

Review Article

The Two Faces of Our Three Brains (Part I)

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Abstract

Arthur Koestler's Janus-faced holon is explored as characteristic of hierarchical levels that pervade the natural order. The self-transcending face of the holon identifies with an integrating ideal entertained by the conscious intellect that is easily subverted to the emotional desires of the crocodile and the horse wired into our limbic brain. This allows our self-assertive face to act without human conscience thus accounting for the tragic mess we have made of our history. The "flatland" vision of cause and effect has ruled the development of the psychological, social, physical and biological sciences while ignoring hierarchies implicit in the cosmic order that pervade all phenomena. The holon is shown to derive from Universal and Particular active interfaces that are requirements of universal wholeness implicit in the cosmic order. It is called System 2. The hierarchically nested Systems 3 and 4 require that there are three mutually closed active interfaces essential to physical reality, and to the mental integration of phenomenal experience, respectively.

This article reviews the Papez-MacLean Theory of Emotions from the perspective of the holon. MacLean researched the schizophysiology of the split between the ancient emotional limbic brain and the new brain or neocortex to account for humanity's tragic history. Sperry's work on split-brain patients confirms that the right and left hemispheres function independently, the holistic right brain acting as a self-transcending face with respect to the self assertive left brain. Together they can be conscripted into the service of our primitive limbic brain. Polar relationships between the sensory and motor topologies of the neocortex explored by Penfield and later by Woolsey act as two of the three polarities essential to the integration of human experience, the third being the ancient limbic system that reflects autonomic emotional experience in conscious awareness. The mind is shown to transcend and subsume the physical brain by regulating archetypal patterns behind the scenes that direct brain chemistry.

Part I of this two-part review article includes: The Unsolicited Gift; The Poverty of Psychology and the Need for a New Paradigm; MacLean Relates Brain Structure to Evolutionary History; Koestler Reviews Some Historical Evidence; The Schizophysiology of Horse and Rider; Aristotle's Horse and Hierarchies; Janus and the Holon; and The Holon as an Active Interface.

Key words: Koestler, Papez, MacLean, Sperry, Penfield, Woolsey, limbic system. split brains, universal wholeness, universal and particular, holon, cosmic order, brain and mind, three brains, hierarchies, active interfaces, triune brain, schizophysiology

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The Unsolicited Gift

In *The Ghost in the Machine*¹, Arthur Koestler's tells an interesting parable which he calls the paradox of the unsolicited gift:

There was once an illiterate shopkeeper in an Arab bazaar, called Ali, who, not being very good at doing sums, was always cheated by his customers; instead of cheating them, as it should be. So he prayed every night to Allah for the present of an abacus that venerable contraption for adding and subtracting by pushing beads along wires. But some malicious djin forwarded his prayers to the wrong branch of the heavenly Mail Order Department, and so one morning, arriving at the bazaar, Ali found his stall transformed into a multi-storey, steel framed building, housing the latest IBM computer with instrument panels covering all the walls, with thousands of fluorescent oscillators, dials, magic eyes, etc., and an instruction book of several hundred pages; which, being illiterate, he could not read. However after days of useless fiddling with this or that dial, he flew into a rage and started kicking a shiny, delicate panel. The shocks disturbed one of the machine's millions of electronic circuits, and after a while Ali discovered to his delight that if he kicked that panel, say, three times and afterwards five times, one of the dials showed the figure eight! He thanked Allah for having sent him such a pretty abacus, and continued to use the machine to add up two and three happily unaware that it was capable of deriving Einstein's equations in a jiffy, or predicting the orbits of planets and stars thousands of years ahead. Ali's children, then his grandchildren, inherited the machine and the secret of kicking that same panel; but it took hundreds of generations until they learned to use it even for the purpose of simple multiplication...We ourselves are Ali's descendants, and though we have discovered many other ways of putting the machine to work, we have still only learned to utilize a very small fraction of the potential of its estimated hundred thousand million circuits. For the unsolicited gift is of course the human brain. As for the instruction booklet, it is lost, if it ever existed. Plato maintains that it did once, but that is hearsay...It is entirely unprecedented that evolution should provide a species with an organ which it does not know how to use; a luxury organ, like Ali's computer, far exceeding its owner's immediate, primitive needs; an organ which will take the species millennia to learn to put to proper use, if it ever does.

The Poverty of Psychology and the Need for a New Paradigm

Despite all of our scientific efforts, no one knows how the human nervous system works in terms that can allow us to master the operation of our most important instrument in constructively balanced ways. As proprietors of our unsolicited gift we are left groping in the dark. There are various systems with certain vague verbal guidelines, which have a degree of validity in limited circumstances, but invariably these have serious shortcomings. This includes the whole range of psychological and philosophical systems of understanding as well as our physical and biological sciences. All of these may catch some particular glimpse of truth from a certain angle but all are deficient to varying degrees. Language is not up to the task.

Koestler takes particular aim at behavioural psychology founded before the outbreak of the First World War by John B. Watson² who proclaimed in his book, *Behaviourism*³:

The time has come when psychology must discard all reference to consciousness... Its sole task is the prediction and control of behaviour; and introspection can form no part of its method. (1913 pp 158-67)

[Behaviourist] must exclude from his scientific vocabulary all subjective terms such as sensation, perception, image, desire, purpose, and even thinking and emotion as they were subjectively defined. (1928. p 6)

The absurdities of behavioural psychology were further advanced notably by B.F. Skinner⁴ into the 1980s. His many colleagues still exert their influence today including on other disciplines such as psychiatry, physics, evolution theory, biology and social sciences. Experiments on rats and pigeons have been extrapolated to human behaviour. The mechanical linkage of cause and effect has been translated into stimulus and response as in the Pavlovian conditioning of dogs.

Koestler points out that Pavlov went so far as to count the drops of dog salivation to quantify the degree of conditioning. We generally acknowledge that a degree of social conditioning is essential to the development of a child but to reduce us all to mindless totally conditioned robots no better than rats is ludicrous. It may be argued that behaviourism is dead but the corpse still stalks the corridors of the psychologist's mind. There has been resurgence in recent years and the general populace is on the band wagon analysing who out there caused their every psychological hiccup. There is such a thing as taking personal responsibility for one's life.

To be valid any attempt to understand how the human nervous system works must be universal. It must embrace all possible varieties of human behaviour. This requirement implicitly rules out studies in behavioural psychology that are invariably dependent upon the accepted use of language restricted to Aristotle's efficient cause. That renders it useless at bridging deep rooted cultural differences in the global social meltdown that is currently taking place. To bridge our cultural differences implicitly requires a capacity for direct intuitive insight into the workings of the cosmic order by which we have all evolved. By its nature the cosmic order must be universal. It must encompass all creation, all manner of phenomenal behaviour both in the private and public realms. Nothing short of this can hope to mend the sadly tattered fabric of human civilization.

This is a tall order but a start has been made that is not itself dependent on language. The System of delineating the cosmic order facilitates intuitive insight into the roots of meaning implicit in all languages.⁵ The cosmic order cannot be reinvented in language. It can not be contrived intellectually. It can only reveal itself in response to a persistent intuitive quest into the hierarchical structure of how phenomena are presented to us.

We need to understand how we *meaningfully* integrate sensory input and organize it into appropriate responses according to circumstance. This means that the System⁶ of delineating the cosmic order that will be revisited later is structural in nature as distinct from behavioural. All thought, feeling, and behaviour derive from how it works, not vice versa. We are cosmic beings

that have taken a couple billion years to evolve to the point where we can realize this. Our unsolicited gift has become a very sophisticated instrument over the last million years or so, especially since the development of structured languages. Later we shall see that this has polarized the functions of Ali's abacus.

