

Article

Humans Evolve via Cosmic Order

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Abstract

The hierarchically nested archetypal character of biological evolution is explored from single celled plants through invertebrates and vertebrates to humans by examining how the hierarchical levels reach a resonant balance in the biosphere. It is apparent that human activities are seriously disrupting balances of many kinds in nature. To understand these problems it is necessary to gain an intuitive insight into how the evolutionary process unfolds according to how the cosmic order works. While population pressures place grave constraints on our human ability to meaningfully address the issues we can at least begin to see how humanity has assumed responsibility for the balance of life in the biosphere. Being at the summit of the evolutionary hierarchy the Human Archetype subsumes all life in the biosphere. New evolutionary episodes of change can involve painful corrections that are looming ever more ominously ahead. However, we humans have acquired a capacity to evolve our behavior within a relatively fixed biological structure. We can hopefully continue to learn ways to limit our collective and personal suffering. Becoming aware of the creative process as it has unfolded in the biosphere is a giant step in the right direction.

Keywords: Biosphere, resonance, three brains, universal hierarchies, cosmic order, God, archetype of humanity, split brains, limbic brain.

Introduction

Phenomena of all kinds exhibit self-similar patterns that have archetypal characteristics. They are hierarchically nested in subsumed levels that determine biological evolution within the operating field of the biosphere. Recognizing how these patterns work provides right brain intuitive insight into the cosmic order. These mute holistic intuitive realizations concern how we subjectively integrate our sensory experience and make objective left brain social commitments. They are thus basic to our personal spiritual destiny as well as to our collective survival in sustainable ways with our natural environment.

Intuitive insight into the cosmic order is especially indispensable to recognizing more fundamental scientific frameworks of understanding. The sciences have been severely limited by the assumption of a preconceived space and time in which physical matter is embedded. It can thus only deal with the external causal relationships of atomic processes. While it has amassed a huge fund of factual evidence it is sterile at breathing life into biological processes. There is only an external reality. There is no internal or subjective reality to living creatures. Everything began with a Big Bang some 14 billion years ago and the whole of creation has resulted from random

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interactions between atomic processes ever since. The overriding paradigm has pre-conditioned thinking in the physical, biological and social sciences. Even our subjective mind is largely regarded as an emergent property of physics.

No alternate paradigm has presented itself until now. A fundamental empirical fact has been overlooked. All we can ever know is active interface processes between a universal inside and a universal outside, neither of which can be known to the exclusion of the other. A balance between them is the basis of the cosmic order essential to the whole of creation. This implicitly requires a nested hierarchy of discrete “Systems” each being determined by a specific number of active interface processes and all possible ways that they can structurally relate with respect to their common inside and outside.¹ This new paradigm can be meaningfully applied to expand the horizons of science. This is essential to the living integration of the immense fund of factual empirical data accumulated by traditional approaches to the sciences.

The non-linguistic structural method of delineating the workings of the cosmic order is called simply “the System.” Since it embraces all possible structural varieties of phenomenal experience it cannot be a belief system. It must find right brain intuitive confirmation in direct sensory experience from which all left brain language derives.

Frameworks of Understanding

All of us have frameworks of understanding, sometimes several that we switch between depending on circumstances. We need them to intuitively integrate experience according to how phenomena present themselves to us. Without this capacity to integrate diverse elements of experience meaning slips away on us. By its nature this is a holistic and universal characteristic of the right hemisphere of our brain in right handed people.

This requires that there must be a universal order to the cosmos that is to some extent comprehensible however flawed or limited our frameworks may be. Our animal brothers need them too in order to intuitively cope in their behaviour space. The need for them becomes much more acute with the development of language that resulted in the bi-lateral polarization of higher brain functions that ride above our primitive limbic emotional brain. These three mutually interdependent brains, one linguistic, one intuitive and one emotional, seek a sustainable balance. Our human behavioural space is psychological distinct from the territorial behaviour space of our animal brothers. The integration of meaning must reflect self-similar structural characteristics of the cosmic order because our nervous systems have evolved this way to make sense of phenomenal experience according to context.²

The need to have eternal frameworks that transcend our brief sojourn on Earth was implicit in spirit cultures from antiquity. Spiritual beliefs eventually became consolidated into the world’s religious traditions. Philosophers East and West have also been at the endeavour for several millennia.³ The development of modern science introduced a rational left brain twist to the search for universal frameworks. The laws of physics are believed to universally apply. The quest for unified field theories seek universality, transcending our birth and our death. Science

seeks to write a new Bible for all people for all time. The quest for unity is a universal need of the human heart.

Three Brains

The emotional energy patterns of the sympathetic and parasympathetic divisions of the autonomic nervous system are reflected across the ancient Limbic Brain into the Left Brain and the Right Brain hemispheres of the cerebral neo-cortex or new brain. The sympathetic division has evolved animating emotional patterns that fuel the immediate expression of left brain techniques of behaviour. The parasympathetic division has evolved archetypal patterns that are intuitively concerned with the long term interests of the organism and the individual. To put it simply the two autonomic divisions generally work in separate accord with the two hemispheres of the new brain while functioning in mutual polar restraint for emotional balance.⁴

The archetypal patterns of both autonomic divisions have roots in our vertebrate animal ancestry reaching back several hundred million years to the reptiles and to the later development of the lower mammals. They are respectively represented in the reptilian hippocampal gyrus and the lower mammalian cingulate gyrus that constitute the Limbic cortex of our human cerebral brain. This limbic brain has a capacity to think in non-linguistic emotional concepts because of the way the cingulate gyrus can reflect on the more primary drives of the hippocampal gyrus.

Professor Paul MacLean who fathered the Papez-MacLean theory of emotions through extensive research on the Limbic system described the human predicament thus (1961):

“...we might imagine when the psychiatrist bids the patient to lie on the couch, he is asking him to stretch out alongside a horse and a crocodile. The crocodile may be willing and ready to shed a tear and the horse to neigh and whinny, but when they are encouraged to express their troubles in words, it soon becomes evident that their inability is beyond the help of language training. Little wonder that the patient who has personal responsibility for these animals and who must serve as their mouthpiece is sometimes accused of being full of resistances and reluctant to talk. ...”

MacLean extensively explored the relationships of the higher mammalian neo-cortex that in humans developed into a huge blossom with respect to the Limbic or ancient cortical areas that are folded inward around the top of the brain stem. The primitive brain is intimately connected via the hypothalamus and related structures to both divisions of the autonomic nervous system while the new brain to which we humans owe our intellectual capacity has no explicit biological controls over the old emotional brain. They are constrained to live in the same house together and they often don't get along. MacLean called it a built-in schizophysiology that accounts for our tragic human history.^{5,6} As Arthur Koestler described it we have the capacity to build atomic weapons and send rockets to the moon harnessed to the emotional capacity of a crocodile and a horse.⁷

Split brain theory was still in development at this time. There had been evidence mounting of different left and right hemisphere functions but it was Roger Sperry's experimental work on patients who had their neo-cortical hemispheres surgically separated for the treatment of epilepsy

that firmly established their bi-lateral polarization.⁸ In very general terms in the majority of cases the left hemisphere is responsible for rational logical thinking associated with language while the right hemisphere has intuitive holistic characteristics. The new brain is two brains that function in independent yet related ways.⁹

We thus are endowed with three independently functioning brains that seek a mutual balance according to how we develop or identify with our intuitively perceived integrating frameworks of understanding. For the most part these are generally not formulated in language. When we formalize frameworks explicitly in language we have a strong tendency to emotionally identify with them in an effort to satiate our emotional desire for unity and in this way bridge the nagging built-in split between our ancient and new brains. The cultural clashes through the ages are evidence of this holistic exclusivity of frameworks. Our frameworks of understanding are vitally important to us and we tend to become defensive and even aggressive if we sense they are threatened. It is the age old problem of Self-Other, One-Many, Universal-Particular. We have great difficulty intuitively bridging cultural gaps in our understanding.

