was a transformation between logos and physus. In it all four dichotomies are at work, i.e. physus/logos, infinite/finite, heaven/earth, mortal/immortal as we mentioned above. The built up structure of the temple to house the gods towers above the earth and dwarfs men, showing them their finitude and mortality, in relation to the infinitudes of spacetime and the immortals. Men move from making poetry that exalts language, to writing which passes on the scientific and literary culture. Men move from a cosmic time marked off by the movement of the planets and stars in the heavens to their own self made time measured in nanoseconds by atomic clocks.

What appears is the split between the ontological schema and the ontic thresholds of complexity that we use to bring the physus and logos together. The ontic emergent levels are socioculural, oraganism, organ, cell, macromolecule, molecule, atom, particle, string. The ontological emergent levels are pluriverse, cosmos, world, domain, meta-system, system, form, pattern, monad, and facet. Anaximander established the cosmos as the realm beyond experience that we strive to comprehend in physics. Within that temple

that he set over our world there are the basic aspects of the world which have to do with astrological timing, and the fabric of the earth, and the productive writing that leaves the cultural and scientific traces from generation to generation. Anaximander established the principle of projecting the cosmic temple beyond experience that grounds our experience of the world. We see it in the non-experiential levels of the pluriverse and cosmos which we project at one end of the ontological emergent hierarchy, and the monad and facets that we project at the other end of the ontological emergent hierarchy. Between these two extremes are the levels that we can experience. They start off with the world which we define in the meta-physical era in terms of the dichotomy between physus and logos as well as the dichotomy between infinitudes and finitude. Within the world are domains produced by perspectives of specialization that demand rigor and discipline. Within those domains the various environments are defined that surround the systems. We call these meta-systems because they go beyond our systems. Then the systems are made up of things with form and behavior. These forms contain content which is patterned. The individual elements of hyle, content, are monads. The internal structural differentiation of the monads make them faceted like jewels appearing differently in different situations as the qualia. At one end are the qualia that David Chalmers in The Conscious Mind talks about as inherently subjective. At the other hand is the quantum interference that David Deutsch talks about in The Fabric of Reality. When we take the two together, qualia and quantum interference we get macro quantum mechanics as a hypothesis about the nature of the world. The ontic hierarchy is the emergent internal differentiation in to thresholds of complexity of the macro-quantum mechanical world. Quantum Mechanical interference IS the nature of the macro-world. It is hidden from us by the projection of our worldview things. But that

is the underlying reality behind the illusions we project. Between the projections and the discovery of anomalies within the projections we produce the scientific understanding of the world in terms of the ontic emergent hierarchy that comprehends the physus in a way differently from the way the ontic emergent hierarchy comprehends the logos of our written descriptions and explanations of the world.

When we look at the ontological hierarchy we see that each layer has its own fourfold differentiation:

| pluriverse | interference | undecideability | incomputability | ? |
|---|---|---|---|---|
| kosmos | Model of universe | Map of earth | Writing in prose | Astronomical tables |
| world | limited | unlimited | physus | logos |
| domain | discipline | rigor | perspective | specialization |
| metasystem | origin | arena | source | boundary |
| system | objects | relations | dynamics | emergence |
| form | shape | state | behavior | interface |
| pattern | value | sign | flux | structure |
| monad | seed | monad | view | candidate |
| facet | distinction | discrimination | qualia | ? |

This is not a completely thought out differentiation into a fourfold at each level. But it is some indication of the overall direction that needs to be taken. There is also a possible alignment with the Mathematical Categories:

| pluriverse | model theory |
|---|---|
| cosmos | category theory |

| world | topology |
|---|---|
| domain | group theory |
| meta-system | non-division algebra |
| system | real algebra |
| form | geometry |
| pattern | pattern math of Grenader |
| monad | emergent meta-system |
| facet | laws of form of Spencer-Brown |

Perhaps the schemas are generalizations of the various mathematical categories into theories. That would account for their universality and their differences. Perhaps a different kind of logic is added to the mathematical schema at each level so that the schemas are all mathematical categories plus some kind of logic. In this way perhaps the proto-schemas are always the mathematical categories plus some sort of logic. In this way it might be possible to produce some sort of theory of proto-schemas that will allow us to derive our schemas from lower level constructs. This is just a hypothesis at this stage and needs to be worked out in detail.