MacLean Relates Brain Structure to Evolutionary History

MacLean was a leading researcher who pioneered the relationship of our primitive reptilian and lower mammalian brains with respect to our neocortex or new brain that expanded over them when the higher mammals evolved. The cortex is the outer rind of grey matter, about a tenth of an inch thick. It contains many billions of neurons over an area of about three square feet crammed into the convolutions of the brain. Inside it white matter nerve fibres interconnect areas of the cortex in a complex maze of patterns.

In humans the expansion of the neocortex has been so great as to fold the two primitive brains that occupy the limb or edge of the cerebral cortex inward around the brain stem. The structure⁷ and function of the Limbic brain is very similar throughout the mammalian lineage from mouse to man. Its human structure is illustrated in the website article *Inside our Three Brains*.⁸ Later we will come to Koestler's concept of the "holon" which draws heavily on MacLean's work during the 1950s and 1960s.

Building on the work of Papez (1937)⁹, MacLean's pioneering work,¹⁰ covering the last half of the 20th century¹¹ established that the two primitive limbic brains in conjunction with related brain stem structures form a functionally integrated apparatus called the Limbic System. It is intimately associated with our emotional apparatus - the autonomic nervous system. The latter is an emotional vehicle rather than a cause. In 1929 Canon Walter¹² showed that emotions persist even after autonomic connections of the visceral organs with the brain are severed, indicating the emotional limbic brain can function independently on emotional patterns established prior.

The Limbic Brain is fundamental to the recall process and memory. It can learn in itself and is also employed in the learning of the new brain. We know that memories are emotionally coloured. We have a conscious capacity to observe them as they arise according to circumstance. We can tailor them to behavioural responses as we deem appropriate in any given situation. Nevertheless this primitive brain has a capacity to think independently of the neocortex albeit in crude and often confused emotionally coloured patterns. Its cortex is relatively coarse, like the brains of our reptilian and lower mammalian ancestors, while the new brain is finer in texture and more highly organized. The Limbic brain has no capacity to express its impressions in language. Rather it associates them with situations symbolically. The colour red may be associated with blood, or fighting, or flowers, or fire, for example.

MacLean points out that limbic epilepsy, electrically induced in animal studies, is confined to the Limbic System (MacLean 1964 pp10-11). There is thus a clear dichotomy of function between the old and new brains that he calls schizo-physiology. This built-in condition accounts for a fundamental human dilemma associated with Koestler's parable of the unsolicited gift:

Man finds himself in the predicament that Nature has endowed him essentially with three brains which, despite great differences in structure, must function together and communicate with one another. The oldest of these brains is basically reptilian. The second has been inherited from lower mammals, and the third is a late mammalian development, which in its culmination in primates, has made man peculiarly man...

Speaking allegorically of these three brains within a brain, we might imagine that 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... The reptilian brain is filled with ancestral lore and ancestral memories and is faithful in doing what its ancestors say, but it is not a very good brain for facing up to new situations. It is as though it were neurosis-bound to an ancestral superego....

In evolution one sees the beginning of emancipation from the ancestral superego, with the appearance of the lower mammalian brain, which Nature builds on top of the reptilian brain... It has a greater capacity than the reptilian brain for learning new approaches...on the basis of immediate experience. But like the reptilian brain ...it does not have the ability to put its feelings into words."... (MacLean 1964 p 2; Koestler p 277)

MacLean compares the cortex of the brain to a TV screen. The primitive screen of the Limbic cortex mixes projections of the outside world with the internal visceral environment which is adequate for smelling, tasting, and feeling what is going on inside the body. The bigger and finer neocortical TV screen of the higher mammals gives a clearer picture of the outside world with input from the eye, the ear and the surface of the body, however the old screen was also retained and continues to perform its traditional functions.

MacLean's three brains thus resolve into two brains because the reptilian and lower mammalian brains together constitute the Limbic Brain, which is distinct from the new brain or neocortical brain of the higher mammals such as dogs, chimpanzees and humans. Although the growth of the new brain continued with the early hominid species an unprecedented explosive growth is especially evident in the enlarged cranial capacity of humans over the past half million years. (p. 272). Koestler suggests that this tumultuous overgrowth was unprecedented in evolutionary history and was an evolutionary mistake.

There has been little change in the last 35,000 years or so as modern humans consolidated. This dichotomous schism between the old and new brains accounts for the schizophrenic-paranoid streak so deeply evident in human history from our bipedal origins to the present. MacLean elaborates on this built-in schizophysiology in many of his articles on the subject. A sampling is referenced below.¹³

Koestler Reviews Some Historical Evidence

Koestler reviews evidence from our hominid ancestors to ancient Greece of how our new brain easily gets conscripted into the service of our old brain often with exaggerated negative results.

Aristotle's categories became the grammar of existence, his animal spirits ruled the world of physics... the philosophers of the Hellenistic period dwelt in Plato's cave, drawing epicycles on the wall, their backs turned to the daylight of reality. ...During that time the march of science was not only halted but its direction reversed... In the fifth century BC the educated classes knew that the Earth was a spherical body floating in space and spinning round its axis; a thousand years later they thought it was a flat disc.” (p 301)

Reason's task was to act as the handmaid of faith - whether it was the faith of medicine-men, theologians, scholastics, dialectical materialists, devotees of President Mao or King Mbo-Mba. The fault dear Brutus is not in our stars: it is in the crocodile and the horse that we carry in our skulls. Of all the uniqueness of man this seems to be the foremost.(p 302)

Koestler discusses the curse of language at some length. He observes that while language facilitates communication within the group, it also crystallizes cultural differences. He quotes Margaret Mead who talks about the 750 tribal languages among the two million aborigines of New Guinea that were perpetually at war maintaining their mutual tribal separation.

The main danger of language however lies not in its separative, but in its magic, hypnotic, emotion-arousing powers. Words can serve to crystallize thought, to give articulateness and precision to vague images and hazy intuitions. They can also serve to rationalize irrational fears and desires, to give the semblance of logic to the wildest superstitions, to lend the vocabulary of the new brain to the phantasmagorias and delusions of the old. Lastly, words can be used as explosive charges to set off the chain reactions of group psychology. Ali's computer is just as capable of producing Kant's Critique of Pure Reason as the screams of Hitler.

As a general assessment of our situation we have the intellectual capacity to build atomic bombs and send rockets to the Moon and Mars, harnessed to the emotional capacity of a crocodile and a horse. But let us go back now to the earlier part of his book where he develops the concept of the “holon”. Then later we shall see that there is an ingenious method anticipating a far flung future vision implicit in Nature's bold and risky plan. It may be hanging by a thread but it is surely there.

The Schizophysiology of Horse and Rider

One cannot emphasize strongly enough what Koestler calls the divided house of faith and reason and what MacLean calls schizophysiology. The anatomical and physiological evidence clearly identifies a disparity of function between the new brain and the ancient limbic brain. MacLean established that significant interconnections between the limbic cortex and neocortex are lacking while the limbic cortex is connected by major nerve bundles to the hypothalamus and thence to

both divisions of the autonomic nervous system which is responsible for our emotional responses. In other words, the horse – the limbic system – has direct access to our emotion generating apparatus whereas the rider – our conscious rational intellect – has no direct access to them. External input to the neocortex is not emotionally coloured whereas visceral input to the limbic cortex is strongly emotionally patterned.

Both horse and man are very much alive to one another and to their environment, yet communication between them is limited. Both derive information and act on it in different ways. (MacLean 1961 pp 1738-39)

Koestler emphasizes that to go on preaching sweet reason to an inherently unreasonable species is a hopeless enterprise, as history shows.