There are reasons why three focal points of mental activity must always be present to some degree in intelligent social creatures anywhere in the universe.

- 1.) They must have a capacity to draw on past experience, including ancestral experience in an evolutionary context. Humans are indebted to our animal ancestors for our primal emotional drives. The vertebrate structure is harnessed to a quadruped limb structure and similar visceral organs and nervous system arrangement throughout the lineage from reptiles to humans. The energies that emotionally fuel behavior are patterned in self-similar ways accordingly. We can sense behavioral patterns across vertebrate species. Our recall processes has access to them via our limbic brain and our new brain can consciously tailor them according to frameworks of understanding or world-views that we intuitively entertain. Intelligent beings everywhere must have some evolutionary history to intuitively draw upon.
- 2.) There must be a private non-linguistic conceptual capacity to evaluate contextual constraints and opportunities. This requires that intelligent creatures must intuitively assess potential responses in a holistic context relevant to their experience in their natural environment. Value judgments require an integrating worldview of some kind that transcends transient events in space and time. This is an intuitively integrating right-brain function in humans. Beings everywhere must have a self-similar capacity.
- 3.) Social intelligence even at a rudimentary level requires a capacity to mutually communicate in some explicit way to achieve a common result. This requires common referents and mutual expectations that left-brain language makes possible in humans. Social beings everywhere must have a capacity to explicitly communicate in some way by signs and signals that correspond to language.

The Resonance of the Biosphere

Because our limbic brains encompass the evolution of the biosphere we have sought to understand it ever since the development of language that resulted in the bi-lateral polarization of brain function. Our most primitive human cultures were universally animist spirit cultures. They intuitively sensed the emotional patterns that animate our animal brothers. Creation myths generally had animist themes, including the Garden of Eden. Our animal ancestry is highly structured historically however, and the history is reintegrated again and again into successive waves of refinement that each built on the learning of prior episodes. We live in the holistic enterprise of the biosphere. The whole of life is interconnected and interdependent. The biosphere seeks resonant balance within itself. We may think of it as a self-similar musical orchestration and yet one that frequently develops discordant notes that tend to get gradually weeded out over great spans of time. The biosphere is an integrated operating field. The learning from experience is integrated anew and reinvested in more refined levels of development with each new episode. The fossil and natural records attest to this refinement in stages implicit in the evolutionary process.

There are also many examples of complementary converging and diverging patterns of evolution often on opposite sides of the planet. One of the most explicit examples is the independent evolution of the marsupial and placental mammals and yet there are marsupial versions of the wolf, mouse, rat, bear, beaver, bat and so on with a similar skeletal, visceral and nervous system arrangement. However the marsupial neo-cortex lacks a corpus callosum (as do brains of reptiles and birds) that interconnects the two hemispheres in placental mammals. The two neocortical brains of marsupials cannot combine forces to work together to the same extent although there are limited interconnections via lesser commissures. The hemispheres of marsupials must work largely independently harnessed to their primitive emotional brain which does have its two halves interconnected. Both neo-cortical hemispheres nevertheless receive common sensory input and they both have both major and minor sensory and motor areas as in placental mammals. This allows the sensory integration of idea distinct from motor expression in each hemisphere thus allowing them to function independently, just as split brain patients can. It thus appears that the marsupials tucked away separately in Australia had a biospheric role in working out the independent function of left and right brains in the evolution of placental mammals that is so essential to the development of language in humans.

The three cerebral brain bulges that historically developed with the reptiles, lower mammals and higher mammals were all present but undeveloped in the quadruped amphibians that first colonized the land. Each bulge developed mainly in a historical sequence with the characteristics of each successive brain development integrated anew in succeeding waves of evolutionary episodes. The limbic brain is similar in structure and function throughout the mammalian series albeit with some modifications. Each wave also explored limits of size from small to large within its biospheric niche. Some early amphibians grew up to five meters or more in length. Each wave generally emerged early in the previous episode then tended to remain largely unchanged for long periods before diversifying in later episodes. Early reptiles developed a large diversity of species exploring mammal-like features a few of which survived the Permian extinction. Tiny mouse-like mammals first emerged during the Triassic period over 200 million years ago and

remained small with comparatively little change for over 150 million years until they began to diversify just as the dinosaurs were facing extinction.

Exploring the Limits to Size

Following the demise of the dinosaurs both small and large mammals evolved and existed together, but there have been recurrent patterns of exploring the limits to size, followed by extinctions. For example an early dog sized version similar to the rhino grew into the massive Brontotherium that was 8 feet tall at the shoulder and 16 feet long. It became extinct about 30 million years ago. Other members of the Titanotheres include the Arsinoitherium about 10 feet long and 6 feet tall at the shoulder. It also became extinct about 30 million years ago. The largest land mammal ever was the enormous rhino-like Indricotherium. It was 18 feet tall at the shoulder and 33 feet long with a weight conservatively estimated at over 20 tons. It had a long neck and could browse from trees 28 feet tall. Its head was about 5 feet long. It became extinct about 18 million years ago. A little later the Chalicotherium had a horse-like head and feet with claws. By standing on its hind legs it could browse from trees 13 feet high. The largest mammalian carnivore was the Andrewsarchusa, a wolf-like creature about 40 million years ago that weighed about 1500 pounds. Its head was nearly 3 feet long with an estimated body length excluding tail of 11 feet. A one ton rat lived about 4 million years ago. The waves of exploring the limits to size continued into the relatively recent past. The giant ground sloth could stand 18 feet tall and became extinct only 10,000 years ago. It weighed in at 8 tons. The armoured Glyptodon, similar to the armadillos became extinct about the same time. It was about 5 feet high and 11 feet long. The pattern of exploring the limits to size also occurred with the marsupials in Australia. The giant wombat was 10 feet long, 6.5 feet high at the shoulder and weighed in at 3 tons. It became extinct about 46,000 years ago.

The invertebrate animals and early plants also explored the limits to size. There was an ancient Dragonfly with a 2.5 foot wingspread that lived 300 million years ago. A Nautilus 8.5 feet in diameter lived about 450 million years ago. A sea scorpion that was bigger than a man lived 390 million years ago. The fossil record exhibits abundant evidence of exploring the limits to size from small to large. This learning from experience is reinvested in successive waves of more refined species whose descendants are with us today. Hierarchical self-similar patterns dominate the evolutionary process. Although adaptive pressures exist the hierarchical learning pattern is not consistent with random mutation and natural selection as the sole evolutionary determinant.