Aristotle's Horse and Hierarchies

It is incredible that mainstream science in its questionable wisdom has chosen to ignore hierarchical order that is so all pervasive in the universe, in the biosphere around us, in our evolutionary history, in our biological structure, in our language, and in our social organizations.¹⁴ Causal determinism on a level playing field has been the favoured engine of science. Peering through the murky gloom, modern science and its philosophical partners remain drawn to the flickering candle of Aristotle's ancient Efficient Cause attired in various clothing. Mystical apparitions are conjured in the forbidden darkness beyond, about the spiritual implications that hierarchic order might imply. So it is that our elite intelligentsia clutches to the mane of Aristotle's runaway horse, having released the reins he intended with his other three causes.

Koestler summarizes some of the directions that Aristotle's horse has carried us in:

The citadel of orthodoxy which the sciences of life have built ... rests on a number of impressive pillars, some of which are beginning to show cracks and to reveal themselves as monumental superstitions. The four principal ones, summarized in a simplified form, are the doctrines

- a) *That biological evolution is the result of random mutations preserved by natural selection;*
- b) *That mental evolution is the result of random tries preserved by 'reinforcements' (rewards);*
- c) *That all organisms, including man, are essentially passive automata controlled by the environment, whose sole purpose in life is the reduction of tensions by adaptive responses;*
- d) *That the only scientific method worth the name is quantitative measurement; and, consequently, that complex phenomena must be reduced to simple elements accessible to such treatment, without undue worry whether the specific characteristics of a complex phenomenon, for instance man, may be lost in the process.*

Cracks or not these four pillars are still very much in evidence today. Recent developments in molecular biology, especially the epigenetic revolution,¹⁵ are casting the pallor of death over the strict Darwinian paradigm. Although this may eventually pry some of the cracks into complete fractures, even this will face the creative imagination of mainstream science in the service of the horse with a remarkable capacity to manipulate words to justify any position.

Koestler goes to considerable lengths to examine characteristics of Hierarchies of various kinds. They are clearly distinct from the “flatland” of random order. In a footnote he quotes Joseph Needham:

Whatever the nature of organizing relations may be, they form the central problem of biology, and biology will be fruitful in the future only if this is recognized. The hierarchy of relations, from the molecular structure of carbon compounds to the equilibrium of species and ecological wholes, will perhaps be the leading idea of the future. (Needham J. 1932)

Koestler emphasizes that hierarchic order is a characteristic of all forms of social organization from “insect state to Pentagon.” It is “true of the process of becoming – phylogeny, ontogeny, the acquisition of knowledge.”

In more recent years it has been found to be true within the cell. There are homeobox genes that coherently control batteries of subordinate genes that are hierarchically regulated by complex transcription factors. And single Cells have an obvious hierarchical relationship to a complement of tissues in Organs which in turn are hierarchically related to the whole Host creature. And the host creature is part of a whole species and species part of a genus which is subordinate part of a whole family, then kingdom and then part of the whole living biosphere which is somehow regulated by the ontological essence of all being. Hierarchies are all pervasive.

Let us go back now to the earlier part of Koestler’s book where he develops the concept of the “holon”. Then later we shall see that there is an ingenious method anticipating a far flung future vision implicit in Nature’s bold and risky plan. It may be hanging by a thread but it is surely there.

Janus and the Holon

The ‘wholes’ and ‘parts’ are not isolated ‘things’ sufficient unto themselves. They are mutually defined by their mutual relationship. There is no such thing as a species consisting of one isolated member and no such thing as a species with no members. This ancient philosophical theme has been expressed and debated as the Universal and Particular, or the One and the Many. It was implicitly recognized in the ancient Vedas, in ancient Egypt, and in pre-Socratic Greek philosophy culminating in Plato’s Theory of Forms¹⁶ which Aristotle firmly objected to.¹⁷ He replaced it with his categories and four causes. As the saying goes the whole of subsequent western philosophy is a footnote to Plato and Aristotle. Somehow the debate has avoided examining the characteristics of hierarchies, especially in modern science and its philosophical underpinnings. The existence of universals is generally rejected in favour of a bottom up atomistic approach consistent with Aristotle’s runaway horse across “flatland”.

Koestler makes a crucial observation that allows a much more intelligible discussion:

The members of a hierarchy, like the Roman God Janus, all have two faces looking in opposite directions; the face turned toward the subordinate levels is the of a self contained whole; the face turned upward toward the apex, that of a dependent part. One is the face of the master the other the face of the servant. This 'Janus effect' is a fundamental characteristic of sub-wholes in all types of hierarchies.

*But there is no satisfactory word in our vocabulary to refer to these Janus-faced entities... It seems preferable to coin a new term to designate these nodes of the hierarchic tree which behave partly as wholes and wholly as parts, depending on how you look at them. The term I would propose is '**holon**' from the Greek 'holos'=whole, with the suffix 'on' which, as in proton or neutron, suggests a particle or part. (p 48)*

The Gestalt school¹⁸ has considerably enriched our knowledge of visual perception, and succeeded in softening up the rigid attitude of its opponents to some extent. But in spite of its lasting merits, 'holism' as a general attitude to psychology turned out to be as one sided as atomism was, because both treated 'whole' and 'part' as absolutes, both failed to take account of intermediate strictures of sub-wholes...(p 49)

In his discussion of social holons Koestler points out:

*We can dissect a complex whole into its composite 'holons' of the second and third order, and so on, but we cannot 'reduce' it to a sum of its parts, nor predict its properties from those of its parts. The hierarchy concept of 'levels of organization' in itself implies a rejection of the reductionist view that all phenomena of life (consciousness included) can be reduced to and explained by physical-chemical laws. ... Whatever the nature of a hierarchic organization, its constituent holons are defined by **fixed rules and flexible strategies.**" (pp 54-55)*

Koestler elaborates at length on the properties of holons in physical, biological and social systems. It will be sufficient here to paraphrase his treatment of holons as they relate to our social situation. The individual person constitutes a nicely integrated hierarchy of molecules, cells, organs, and organ systems. Looking inward into the space enclosed by the boundaries of our skin, we can rightly assert that we are something complete and unique, a whole. But facing outwards, we are constantly reminded that we are a part, an elementary unit in one or several social hierarchies.

No man is an island – he is a holon. His self-assertive tendency expresses his unique wholeness, his autonomy and independence as a holon. His equally universal other face on which he depends relates to the larger whole that transcends him and to which he belongs: his partness. The self-assertive face is self-gratifying, feeding the horse, being competitive or being a rugged individual. The self-transcending face of the holon relates to the social group or to an ideal. We may speak of "clannishness", "class-consciousness", "esprit de corps", "local patriotism", "nationalism", etc. There can also be related integrating tendencies such as "cooperativeness",

“disciplined behaviour”, “loyalty”, “self-effacement”, “devotion to duty”, “internationalism”, and so on.

Note that most of the terms referring to higher levels of the hierarchy are ambiguous. The loyalty of individuals towards their clan reflects their integrating tendencies; but it enables the clan as a whole to behave in an aggressive, self-assertive way. The obedience and devotion to duty of the Nazi SS Guard kept the gas chambers going. “Patriotism” is the virtue of subordinating private interests to the higher interests of the nation but “Nationalism” is a synonym for the militant expression of those higher interests. The infernal dialectic of this process is reflected throughout human history. It is a manifestation of the delusional streak in the human psyche as evidenced by the tragic mess we have made of our history.

The single individual, considered as a whole, represents the apex of their organic hierarchy. Considered as a part, the individual is the lowest unit of the social hierarchy. On this interface between physiological and social organization, the opposing faces of the holon manifest themselves in the form of emotive behaviour. So long as all goes well, the self-assertive and self-transcending tendencies of the individual are more or less balanced in their emotional life. People generally live in a kind of dynamic equilibrium with family, society and beliefs which constitute their mental environment. It is under conditions of stress that this balance is likely to become disrupted. In pain, the injured part tends to monopolize a person’s attention. Under emotional stresses the digestive juices may attack the stomach walls. In rage and panic, the sympathetic - adrenalin apparatus takes over from higher centres which normally coordinate behaviour. When sex is aroused, the gonads seem to take over from the brain.