Evolution is a global learning process. If it was a linear process of genetic mutation with so many lines of extinction following the earlier divergence of varieties that were to develop into later episodes, all this learning would be wastefully lost. The diverging branches of the evolutionary tree would be drying up. Life could not be re-assimilated into a refinement of successive evolutionary episodes up the ladder of increasing sentient awareness that is so evident in the natural and fossil records. Each episode would have to re-explore its possible limits anew, but we find no eight legged lizards or four winged birds. The invertebrates explored the modes of sensory and motor integration that became assimilated in the vertebrate quadruped limb structure along with an internal skeleton and cerebral hemispheres that reflect autonomic emotive patterns of behaviour.

Living Processes are Recursive and Archetypal

There are universal influences of an archetypal nature implicit in living processes that cannot be reduced to linear molecular processes of a causal nature. The biochemistry of the cell is highly recursive. The machinery that transcribes and translates the genetic code into protein requires a maze of protein enzymes and transcription factors that must themselves be transcribed, translated, further processed, and transported to their appropriate locations. Later they are recycled for re-use. Because their shape is critical to their function and because their active sites employ non-covalent interactions that do not alter them chemically, this immense integrated complexity consists of an archetypal energy pattern that orchestrates the molecular chemistry of the cell from behind the physical scenes. This extends to the complex interconnected activity of organs of the host creature or human being. It further requires that every species has an archetypal energy pattern that universally determines the self-similar characteristics of each of its members.

There is evidence of this everywhere, if we look for it. For example the fruit fly has a mutant recessive “eyeless” gene that if paired with a second parent that also has the same recessive “eyeless” allele, the offspring will have no eyes. If a stock of eyeless flies is produced and interbreed their offspring will also have no eyes because the required genes are no longer there and accessible. Nevertheless within a few generations flies with normal eyes appear. The recombination of gene sequences to compensate for the missing genes must have been facilitated by a holistic or universal archetypal energy pattern associated with the species. An eyeless line of fruit fly could hardly reinvent eyes from scratch in a few generations. The capacity for self-regulation implicitly depends upon universal archetypal patterns that are hierarchically organized and that pervade the biosphere.

Nature’s Energy Refinery

We may think of the biosphere as an energy refinery that percolates up successive levels from the protists and one celled plants through multi-celled plants, then invertebrate animals, to the vertebrate reptiles and mammals, and finally to humans. Each level up the refinery also provides reflux back down through the hierarchy as the transformations between levels seek a sustainable mutual balance. Nature’s energy refinery is the colossus of a theatre that we call the biosphere. It is the outer film of life on land, in the air and the oceans that rides upon the shifting plates of the planet.

There is a boundless universal memory bank called the timeless Void that spans and integrates the vast reaches of evolutionary space and time. Old quantum energy elements of past experience can be recalled and assimilated anew to accommodate each new episode in the cosmic movie. In our personal experience we have access to episodes of learning going back to the crib that we re-assimilate into more complex behaviors as we deem appropriate. Through the agency of our limbic brain we access and re-assimilate ancient emotional patterns of behavior that have been refined through our cultural evolution. We adapt these emotional patterns in our behavioral responses to current sensory circumstances. The memories themselves are animated energy patterns that are not catalogued within our physical brains, although we employ this instrument

to access them from the boundless sensorium of experience that is the Void. Life is more than a complexity of molecular events and linear causal accidents. Many things converge with each new episode.

In the lead up to the extinction of the dinosaurs the Indian subcontinent was speeding toward Asia, pushing up the Tibetan plateau and placing the Earth's crust under compression. The Rockies, Andes and Alps were rising along with East Africa. The India-Asia collision also plowed sediments of the sea floor rich in fossil remains into the incredibly rich oil deposits of Arabian Gulf while also resulting in one of the largest volcanic outflows in the planet's history. The Deccan Traps were formed between 60 and 68 million years ago and are over a mile deep that today still covers an area of 200,000 square miles despite millions of years of erosion. During this same period a few primitive flowering plants began to diversify in great profusion together with the diversification of specialized insect pollinating vectors. The land masses rose and the dinosaurs lost their swampy habitat. It was if the flowers came for the funeral. The flowering angiosperms provided a much richer food supply to support the higher metabolic rate of the mammals and birds that swarmed onto the stage in great profusion. Many interconnected events were essential to the dramatic sudden changes taking place.

It is noteworthy that a study by M.J. Benton¹⁰ shows that the Cretaceous extinction of the dinosaurs didn't have a major impact on other land animals and plants, although it affected marine life. Other major extinctions have not been correlated with asteroid impacts that brought on a nuclear winter. The pattern evident from the fossil record indicates that the evolutionary process explores the operating field of the biosphere to its limits then reinvests this learning in succeeding episodes when the timing is right.

The Biosphere is a Theatre of Diverse Performers

Just a brief theatrical tour impresses any visitor with the variety of the performance from one location to another. There is such a range of diversity from the lavish mob scenes in the teeming jungle of Brazil, to the shoestring budget productions in the desolation of the Sahara. The feedstock to the energy refinery fluctuates drastically in its constituents. The tiers are populated to the brim in places, while other barren sets are abandoned to a few derelict performers.

Given the complex structure of a theater that has gone through so many renovations since the beginning of the show, the performers belong to an equally complex theatrical guild, many of them displaying temperamental preferences as to where they will perform. Most categories of invertebrates prefer a script written for the sea, the great exception being many millions of species of insects that infest the land. The mammals and reptiles are predisposed to play parts on land, yet some of the largest creatures ever, the whales, share their dominion of the seas with a supporting cast of cousins. Few other mammals like the ocean setting—the only reptiles that have been persuaded to take extended parts are the turtle, snake and crocodile. Birds are the most versatile performers. Some migrate from one polar region to the other, supporting themselves by playing bit parts in local scenes along the way. Other birds, who can't be bothered with the exertion of such active roles, have given up on flight—the Oscar for the most bizarre going to the penguin. Although many birds can swim and dive, this one does little else, choosing the most

inhospitable stage on earth. As for humans, we started out humbly enough, but now, with our machines, no stage is free of us. We dominate the drama, even change the sets and try to rewrite the script, without knowing what the plot is all about.

Whatever the constituents, the refinement of energies seeks harmonic balance up and down the levels of the hierarchy. Reflux becomes regulated through experience. The players on each level of the hierarchy belong to different instrumental sections in the orchestration of the whole, only certain notes being sounded by certain instruments within each section. Percussion, brass, strings, and woodwinds may all be richly represented in grand symphonic movements, while across the way, a few faltering notes from flute and piccolo strive to sustain a single resonating chord. All these renditions meld into a resonating topology to the refinement of energies in the biosphere, modulated by the pace of celestial movements from night to day and from season to season. The enclosed yet boundless active interface of the planet resonates in patterns that seek a biospheric balance.

The daily and seasonal regularity to the modulation of the music has a tendency to induce both complementary patterns and compensating balances in opposite hemispheres of the biosphere. This is implicit in the polar nature of the energies involved, the enclosed character of the biosphere, and the modulated regularity to the resonating whole. Thus we find many examples of converging evolution in different parts of the world from very different ancestral stock, together with the complementary divergence that this implies. The South American rhea, the cassowary and emu of Australia, and the African ostrich are all very similar yet come from different parentage. The fennec fox of the Sahara is smaller than the kit fox of America but with essentially identical traits, yet the two are unrelated. The sea cow of the tropical coast in America is thought to share a common ancestry with the elephant, yet the sea cow has adopted the characteristics of the unrelated sea lion, seal and walrus. Another relative of the elephant, the rock hyrax of Africa and the Near East, has all the characteristics of a rodent, living in burrows and rock crevices. The evolutionary marketplace is full of such examples of copying wherever biospheric resonance requires. It helps to fill the music out to achieve a better balance.