Aberrations of the human mind are to a large extent due to the obsessional pursuit of some part-truth, treated as if it were a whole truth to assert its absolute validity in the teeth of evidence to the contrary. The orthodox Freudian school in its early stages approximated a closed system: if you argued that for such and such reasons you doubted the existence of the so-called castration complex, the Freudian’s prompt answer was that your argument betrayed an unconscious resistance indicating that you yourself have a castration complex; you were caught in a vicious circle.

It we turn from individuals to social holons – professional classes, ethnic groups, etc. – we again find that, so long as all is well, they live in a kind of dynamic equilibrium with their natural and social environment. In social hierarchies, the physiological controls which operate inside of organisms are of course replaced by institutional controls which restrain the self-assertive tendencies of these groups on all levels. Without a moderate amount of self-assertiveness of its parts, the body social would lose its individuality and articulation. However under conditions of stress, when tensions exceed a critical limit, some social holons – the army, the farmers or the trade unions – may get over-excited and assert itself to the detriment of the whole. Alternatively, the decline of the integrative powers of the whole may lead to similar results, as the collapse of empires indicates on a grandiose scale.

As far as we can look back on history, human societies have always been fairly successful in enforcing the sublimation of the self-assertive impulses of the individual – until the howling little savage in its cot became transformed into a more or less law abiding and civilized member of

society. But human societies have also failed to induce a similar sublimation of the self-transcending impulses. Accordingly, the longing to belong, left without appropriately mature outlets, acts mostly in primitive or perverted forms. On the historic scale, the ravages caused by the excesses of individual self-assertion are relatively small compared to those which result from the self-transcending side through misplaced devotion. Self transcending tendencies of the individual are incomparably more dangerous than the self-assertive tendencies. The crimes of violence committed for selfish, personal motives are historically insignificant compared to those committed out of a self-sacrificing devotion to a flag, a leader, a religious faith or a political conviction. Man has always been prepared not only to kill but also to die for good, bad or completely futile causes. What can be more valid proof of the reality of the self-transcending urge than this readiness to die for an ideal?

The need for self-transcendence through some form of 'peak experience' (religious, political, ethnic or aesthetic) is inherent in the human condition. Also the self-assertive behaviour of the group is based on the self-transcending behaviour of its members. The reason why idealistic movements – whether religious or secular – show the inevitable tendency to degenerate into their own caricatures can be derived from the peculiarities of the group mind: its tendency towards intellectual over-simplification combined with emotional arousal and its quasi-hypnotic suggestibility by leader figures or belief systems. There is thus a mentality split between faith and reason, between emotion and intellect, in other words *schizo-physiology*. A hierarchic awareness of one's position as an independent holon is lost. One's personal responsibility for their actions is transcended through total identification with the collective belief system. One can act without conscience.

The paranoid streak is as much in evidence in contemporary history as it was in the distant past but more devastating in its consequences. As the record shows it is not accidental, but endemic – inherent in humanity's condition. Nothing crystallizes the differences between groups more than language. The group-estranging forces of language are active on every level: nations, political parties, ideological movements, tribes, regional dialects, the exclusive vocabularies and interpretations of the Bible, the Torah and the Koran.

The Holon as an Active Interface

Koestler's presentation is a vitally important step in the right direction. And much of MacLean's valuable work on the Limbic System has made its way into standard text books. There is more in the works however as we shall see. Most fundamental to this is the *active interface* that is the primary element in delineating the structural dynamics of how the cosmic order works.¹⁹ When Koestler speaks of the Janus-faced holon as a basic node of reality he is also speaking of the cosmic order. It applies anywhere in the universe as he points out. Koestler also says: '*The hierarchy is open-ended in the downward as it is in the upward direction.*' (p 62) This leads to infinite regress as he points out later but it also allows us to speak of holons in any given context. The question arises that because the holon suggests itself as a viable fundamental structural entity can there in reality be infinite regress in both directions? There is more to this than meets the eye because holons derive from *active interface processes*.

The top end of the cosmic hierarchy is the most fundamental end since holons are conceived to represent all phenomena. Holons concern boundary conditions between inside and outside. However Koestler's discussion of holons is generally confined to things and events in space and time even though he firmly denies that all behaviour is physically caused or conditioned either in rats, human beings or in our natural environment. The concept itself however transcends space and time. It implicitly relates to a timeless or eternal aspect of the cosmic order. This deserves close examination.

It is a fact so obvious that it goes unrecognized that we can never know the inside of something to the exclusion of the outside, or vice versa. All we can EVER know is *active interface processes* between a common inside and a common outside. We normally see active interface processes as closed surfaces consisting of organized collections of atoms and molecules. However there are also *open active interfaces* that are intimately related to closed active interfaces. They have universal characteristics according to context. We do not see the universal characteristics directly because, like holons, they do not exist as physical things in space and time. They make all primary atoms of hydrogen universally the same even though each atom is separate and distinct. They make each human being structurally the same even though each person is separate and behaviourally distinct. A species, whether it is a species of atom, plant, animal or the human species is a *universal active interface* in the context in which it specifies the structural characteristics of all of its diverse members, regardless of their behaviour.

Open Active Interfaces are Archetypes

Archetypes are open active energy patterns operating within all members of each species, like quarks confined within atoms. As open active interfaces, archetypes are not constrained by limitations in space and time. We directly recognize that all rats are both the same and different at the same time regardless of their separation in space and time. It is the same with horses, chimpanzees and people. We intuitively know this, regardless of the process by which species may have differentiated in an evolutionary tree. We can identify a particular rat only in relation to the universal archetypal pattern that is directly evident in all rats, regardless of however different rats may be as individuals. That is what we mean when we shout "There is a rat!"

We can thus say that open active interfaces are universal archetypes with respect to each particular species. We can also say it will be the same on any planet in any solar system where biological life has evolved. We can only identify a particular individual of anything in relation to its archetypal kind. Archetypes determine the physical characteristics of each species with respect to its members according to *Fixed Rules* and *Flexible Strategies*, as Koestler put it. We recognize an automobile as a Model 'T' Ford because there is an archetypal plan common to all Model 'T' Fords. The body plan is real and universal with respect to its members. It is an archetypal idea that may be inscribed on a blueprint but the idea itself is not a physical thing. The body plan is firmly fixed but individual cars may come with certain extras or in different colours that were introduced as flexible strategies of the archetypal idea that evolved over time.

The contextual hierarchies are open ended in one direction only because they elaborate in discrete levels within themselves. For example a human being is a member of a self-transcending

archetypal species as well as a member of a self-transcending culture, nation and civilization. But each person also has archetypal characteristics in their own right.²⁰ We can entertain archetypal feelings and ideas that subsume hierarchical levels going back through our evolutionary history to unknown origins of biological life early in the formation and consolidation of the planet. There is a nested hierarchical interaction and interdependence involved in the living operating field of the biosphere as a whole. The planet was somehow seeded and pregnant soon after it cooled to the point where it could support life. Like living systems, solar systems also display evidence of cyclic birth, death and rebirth. There is a self-similar structural pattern that pervades the universe.

Active interface processes are universal on a cosmic scale. We can conceive of nothing apart from them. Light emanates from atomic processes in suns. Closed surfaces on Earth such as trees and rocks reflect the light to betray themselves as physical things to retinal cells in our eyes. They in turn transmit through active interfaces at synapses in our nervous system that in turn reconstructs in our subjective minds the physical shape and appearance of the contextual things out there that we see objectively around us. The things we see do not physically exist in our minds. Our mind is our reality and it is not a physical thing. The content of our mind, the reality that we see, has transient moment to moment characteristics that we timelessly integrate as a whole to lend the transience integrated meaning. We perceive meaningful continuity through the perpetual change of circumstances.