The Universal Hierarchy

The major levels in the hierarchy can be represented in the order in which they first evolved. The plants provided primary *forms* of food stock for invertebrates which explored *routines* of sensory response which the vertebrates learned to reflect in conscious *knowledge* which humans with language can deal with in abstraction and thus create new *ideas* to better cope in our environment. The four levels also tend to evolve four distinct levels in a self-similar way within each level.

This evolutionary hierarchy has evolved in reverse order to the way the creative process works. We know that creative *Ideas* give direction to acquired *Knowledge* which gives direction to *Routines* of behavior that give explicit *Form* to some physical result. This is a universal hierarchy that is evident in all human undertakings. In a self-similar way it is also evident in the evolutionary fossil and natural record. The creative process is implicitly self-regulating through

intelligent communication with itself in the biosphere. The hierarchy can be summarized in general terms thus:

Idea*→*Knowledge*→*Routine*→*Form

Organic evolution is nested within the physical creation that subsumes it. It is a distinct hierarchical sub-System (System 4)¹¹ nested within the System that generates the physical universe (System 3)¹² and both are discrete Systems of the cosmic order that pervades every aspect of phenomenal experience. Our human socio-economic organizations also evolve in the same self-similar hierarchical manner. For example in any evolved business of a few thousand employees we find four distinct levels of work that implicitly provide direction from the top down with feedback from the bottom up as follows:

1. Managerial work is the integrating ***Idea*** that directs the company's activity.
2. Administrative work employs technical ***Knowledge*** to direct the company infrastructure.
3. Supervisory work commits resources to direct specific production ***Routines***.
4. Functional work directs task cycles that produce the physical ***Form*** of the product.

The Managing Director (MD) of a growing company initially works at the Functional level assigning specific task cycles to others. He moves up to work at the Supervisory level concerned with product cycle routines as a natural consequence of expanding functional levels of work in Production, Accounting and Sales. It is a natural progression to organize work at these levels into departments and the MD may work at the Functional level in some departments and at the Supervisory level (routines of product cycles) in others for a while depending on rate of growth. When the MD advances to the Administrative level of work things become a more complex in the growing company. New infrastructure demands will require delegation of Engineering product lines as well as formal delegation of Human Resource development. The MD may still assess the market's needs himself at this level but further growth to national or international markets will require delegation to a Marketing Department (distinct from Sales) when the company reaches four levels of delegation. Marketing is concerned with the long term vision of the company and Sales can only be properly assessed within this context. This results in six departments of activity that relate in polar pairs as a delegated extension of how we humans integrate experience by employing three mutually distinct but related brains. The job of the MD at the Managerial level of work is to creatively balance the three polar insights into the company's whole operation in sustainable ways.¹³

It is apparent that our human activities have assumed global consequences for the biosphere. Whether we like it or not we have assumed responsibility for managing the biosphere in sustainable ways. In one respect we have climbed to the top of the evolutionary ladder of sentient awareness as the sole species whose actions affect a sustainable balance in the resonant harmony of the biosphere. In another respect our intuitive capacity to perceive the workings of the cosmic order is confined to the Functional and Supervisory levels of work associated with task cycles and product cycles respectfully. We cannot continue to endlessly create more products without due regard for the planet's infrastructure to sustain us. We must advance to the Administrative level concerned with infrastructure which requires direct insight into the dynamics of the Cosmic Order that governs the biosphere.

The Cosmic Order

The cosmic order consists of an open ended series of hierarchically nested Systems that cannot be reduced to algorithm or language of any kind. It is structural as distinct from behavioral. Although it never changes it prescribes the nature of all change. It can only be intuitively recognized with respect to the sensory perception of phenomenal behavior from which all language derives. We intuitively seek holistic right brain meaning of a timeless character to integrate our linear left brain knowledge of sensory events. Intuitive insight into the structural dynamics of the cosmic order is essential to select sustainable behavior patterns that timelessly reflect the way in which the cosmic order works.

Each System consists of *all possible* ways that a specific number of active interface processes can mutually relate with respect to a common inside and outside. This allows us to speak of System 1, System 2, System 3, and so on according to the number of active interface processes involved in each discrete nested System.

All we can ever know in sensory experience of any kind is active interface processes. We can never know or see the inside of anything to the exclusion of the outside or vice versa. Active interfaces are the only allowable boundary condition of the Cosmic Order. Otherwise we are left with contradictory concepts of boundary conditions that can never find verification in sensory experience of any kind. We can never know the Big Bang, or infinitesimal strings, or dark matter, or probability waves, etc. They are imaginary.

- 1) **System 1** as universal wholeness subsumes the whole cosmic order nested within it. It transcends and subsumes the whole of creation. It is the Supreme Universal Source of All Being. It transcends Space and Time and the whole of evolutionary history. As the primary active interface process between a universal inside and a universal outside it requires this of all subsumed active interface processes.
- 2) **System 2** is a consistent elaboration of System 1. There must be two active interface processes in order for there to be phenomena evident in sensory experience. One active interface must be the unique System 1 and it must transcend and subsume the other active interface that represents many Particular interfaces of one universal kind. There are only two possible structural orientations. The Universal interface may be inside all the Particular interfaces that are oriented objectively outward. This is a public orientation. Alternately, the Universal Interface may be separate from just One Particular interface and facing it. This alternate subjective orientation is a private realization. System 2 transcends and subsumes the physical world. One particular human being can see the Cosmic Source of All Being face to face.¹⁴ The two orientations proliferate throughout the natural order however. For example we can only identify a particular creature in relation to its species. The whole of creation derives from the need to reconcile the two structural orientations between Inside and Outside. This age old question has been variously expressed as One and Many, Self and Other than Self, Universal and Particular, Unity and Diversity. Nothing that physically exists is entirely unique. It is a member of an archetypal kind. For example we implicitly recognize an oak as an archetypal tree and a tree as an archetypal plant and so on.

- 3) **System 3:** Three dimensional physical objects consist of atoms generated by System 3 as an elaboration of System 2. Separate primary hydrogen atoms consist of a distinct Particular Set of three Closed Active Interfaces namely a closed Photon energy shell, a closed Electron particle, and a closed Proton particle. Each Particular Set is intimately linked by one unique Universal Set that is confined within the three mutually closed interfaces (called Centres) of all hydrogen atoms everywhere at once (like quarks). It defines an inside with respect to an outside between the surface of each particular centre and makes all hydrogen atoms the same. (The universal set cannot physically exist because it is open, boundless, and confined.)¹⁵

The closed orientation that defines physical particles alternates with a reciprocal open orientation where all primary atoms everywhere invert in such a way that the open interfaces of electron and proton coalesce together as one within the photon interface. In other words each particulate atom becomes its open photon energy equivalent as elements of the boundless and timeless Void encompassed by the unique Universal Set. The Void reconciles the internal and external aspects of all physical atoms as coalesced elements that are timeless or eternal and yet subject to recall into physical atoms.¹⁶

The Void is a master sensorium or memory bank associated with mind. Because the Void is both timeless and spatially indeterminate or boundless it spans and integrates the whole of space and time. The wave nature of matter derives from the synchronous oscillation between particulate Form and the boundless Void. In this way Systems 1 and 2 transcend and subsume the whole of space and time, the whole of history.¹⁷

Homologues of System 3 create the heavier elements by contracting space in the centres of stars. This introduces the neutron as a Regenerative Mode that alternates with an Expressive Mode. Since the neutron contracts the space of a hydrogen atom by 15 orders of magnitude it is required to offset the contraction of space at galactic centres with respect to their peripheries due to their cyclic angular velocities.¹⁸

- 4) **System 4:** Biological evolution is nested within and distinct from the physical universe. It is specified by System 4 which is a nested elaboration of System 3. Inorganic molecules have no demonstrated capacity to spontaneously organize themselves into the immense complexity of biologically living cells. The most credible explanation is an interstellar gene pool where prokaryotic spores (and probably eukaryotic spores) can be seeded from space as first proposed in the Panspermia Theory by the Nobel Laureate Svante Arrhenius in 1907 and later taken up by Hoyle and Wickramasinghe.¹⁹ Direct evidence is growing in support of the theory.²⁰

System 4 has four active interfaces or Centres. There are only nine possible ways that they can structurally relate with respect to a common inside and outside and each way is called a Term. Six of the Terms are generated by three Particular Sets that transform through a six Term sequence one Step apart in the repeating order 1, 4, 2, 8, 5, 7. The six Terms relate in three polar pairs that relate to our three brains. Terms 1, 2 & 5 are synchronous and alternate with the synchronous Terms 8, 7, & 4. The former are objective with respect to the latter which are subjective, thus elaborating on System 2 and 3.

Hierarchies in Nature's Energy Refinery

HUMANS Idea	Idea	Future delegation of cosmic <i>ideation</i> will open the human mind to levels of realization as yet undreamed of, with a new balance throughout the hierarchy.
	Knowledge	Delegation of direct <i>knowledge</i> of cosmic order requires a new paradigm for science. The three focal points of mentation must balance in the biosphere.
	Routine	Expansionist empires fueled western science & industrial <i>routines</i> that now dominate the planet through huge corporations, threatening global resources.
	Form	Spirit cultures explored the planet. Cities brought division of labor & writing. Three <i>forms</i> of ideation emerged in Western, Eastern & African cultures.
VERTEBRATES Knowledge	Idea	Apes evolved to humans that plan time with left brain verbal <i>ideas</i> distinct from mute right brain integration both fueled by the ancient emotional brain.
	Knowledge	Higher mammals, dog, seal, etc, select behavior. Ancient limbic brain reflects emotional patterns in conscious neocortex that intuitively action in <i>knowledge</i> .
	Routine	Lower mammals, horse, cow, etc., modulate behavioural <i>routines</i> to suit space-time events. Mesocortex blooms. Marsupials lack a corpus callosum.
	Form	Historical reptiles explored quadruped behavioural <i>forms</i> . Autonomic nervous system reflects emotional patterns in cerebral awareness. Archicortex blooms.
INVERTEBRATES Routine	Idea	Ants, bees, etc., use the <i>idea</i> of division of labor for their collective survival. The giant squid's developed brain employs <i>ideas</i> for its individual survival.
	Knowledge	Flying insects use rapid <i>knowledge</i> of space & time in flight routines. Most span time via metamorphosis. Spiders & some crustaceans span time & space.
	Routine	Segmented worms repeat <i>routines</i> to move in space. Centipedes colonize land. Arthropods specialize body segments. Cephalopods & mollusks unsegmented.
	Form	Sponges, jelly fish, coral, flatworms, nematodes, starfish, & chordates explore <i>forms</i> of routine in motor-sensory responses, with embryo developments.
PLANTS Form	Idea	Flowering plants (angiosperms) use <i>ideas</i> extended in space & time to attract animal pollinating vectors, while providing food in stems & fruit for dispersal.
	Knowledge	Gymnosperms use <i>knowledge</i> extended in space and time to join gametophyte and sporophyte in pollen & seeds, allowing conifers to live in dry terrain.
	Routine	Giant horsetails & clubmosses on land explore <i>routines</i> with vascular systems and alternate sporophyte and gametophyte generations, leaving us coalbeds.
	Form	Bacteria, algae, fungi, slime molds & lichens explore living <i>forms</i> of the cell, from microscopic to giant. Alternate sexual and asexual generations emerge.

Adapted from Fisherman's Guide to the Cosmic Order²¹
 (First published by Shambhala - Random House 1985)

Figure 1

Term 9 defines a universal hierarchy from inside to outside such that the host **Idea(1)** directs **Knowledge(2)** implicit in the infrastructure of the human body which directs muscular **Routines(3)** which directs the physical **Form(4)** of the body with respect to the physical universe.

Idea(1)→Knowledge(2)→Routines(3)→Form(4).

Four levels elaborate within each level. The hierarchy is evident in the way the natural order has evolved as illustrated in the Figure 1 chart.

The Particular Set transform sequence is regulated by the Universal Sets transform sequences into three Cycles of four Steps each. There is a Primary Universal Set and a Secondary Universal Set, each with its own transform sequence that takes four particular transform Steps. The Primary Set stays as T9 for two Steps and then transforms to T8R for two Steps before switching back to T9 again. The Secondary Universal Set transforms from T3 to T6 in Step 2 where it stays for two Steps. In Step 3 the Primary Universal T8R term coheres with it. In Step 4 T6 inverts to a Secondary Universal T2E Term where the Primary T8R Term again coheres with it in a similar manner. Then both Terms transform back to their original positions to begin a new four Step Cycle.²²

Explanatory note

It may be noted that each successive level begins to diverge early in the preceding level. For example at the primary functional level biologists have difficulty clearly classifying some single celled organisms as either plant or invertebrate animal and call them protists. For example the unicelled Euglenida photosynthesize energy from the sun, just as plants do, but they also swim with a tiny tail and have a mouth and gullet to ingest food. These tiny one-celled creatures cannot survive by photosynthesis alone. Some ciliates are amazingly complex for single cells. One called "*Diplodinium dentatum*" has complex mouth parts leading to a gut, with a contractile esophagus and anus. It also has a skeleton, like a tiny boney structure within the cell. In this sense invertebrate evolution began at a primary level soon after the first single celled plants and fungi. This is a recurrent pattern. The first vertebrates are thought to have diverged from chordates that exist in the embryonic stages of the invertebrate tunicates and related animals. The first mammals diverged early in reptilian evolution about 150 million years before the Cretaceous extinction of the dinosaurs. The first flowering plants appeared early in the evolution of the gymnosperms. Evolution is not a random linear affair.

Moreover, if survival of the fittest is the sole linear driving mechanism of evolution one might well wonder why it ever proceeded beyond the level of the amoeba. Creatures that proliferate by division without benefit of either ancestors or offspring achieve a kind of immortality. In a sense they are the same living creature that spreads itself into a universal energy pattern in the global theater.