The whole nested hierarchy that we actively perceive is integrated through the subsuming characteristics of *a unique open active interface common to the cosmos as a whole*. In other words one unique active interface generates the whole of creation by subsuming and transcending self-similar open ended hierarchies nested within it. Although it is not a physical thing it constitutes the nature of reality. There must be a single open active interface between a universal inside and a universal outside that both transcends and is implicit within the whole of creation. This is an implicit requirement for us to subjectively integrate the diversity of our objective experience into a meaningful whole. There are simply no alternative structural possibilities unless we deny our own mind and choose to believe the universe came galloping out of absolutely nothing on Aristotle's runaway horse.

Call the primacy of a universal active interface what you will. Language cannot define its character because the cosmic order that derives from it defines the roots of meaning implicit in all language according to context. This universal active interface must admit of both Unity and Diversity, both One and Many, both Universal and Particular. These related characteristics hierarchically pervade the universe. Koestler has named this Janus-faced characteristic the holon, but there is more to the story.

The Rift in Universal Wholeness

We have seen that Universal Wholeness requires that the only boundary condition possible is a universal active interface between a universal inside and a universal outside, neither of which can ever be known to the exclusion of the other. We see events with characteristics of space and time that derive from creation, not vice versa. We cannot assign boundary conditions in the

universe to either space or time without begging the questions “What is beyond that?” or “What was before that?” Space and time can have no independent existence. So all we can know is active processes occurring across a boundary or interface between a common inside and outside. This fact of creation is universal.

There is a catch however because the primacy of a Unique Universal Active Interface does not allow of “other than Self.” If there can be no Being apart from Universal Being there can be no phenomena in experience. We know from our own experience that this is not so. This requires that the One Universal Active Interface must allow of a Particular Active Interface that represents Many. The Rift in Universal Wholeness that results *must* be mended. In order for Universal Wholeness to maintain its holistic integrity the Universal Interface must transcend and subsume the Particular Interface. This means that there is a common Universal interface within all Particular interfaces, just as each species is universally evident within all of its members. The age old discussion of Universal and Particular revolves around this structural reality that is implicit in all phenomena.

There are two orientations between the Universal (interface 1) and Particular (interfaces 2) possible, ONLY two. They are called System 2. They neatly correspond to the Janus faced holon. The objective (self assertive) orientation is illustrated in Figure 1.

Because active interfaces share common active centers they are called Centers to make talking about them less cumbersome. Center 2 looks out to others of its kind that share a common Center 1 within.

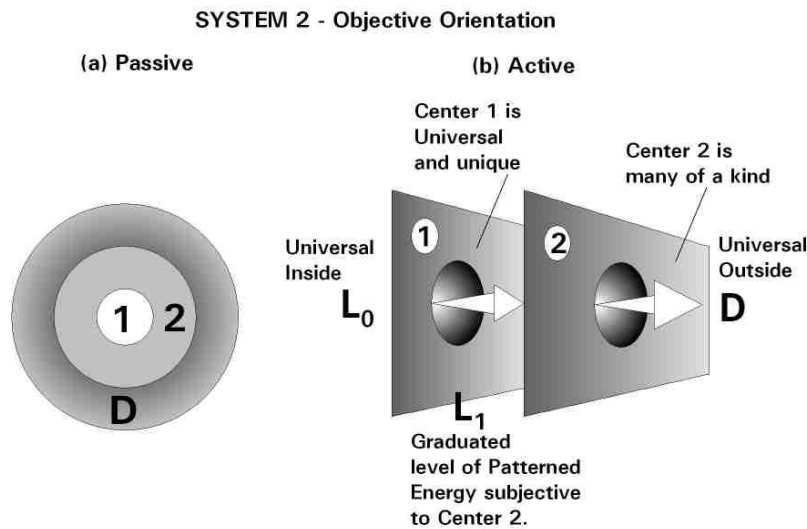


Figure 1

The subjective (self-transcending) orientation is illustrated in Figure 2. In the subjective orientation the Universal Center 1 and Particular Center 2 are coalesced together as ONE to preserve Universal Wholeness. This can occur with only One of Many Particular interfaces at a time, that is, one person at a time. In fact it is a timeless realization that transcends space and time. Consistent with Koestler’s holon each person can become independently captivated by a

self transcending universal ideal, religious dogma, nationalistic cause, or whatever. This verbalized intellectual identification of oneself with an emotional timeless “cause” rooted in the limbic system allows the individual to act without conscience toward others in order to realize the cause.

SYSTEM 2 - Subjective Orientation.

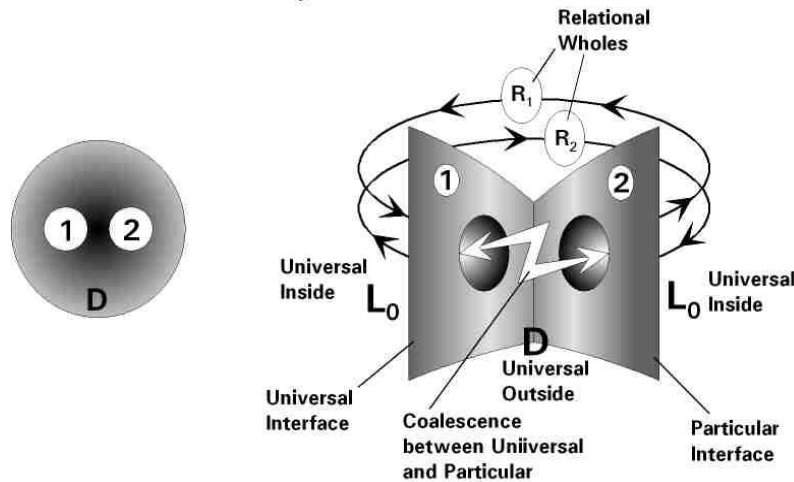


Figure 2

The screams of Hitler galvanized the mainstream population of One particular nation (center 2) that identified with him (center 1). As the universal father of the Nazi self transcending ideal (center 1) in Figure 2 he was behind the self-assertive face in Figure 1 invading other particular nations (centers 2). The transcendent relationship of individual people to the human species was subverted to the Nazi ideals of the nation. For many people this satisfied a quest for Unity that is so important to everyone everywhere. The communist manifesto was no less brutal in its willingness to inflict human suffering to realize a unifying ideal. It is a common pattern throughout human history. It was evident in the brutality of the slave trade and in genocidal practices against the Native Americans. It goes on today.

Three Active Interfaces in System 3 define the subsumed level of physical form

There are *only* four possible ways that three active interfaces can mutually interact with respect to a universal inside and a universal outside common to each interface. Because there are three active interfaces it is called System 3.²¹ Each way defines what is called a Term such that there are two Universal Terms that are alternate modes of a Unique Set of three centers and two Particular Terms that represent any number of Particular Sets. For example the Particular Sets can represent all the primary hydrogen atoms in the universe that share a common relationship to the Unique Universal Set. Consistent with an elaboration of System 2 above they interact in alternating modes with the Universal and Particular terms coalesced together in each mode. Words can be assigned to describe the three hierarchically ordered active interfaces in the open Universal Set: *Idea(1) → Routine(2) → Form(3)*. We know there is always a *Routine* of activity

that gives *Form* to an *Idea*. Illustrated in Figure 3 is a subjective orientation (below) alternating with an objective orientation (above). (see reference 16)