The Living Biosphere

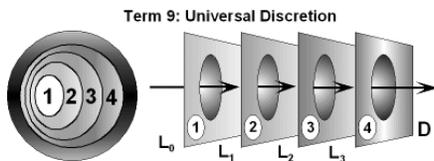
It has become clear that human activity is seriously altering all patterns of life on Earth that have become established over evolutionary history. We see hundreds of mammalian, reptilian and bird species vanishing or endangered at an alarming rate. Scientists estimate that one fifth of invertebrate species are facing extinction with many already gone. The rapid decline of the bee population is worrying because the majority of our plant food supply and that of most other animal species depends on them to pollinate. The list of extinct plants in the last couple centuries due to loss of habitat is already in the many hundreds.

It is very instructive to investigate each of the System 4 Terms as they relate to the overall hierarchy in the Figure 1 chart. This will tell us how we humans relate to the vertebrates, invertebrates and plants in each Term as they mutually interact through the complexity of interdependent transform sequences. As noted above there are three Sets of Particular Terms that transform through a six Step Sequence that is regulated by two Universal Sets that have a four Step transform sequence. Since the Particular Terms have both Expressive and Regenerative Modes there are a total of twelve Particular Steps divided into three Universal Cycles of four Steps each.

The System 4 hierarchy is of primary relevance. It defines each active interface process.

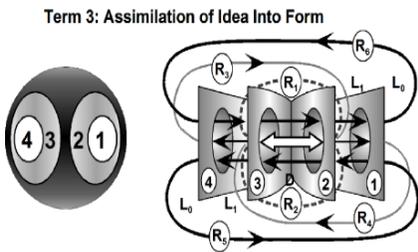
Human Idea(1)→Vertebrate Knowledge(2)→Invertebrate Routines(3)→Plant Forms(4)

Primary Universal Term 9 - Steps 1 & 2 of each Cycle



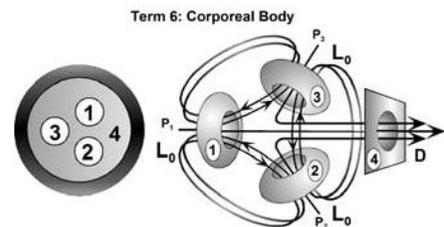
Term 9 in conjunction with Universal Term 3 recalls the memory term T7R to T1R from Step 1 to Step 2. Memories of global behavior sequences influence Steps that follow. Global change in the biosphere is difficult. Major human adjustments are necessary over a long period of time to redress a new balance with vertebrates, invertebrates and plants. T9 transforms to T8R in Step 3 of each Cycle when it coheres with T6.

Secondary Universal Term 3 - Steps 1 of each Cycle



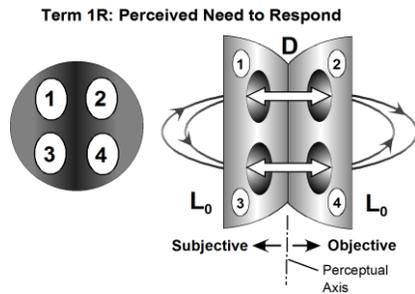
The coalescence of invertebrates (3)=(2) vertebrates relates to plants (4) via invertebrates (R_3) & to humans via vertebrates (R_4). Human relationship to plants R_5 is balanced by plant relationship to humans R_6 . Invertebrates and plants are subjective to the central axis with objective respect to vertebrates and humans. This balance of internal and external allows access to assimilate eternal T7 Terms for recall from the Void in conjunction with T9.

Secondary Universal Term 6 - Steps 2 & 3 of each Cycle



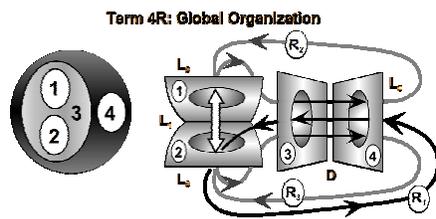
T3 transforms to the universal term T6 in Step 2 of each Cycle. The animated body of the biosphere is the closed relationship of humans (1), vertebrates (2) and invertebrates (3). They mutually relate as an intimate triad to plants (4) by projections P_1 , P_2 and P_3 as the universal food supply, although they also feed on one another. In Step 3 term T8R coheres with T6 by tunneling through and linking the triad in pairs. See Fig. 3. The universal terms regulate particular terms in three Cycles of 4 Steps each.

Particular Term 1R - Step 2 of each Cycle



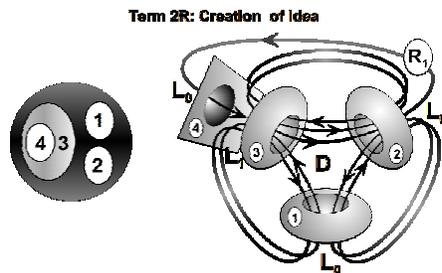
The invertebrate (3)=(4) plant coalescence is the regenerate resource capacity recalled from the previous T7R memory term. This parallels the (1)=(2) coalescence and determines the limits to human (1) activity as it relates to vertebrate (2) species. This is a human archetypal mindset that can recognize a need to alter behavior that impacts vertebrate life such as loss of habitat and diminished biosphere resource capacity. In the expressive mode of the term, (1) and (2) exchange places in an expressive sequence that begins with Term T8E that follows.

Particular Term 4R - Step 3 of each Cycle



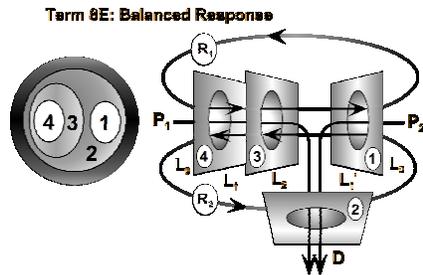
Vertebrates (2)=(1) humans evolved within the context of the invertebrate relation to plants (R_2 & R_3). Although some animals & birds feed on each other, all depend on the relation between invertebrates and plants (including fungi). Plants relate back by R_1 to supply the food chain that regenerates invertebrates (3) & all vertebrates (2) (including humans). In the T4E expressive mode R_1 relates back specifically to humans (1) who actively create ideas & behavior that impacts the biosphere by R_2 & R_3 .

Particular Term 2R - Step 4 of each Cycle



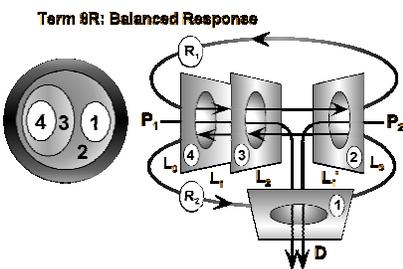
Humans (1), vertebrates (2) & invertebrates (3) are mutually closed and intimately locked in a mutual balance. What happens in one affects the biosphere balance. Imposed on the triad plants relate via invertebrates to vertebrates (including humans) in R_1 to sustain species as animated *ideas* dependent on plant resources. In the expressive mode (1) & (2) exchange places. R_1 now relates to specific human behavior that affects a balance in the triad. Humanity evolved as a special vertebrate species that subsumes the biosphere with consequent impact due to human actions.

Particular Term 8E - Step 3 of each Cycle



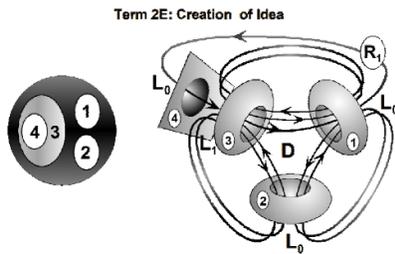
There is only an expressive mode for the Particular T8E. R_1 in T8E is the same following both modes of T4 and T2. It relates to specific species. R_2 is a balanced response to R_1 so that plant food resources balance with human actions across the invertebrate interface that plants depend on. Plant resources P_1 must balance human demands P_2 as they project together through the Vertebrate (2) interface. This double entry bookkeeping means that Human demands deplete resources for all vertebrates. T8R is only a Universal Term that equitably distributes resources by cohering with T6.