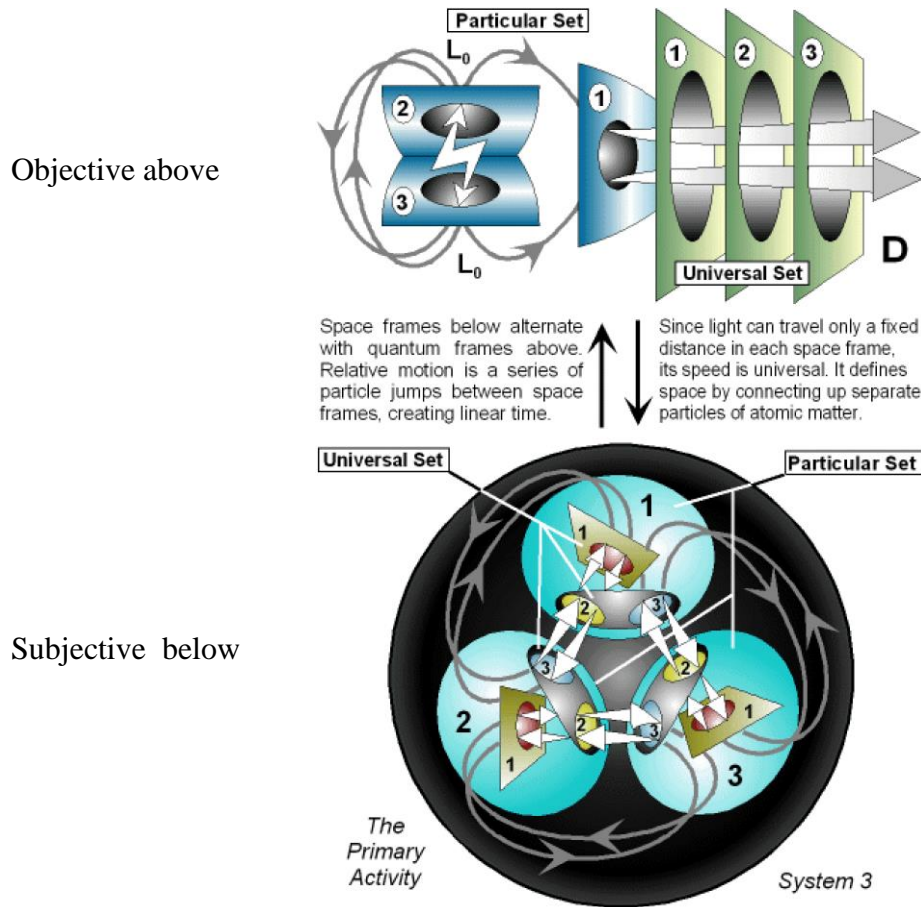


Figure 3

The three Particular Centers are *mutually closed Active Interfaces* with spherical surfaces as represented by the large blue ellipses in the subjective orientation below. In primary hydrogen atoms Centers 1, 2 & 3 represent the closed photon energy shell, the electron particle, and the proton particle. The *Idea(1)* of the whole atom is implicit in the closed Photon energy shell. The *Routine(2)* is implicit in the orbiting electron. The center of physical *Form(3)* is implicit in the proton. The Unique Open Universal Set is confined within them like quarks and tunnels through them to intimately link them together in pairs. It does this synchronously for every primary hydrogen atom in the universe at once. It can do this because it does not exist in space and time and it is not constrained by the limitations of space and time. Atomic structure, space and time, have been explored by the author in other articles.²²

In the objective mode above, the Particular Closed Interfaces invert and become Open Interfaces within the One Open Universal Set. The open Electron and Proton interfaces coalesce as one, as indicated by the “Z” shaped arrow in the Particular Set. This reconciles inside and outside as one with the Photon Interface. They become mutually balanced and spatially indeterminate quantum

Photon energy equivalents of each physical atom. Collectively all such open Photon energy equivalents constitute the Unique Universal Photon Interface (center 1) in the One Universal Set. This is called the boundless and timeless Void. It is a boundless Unity without specific forms of any kind, thus preserving Universal Wholeness via the creative process. This is the objective of creation. The Void is orthogonal to the integrated fabric of space and time. It is associated with mind and the recall process on a hierarchy of levels. It is a master sensorium or memory bank. A new Quantum Relativity emerges naturally from this structural approach.²³ The quantum equivalent of atomic particles is the Conjugate Energy Equivalent of the wave function which is why the wave function must be squared to get a result in particle accelerator experiments.

Triadic relationships between three active interfaces are *always closed in the subjective mode* and open in the objective mode. For example the Cells and Organs of each Host human being are in a mutually closed intimate subjective relationship. The existence of each has a specific closed shape or surface that is clothed with molecules that we can see and identify with respect to the universal human species. The same is true of any multi-cellular plant or animal. This has been explored in other articles by the author.²⁴ Closed triadic relationships come into play in many ways and each has an open quantum equivalent that is a timeless and formless element of memory in the orthogonal Void.

In the human brain the triad is clearly distinguished between the intuitive right hemisphere, the language dominated left hemisphere, and the emotional limbic brain. The right brain that integrates *Idea(1)* as a whole is fueled via the emotive *Routines(2)* of the limbic brain for expression in explicit *Forms(3)* of thought and behavior. This is elaborated on by System 4.

Four Active Interfaces in System 4 elaborate on Biological Processes

There are only nine possible ways that four active interfaces can mutually interact with respect to a common inside and outside. They define a matrix of nine interacting Terms that are generated from five Sets of four active interfaces or Centers. There is a Primary Universal Set and a Secondary Universal Set, each with its own repeating Term transform sequence. The Universal Terms cohere together to regulate three Particular Sets that transform through a repeating six Term sequence, one transform Step apart. Since Particular Terms have Regenerative modes as well as Expressive modes there are twelve transform Steps in each Particular transform sequence. How this structural dynamism works has been outlined in various articles.^{25,26} It was first introduced in the author's book *Fisherman's Guide* in 1985.²⁷

The coherently integrated transform sequence of the two Universal Sets repeats every four Particular transform Steps, so that it takes three such four-Step Cycles to complete the twelve Step Particular transform sequence. Names can be assigned to each of the four active interfaces that define the Primary Universal Hierarchy of System 4. (Active interfaces are also assigned numbers.) As an elaboration of System 3 a Knowledge active interface is distinguished from Idea such that *Idea(1) → Knowledge(2) → Routine(3) → Form(4)*. We know that there is always an integrating *Idea(1)* that directs *Knowledge(2)* that directs *Routines(3)* that result in a mental or physical behavioral *Form(4)*. An Idea to build a house directs Knowledge on how to do it that directs the Routines of behavior that results in the physical Form. The creative process works this

way. Always. The four words must be interpreted in context however. They are not absolutes unto themselves. In a human being the *Idea* of the *Host* individual directs the *Knowledge* implicit in interdependent *Organ* systems that direct the *Routines* of *Cells* that give each person physical and behavioral *Chemical Form*.

The Primary Universal Set relates to the human species. The Secondary Universal Set relates to a specific Host human being. They cohere together to constitute the archetypal pattern of each person in such a way that the Particular Sets transform from Term to Term, synapse by synapse, through the nervous system to animate each of us according to circumstantial context. The human nervous system has structurally evolved to work in just this way. The archetypal pattern is prescribed by the Primary Universal Archetype of the species. This has been demonstrated in two advanced articles on the human nervous system, one on Spinal Integration²⁸ and one on the Cerebellum.²⁹

It will be sufficient for purposes here to illustrate the Primary and Secondary Universal Terms in the four repeating Steps of each Cycle. The complete Universal Integration of Human Experience is illustrated in other articles.^{30,31}

Step 1 of each System 4 Cycle

The Primary Universal Set is the universal hierarchy Term 9 that prescribes the 4 Step sequence of each Cycle. In Step 1 it assimilates the integrating Archetypal Idea (interface 1) of each Host human being. The Secondary Universal Set in Term 3 is the Transference of Idea into Form. It relates the Idea(1) of a human Host to molecular Form(4) through the coalescence of Knowledge(2) implicit in Organs with the Archetypal Routines(3) of Cells that constitute the complement of Host Organs. The coalescence is represented by the white arrow. Because Term 3 coalesces Idea inside with Form outside it has timeless characteristics that can access appropriate quantum energies from the Void. Note in Figures 4a and 4b that all centers are open so that any specific Term 3 human Host is synchronously assimilated with the species prescribed by the Primary Universal Set in Term 9.

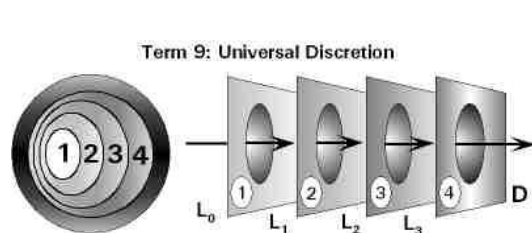


Figure 4a

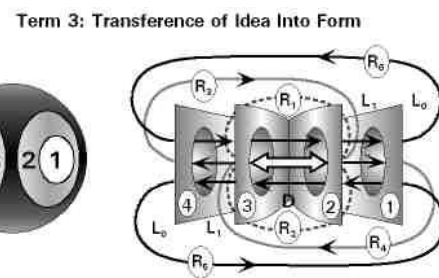


Figure 4b

The left side of each diagram is the passive representation. It may help to visualize the active representation that links the active interfaces with patterned energy flows shown with arrows in all possible ways. There is meaning implicit in each linkage relationship, designated as R1, R2, R3, etc.

Step 2 of each 4 Step Cycle

In Step 2 of each Cycle Term 9 does not transform. It advances from the *Idea(1)* active interface to the *Knowledge(2)* active interface which concerns the *Knowledge* implicit in the interdependent *Host, Organ, Cell* organization common to the human species. The Transference of *Idea* into *Form*, Term 3, transforms into the Corporeal Body, Term 6, as illustrated in Figure 5b. In Term 6 we see that the closed intimate triadic relationship between *Host(1)*, *Organs(2)*, and *Cells(2)* of each Human Being is realized in physical *Form(4)*, since the archetypal pattern of the triad *Projects* via P1, P2, and P3 through the open interface of molecular *Form(4)* shared with the biosphere and beyond. In other words the intimately linked triad is independent from the molecular *Form* of the body yet its archetypal energy patterns orchestrate the chemistry of *Cells* and *Organs* that make up the physical human *Host*.

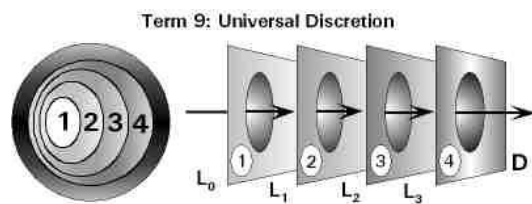


Figure 5a

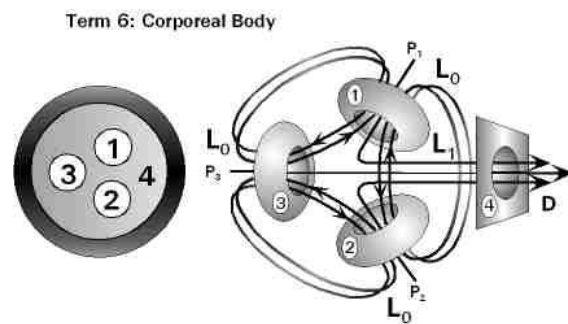


Figure 5b

In Step 2 many parallel Particular Sets acting through parallel neural and muscular pathways enact a coherently integrated Term 5 action sequence planned in a previous Cycle. The Particular action sequence was coherently planned by the Universal Sets as we shall see in Step 4 for the next action sequence in the next Cycle. The corporeal body in Term 6 thus responds as an integrated whole in each Particular action sequence. The action sequences are learned from jerky actions in the crib to smooth performances as we mature.

Step 3 of each System 4 Cycle

In Step 3 of each Cycle the Primary Universal Set transforms from Term 9 to a Regenerative mode of Term 8 illustrated in Figure 6a. The secondary Term 6 does not transform as illustrated in Figure 6b.

Term 8R: Balanced Feedback

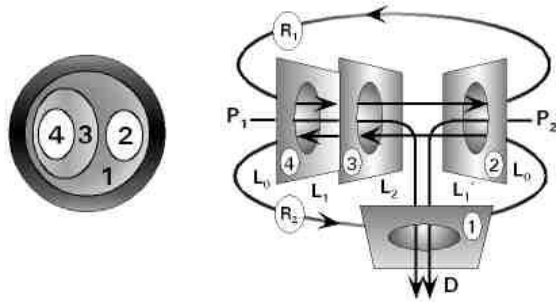


Figure 6a

Term 6: Corporeal Body

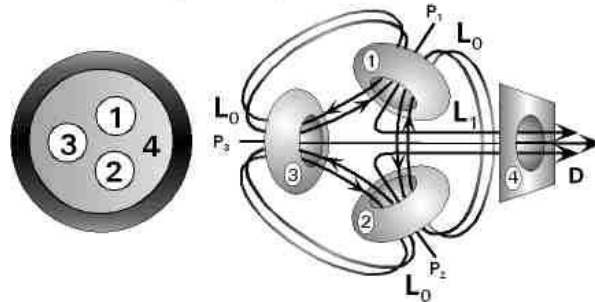


Figure 6b

Note in Term 6, Figure 6b, that the Host(1) individual, their Organs(2) and Cells(3) are in a mutually closed intimate triad that is self-similar with the subjective mode of System 3 in Figure 3. This triad however operates within the open active interface of Chemical Form(4) that is common to the biosphere of the planet. System 4 is nested within System 3 that prescribes atomic matter. In other words the triad represents the archetypal energy pattern of the human individual that orchestrates its own chemical clothing within the ecosystem of the planet, as indicated by the Projections P1, P2 and P3. It is this triadic energy pattern operating behind or within the physical environment that has evolved up through the hierarchical levels, anchored to the quadruped limb structure of the reptiles, lower mammals, to higher mammals to humankind. Chemistry cannot mindlessly orchestrate this magic by itself.

Note in Term 8R, Figure 6a, that the counter-current Relations R1 and R2 relate chemical Forms(4) to Organs(2) across the open active interface of Cells(3), all within the open active interface of the Host(1). This budgets the resources of chemical Form(4) within Cells(3) to the distributed needs of Organs(2). A balance is attained between the resources of chemical energy Forms in Cells with the needs of Organs within the context of the Host's needs. The balance is represented by the Projections P1 and P2. Together this P1 and P2 balance *each* of the Projections P1, P2 and P3 in Term 6. All the active interfaces are open in Term 8R so that all Cells(3) subjectively manufacture their chemical Forms(4) in an objective relationship with the Organs(2) to which they belong according to demands of the Host(1). Together these archetypal energy patterns subjectively constitute the open Host(1) species, whether it is the human species, or a horse species, or whatever. The species dictates the archetypal pattern.

The countercurrent relations R1 and R2 in Term 8R balance universally open Centers that do not exist as physical things. Since they are not constrained by the limitations of space and time R1 and R2 tunnel through and intimately link in pairs the closed interfaces of the triad in Term 6, in a self-similar way that the Universal Set does in the subjective mode of System 3 in Figure 3.

This aligns the Primary Universal open Idea(1) of the species in Term 8R with the open chemical Form(4) of each member of the species in Term 6. All humans thus have a self-similar molecular structure, as do all members of any species. We identify each creature as a living Idea(1) defined by its species.