Primary Universal Term 8R - Steps 3 & 4 of each Cycle



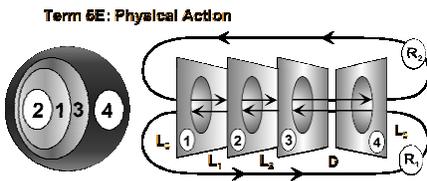
T9 transforms to Universal T8R term in Step 3 of each Cycle. It coheres with the corporeal body T6 such that R_1 and R_2 tunnel through the members of the closed triad in pairs & link them up from within in a clockwise direction with Plant food resources within each member. There is feedback in reverse direction between members. This equitably distributes food according to the P_1 plant *supply* via invertebrates & the P_2 *demand* of via vertebrates & humans. The open interface of plants (4) in T6 is also aligned with that of human (1) in T8R as in the Universal Terms coherence. (Fig 3) So human behavior is a limiting factor on plant resources for distribution.

Secondary Universal Term 2E - Step 4 of each Cycle



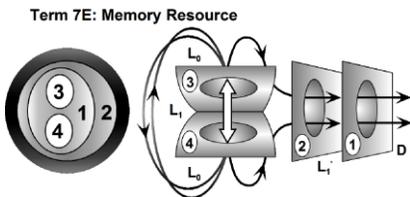
In Step 4 of each cycle Universal Term T6 inverts to a Universal Idea term T2E in the expressive mode that aligns with and regulates all Particular T2R terms associated with Particular species. The T8R term tunnels through the triad linking members in pairs as in T6 within the open Human interface of T8R that subsumes all the particular T2R terms. (See Figure 3) All creative ideas related to species and funded by plants via invertebrates in P_1 of T8R occur in relation to specific human demands P_2 . In this respect the universal human archetype subsumes all life in the biosphere. We have evolved to a position of global responsibility.

Particular Term 5E - Step 2 of each Cycle



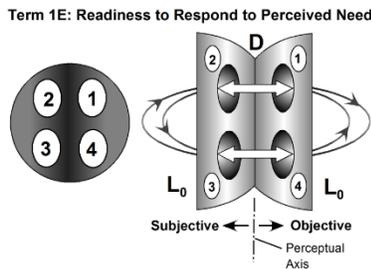
T5E follows the above regenerative sequence relating to vertebrates. In R_2 human actions (1) affect vertebrates (2) which affect invertebrates (3) as they relate to plants (4). Plants feedback via the food chain to humans in R_1 . Our actions reduce vertebrate and bird habitats and disrupt the relationship between plants and invertebrates, especially insects. Insects have a special relationship to plants from pollinators to parasites.

Particular Term 7E - Step 3 of each Cycle



Invertebrate (3)=(4) plant coalescence is the basis of the food chain. Each relates inside through the other thence outside through vertebrates and humans thus reconciling inside & outside as eternal memory elements subject to recall. This is an accounting of energy expended in the biosphere for the regenerative action sequence budgeted for by T7R that preceded T1R above and that created the preceding expressive action T5E. There is thus a budgeting and accounting of energy expenditures in the biosphere.

Particular Term 1E - Step 4 of each Cycle



The (3)=(4) coalescence in T7E is recalled in T1E as an energy capacity to respond in an expressive sequence of term transformations to follow. Plants are objectively aligned with potential human actions that are respectively anchored to invertebrates and vertebrates. The expressive sequence of seven term transformations that began with T8E is a causal response to past sequences that conditioned the biosphere. The five particular regenerative Steps begin again following the next T8E. The transform sequences repeat.

Figure 2

The Degenerate Variant:

There is a System 4 degenerate (involutionary) variant in which (3) and (4) change places. This represents decay processes and leads to fragmentation. The involutionary and evolutionary variants feed on one another. There are remembering variants that do not lead to overt action. Since the expressive mode of one variant is the regenerative mode of the other, involutionary energies may be redeemed or they may destroy the evolutionary variant as in the case of cancers

that become ends unto themselves.²³ The tug of war between the evolutionary and involutory variants in thought results in the bi-polar moral disparity at the roots of perception on which our social and spiritual values depend. In this regard it is apparent that humanity cannot survive as an end sufficient unto itself. We must intuitively perceive ourselves in a greater cosmic context.

Coherence of T8R and T6:

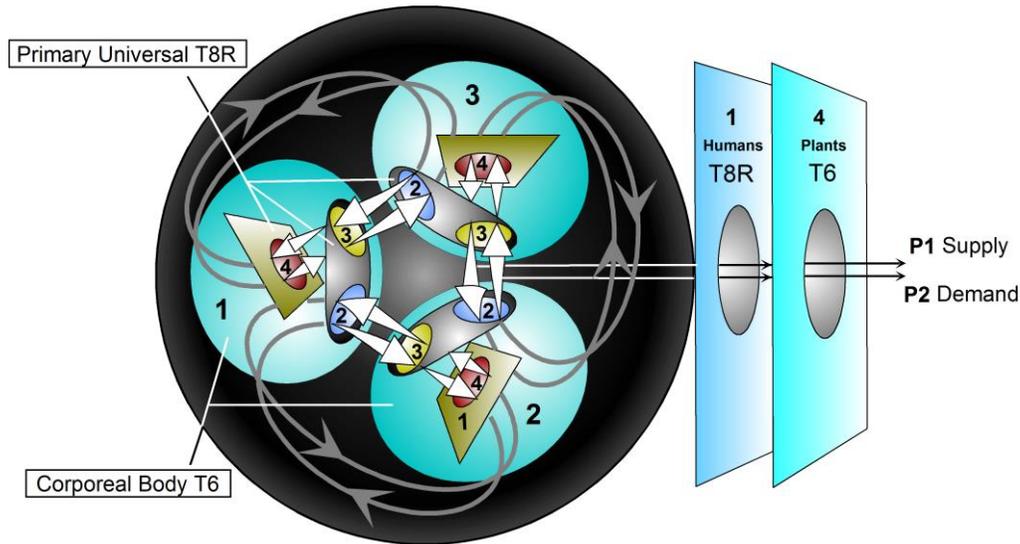


Figure 3

The Figure 3 diagram should help to visualize how the primary universal term T8R tunnels from within to link the corporeal body triad of T6 in pairs. Because the open interfaces of T8R are unbounded and universal they are not constrained by limitations of space and time. They are confined within the closed interfaces of the T6 triad, namely human (1), vertebrate (2) and invertebrate (3). The open T8R human (1) interface is aligned within the open T6 plant (4) interface. So supply of plant energy resources stored from the sun P_1 is balanced by total human demand P_2 as it relates to vertebrates (2) and invertebrates (3) across the three intervals that link the triad members.

Four Steps in Each Cycle

Since there are three Particular Sets transforming through the six term sequence one Step apart there are alternating subjective and objective synchronous groupings. They are regulated by the transform sequences of the Primary and Secondary Universal Sets that work in concert in repeating four Step sequences that are called Cycles. Note that the Primary T9 Term shifts to a subjective T8R alignment in Step 3 and reverts back to an objective alignment to begin each new Cycle.