Step 4 of each System 4 Cycle

In Step 4 the Primary Universal Set in Term 8R does not transform. The Secondary Universal Set in Term 6 transforms to invert its triadic relationship with respect to the Open Interface of chemical Form(4). Chemical Form(4) is now within or subjective to the closed Cells(3) in their intimate relationship with the individual Host(1) and their complement of Organs(2). This means that the chemical resources of all Cells(3) in a specific human being are equitably distributed as they relate to the needs of each Host(1) human being with respect to their complement of Organs(2) involved in a specific action sequence. The action will be enacted by Particular Terms 5 two transform Steps later.

Term 8R: Balanced Feedback

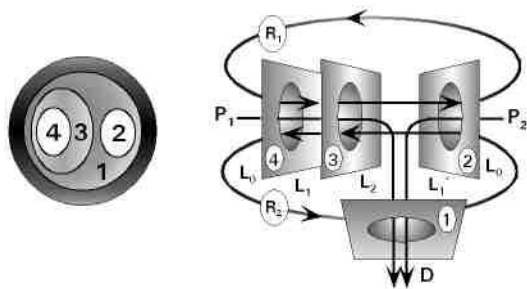


Figure 7a

Term 2E: Creation of Idea

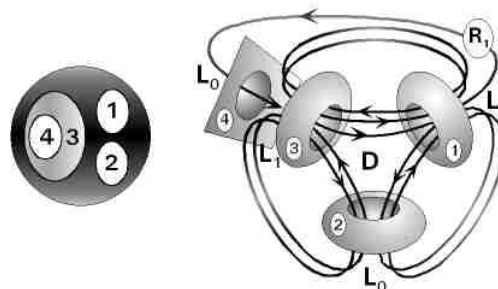


Figure 7b

R1 and R2 of the Primary T8R Term tunnel through and intimately link the closed active interfaces of the triad as in Step 3. In this case however, the triad represents a specific integrated action pattern aligned with the Primary Universal Archetype of the Host(1) species. The planned action sequence is the R1 Idea in the Secondary Universal Term 2E (Figure 7b) that will be physically enacted in Step 2 of the next Cycle by synchronous Particular behavior Terms in many parallel Particular Sets in a specific human individual. The patterned funding and distribution of the energies needed is dictated by the mutually coherent archetypal patterns of the two Universal Sets in Step 4 of each Cycle.

Figure 7b is a *closed subjective orientation* of a specific person integrating a specific *creative or behavioral* Idea represented by R1 superimposed on the triad. We are free to create ideas as we subjectively desire, according to how we individually chose to integrate our experience consistent with our resource capacity to do so. This Figure 7b closed idea R1 is subjectively entertained. It can be a *self-transcending Ideal* that regulates the activity of the Particular Sets in a specific human Host. It determines the integrated action sequence of the Corporeal Body (Term 6 in Figure 5b) that follows two Steps later in Step 2 of the next Cycle.

In Step 2 of the next Cycle a Particular Expressive action sequence occurs via the neural musculature. The Corporeal Body Term 6 relates objectively outward through its physical Form(4) as the *self-assertive face* in concert with the Primary Universal Term 9. The structural substrate of Arthur Koestler's Janus-faced holon is implicit in these two orientations, one *self-transcending* and one *self-assertive* of the Secondary Universal Set.

If the individual chooses to override the Primary Universal Host(1) of the species in Term 8R by personally identifying, not with our common humanity, but with an extreme political, religious, ethnic or other ideal or transcending 'cause,' then the patterned energies funded by projections P1 and P2 of Term 8R will reflect the person's emotional commitment to the extreme ideal, represented by R1 in the Secondary Universal Term T2E. Their natural human conscience will be subverted to the service of a runaway horse. We have free will in this respect. (The four Steps of each Cycle keep repeating).

Koestler, however, related the two faces of the holon to the split between the primitive emotional limbic system and the intellect of the new brain or neocortex, empowered with language. The triad indicates there is more to the way emotion and intellect interact. There are three independent yet mutually related closed boundaries involved. This requires that there must be another split in brain function that accounts for aberrations of behavior that are peculiar to humanity. The evolution of language has polarized the function of the neocortex into two distinct yet mutually related minds, as we shall see. But first a brief look at how the Particular Terms relate will be helpful.

The Polar Relations of the Six Particular Terms

As mentioned the three Particular Sets transform through a sequence of six Particular Terms. The three Sets transform from Term to Term one Step apart in a repeating sequence. Term 7 is the memory Term. It is tensionally coupled to sensory input in Term 4. The sequence of Term transformations recalled is the inverse of the number 7, which is 1,4,2,8,5,7 repeating. This means the Terms 8, 7, 4 alternate with Terms 1, 2, 5. The structural relationships between the active interfaces within each Term implicitly defines the basis of meaning which has a dynamic relationship to the meaning defined in each of the other Terms. Each Term transformation conforms precisely to a synapse in the integration of the whole nervous system. The human nervous system has evolved to work in precisely this way. The six Terms dynamically integrate meaning that is contextually understood in three polar pairs that relate to our three brains. The numbers in the following text refer to Figure 8.

One polar pair provides insight into the *Potential Dimension* of experience via the right hemisphere. For example the potential of a specific **creative idea(Term 1)** has a polar relationship to the person's **resource capacity(Term 7)** to realize it. They may have an idea to sprint for a mile but they intuitively know from memory they do not have the resource capacity to do it. They may have an idea to buy or build a yacht or an airplane but they intuitively know whether or not they may have the resources to make the potential idea a physical reality. A person may also identify with the Idea of a social movement that depends upon popular support of a portion of the population.

The second polar pair provides insight into the *Commitment Dimension* via the left hemisphere. A person's commitment to a **specific behavior(Term 5)** can only be assessed in a polar relationship to **social organization(Term 4)** in the social context. A person may have a commitment to feed their family but they know it is not legal to rob a convenience store to do it. They make their commitment to a job and earn the means to feed their family by making a contribution to our collective social organization. If they commit to building a small airplane as a hobby they will need suppliers of plans and materials in the social marketplace. One can also identify with an exclusive social movement that can be anti-social in the larger context of humanity. Terrorist actions are becoming commonplace.

The third polar pair provides insight into the *Performance Dimension* via the limbic system. The limbic system **fuels the energy Resources(Term 1)** to develop a *potential* idea and make a *commitment* to act on it, but it also assesses the whole performance by **emotional feedback(Term 8E)**. A person can be emotionally satisfied or dissatisfied with the result. A man may have an emotional desire to build a small airplane that becomes his guiding vision(1) that leads him to check out sources(4) and decide on a specific plan(2) that he is satisfied with(8) and commits to(5). He learns from his creative efforts and it is committed to memory(7). When his project is finally finished he will emotionally assess(Term 8E) his degree of success with respect to the emotional germ that was his guiding vision(Term 1). We seek emotional balance whether our commitments are socially acceptable or not. A thief may be happy to get away with a robbery. The policeman may be content to catch him.

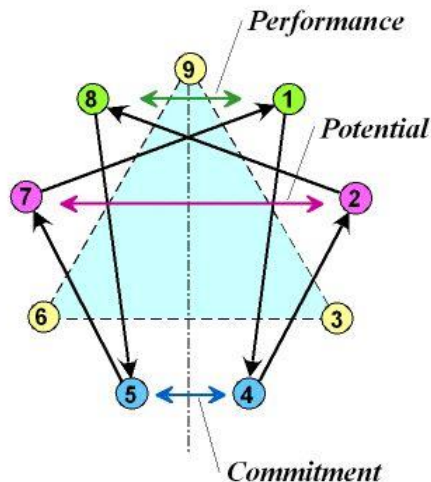


Figure 8.

We find that both Universal and Particular Term transformation sequences indicate there is a split between right and left brain function. This brings us to the experimental work done on split brain patients. Our *self-assertive* face is our left brain commitment to behavior. Our *self-transcending* face is the right brain potential or integrating ideal that guides us. Both are fueled and performance assessed by the limbic system.

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