It can be seen that within each Cycle all seven expressive modes and all five regenerative modes of Particular Terms are represented in three Sets. In this case Cycle #1 begins with a T4E term

because input from the environment (as a resource R_1 in T4) is always coupled to a T7R memory term in a synchronous Set for recall to begin each Cycle. In mid Cycle a T4E term is always coupled to a T7R term in a synchronous Set for recall. For example in the human body T4 terms represent sensory input from the environment because memory recall must always be relevant to current sensory experience. This is essential for coherent behavior.

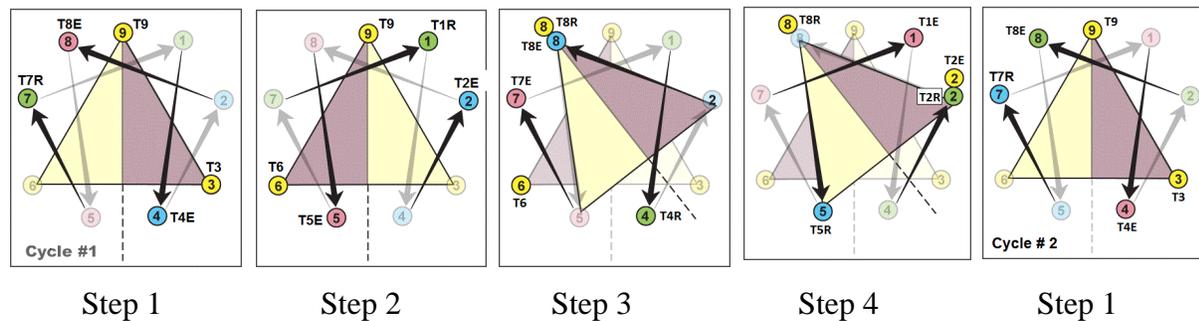


Figure 4

Concluding Remarks

It should be noted in Figure 1 that we humans have as yet only evolved to the Routine level. This concerns our technologically oriented multi-national corporate endeavors and how we commit the planet's resources to our burgeoning population to satiate our demand for ever more products. Corporate giants live to grow without limits devouring one another in the process of raping the planet. The exploration of the biosphere at this level is rapidly approaching a limit. Causal principles dating back to Aristotle have amassed an enormous fund of empirical knowledge but the paradigm is exhausting itself. Our knowledge needs to be re-assimilated anew.

We may expect to find that our multinational corporate dinosaurs will be replaced by more responsive and refined organizations committed to a creative balance between stockholder, employee and customer in the long term best interests of everyone. This can result in enhanced social and spiritual lives in more meaningful economic settings that are sustainable. The next level of delegation requires that we gain direct intuitive insight into how the cosmic order works with expanded scientific horizons. Only then can we begin to intelligently manage the living infrastructure of the biosphere consistent with how nature's energy refinery works.

Our physical, biological, and social sciences need to be reformulated consistent with the cosmic order. This is especially important in the structuring of large social and business organizations to render their creative dynamics transparent to all concerned. This can liberate people from the frustrations of stultifying mindsets and open human perceptions to a far more meaningful view of life. We live in challenging times and our old frameworks of understanding won't do any more. Although causal determinism has served us well in the physical and biological sciences, a grander view must replace Aristotle's efficient cause as the sole determinant of the world we live in. After 2,300 years it is time for a more comprehensive paradigm of the living cosmos in which we have a cosmic role to play.

The cosmic order is not an intellectual contrivance of the author. It is not within the capacity of the unaided human intellect to re-invent the cosmic order in language, including the obscurities of mathematics. Indeed the collective efforts of our academic intelligentsia have failed at the endeavor. The cosmic order can only reveal itself to individuals through a private intuitive quest. We must know directly as responsible individuals. This is how the cosmic order was explicitly demonstrated to the author as far as it has thus far been deciphered. Even a cursory review of how the cosmic order manifests in nature as outlined above should be sufficient to demonstrate the extreme precision and interconnected complexity of how it works. It is beyond the grasp of logic and reason and yet it is rationally consistent with how sensory phenomena are presented to us.

New evolutionary episodes of change can involve painful corrections that are looming ever more ominously ahead. However, we humans have acquired a capacity to evolve our behavior within a relatively fixed biological structure. We can hopefully continue to learn ways to limit our collective and personal suffering. Becoming aware of the creative process as it has unfolded in the biosphere is a giant step in the right direction.

References

- ¹ http://www.cosmic-mindreach.com/System_Intro.html
- ² <http://www.cosmic-mindreach.com/Three-Brains.html>
- ³ <http://www.tandfonline.com/doi/full/10.4161/cib.20953>
- ⁴ <http://www.cosmic-mindreach.com/Two-Faces-of-3-Brains.html>
- ⁵ MacLean, PD. Psychosomatic disease and the visceral brain; recent developments bearing on the Papez theory of emotion. *Psychosom Med* 1949; 11:338 - 53; PMID: 15410445 [CrossRef], [PubMed]
- ⁶ MacLean PD. Some psychiatric implications of physiological studies on frontotemporal portion of limbic system (visceral brain). *Electroencephalogr Clin Neurophysiol* 1952; 4:407 - 18; [http://dx.doi.org/10.1016/0013-4694\(52\)90073-4](http://dx.doi.org/10.1016/0013-4694(52)90073-4) ; PMID: 12998590 [CrossRef], [PubMed]
- ⁷ Koestler A. *The Ghost in the Machine*. London: Pan Books, 1967.
- ⁸ Sperry RW. Hemisphere disconnection and unity in conscious awareness. *Am Psychol* 1968; 23:723 - 33; <http://dx.doi.org/10.1037/h0026839> ; PMID: 5682831 [CrossRef], [PubMed], [Web of Science]
- ⁹ Gazzaniga MS. Forty-five years of split-brain research and still going strong. *Nat Rev Neurosci* 2005; 6:653 - 9; <http://dx.doi.org/10.1038/nrn1723> ; PMID: 16062172 [CrossRef], [PubMed], [Web of Science]
- ¹⁰ Benton M.J. *Science*, 268, 52, 1995.
- ¹¹ <http://www.cosmic-mindreach.com/System4Terms.html>
- ¹² http://www.cosmic-mindreach.com/Atoms_Space-time.html
- ¹³ http://www.cosmic-mindreach.com/Organize_structure.html
- ¹⁴ http://www.cosmic-mindreach.com/Cosmic_Insight.html
- ¹⁵ <http://www.cosmic-mindreach.com/System3.html>
- ¹⁶ http://www.cosmic-mindreach.com/Atomic_structure.html
- ¹⁷ http://www.cosmic-mindreach.com/Quantum_Mind.html
- ¹⁸ <http://www.cosmic-mindreach.com/Cosmology.html>
- ¹⁹ Hoyle F., Wickramasinghe N.C.: *Evolution From Space*, Simon & Schuster, NY. 1981
- ²⁰ <https://www.youtube.com/watch?v=A5lFeW1FWfo>
- ²¹ Campbell R. http://www.cosmic-mindreach.com/Cosmic_Guide.html
- ²² <http://www.cosmic-mindreach.com/System4.html>
- ²³ http://www.cosmic-mindreach.com/Human_Values.html.