I

Spirit of the Beehive

Hermetic Resonances in Cybernetics, AI & Cyberspace

Esoteric Machines

In what now seems a prescient description of a planet reticulated with computer networks, Oswald Spengler provided this description of the machine in his *The Decline of the West* (1918):

Machines become in their forms ever less human, more ascetic, mystic, esoteric. They weave the earth over with an infinite web of subtle forces, currents, and tensions. Their bodies become ever more and more immaterial, ever less noisy. The wheels, rollers and levers are vocal no more. All that matters withdraws itself into the interior. Man has felt the machine to be devilish, and rightly. It signifies in the eyes of the believer the deposition of God. It delivers sacred Causality over to man and by him, with a sort of foreseeing omniscience is set in motion, silent and irresistible.¹

Writing at the turn of the century, it is not at all difficult to imagine that Spengler was seeing way beyond his times and describing the metamorphosis in the nature of machines at the end of the 20th century, when the era of ‘information technology’ is popularly regarded as having superseded the era of heavy industry and its attendant technologies.

What has Spengler’s description of mystic machines have to do with computers or computer networks? While it is difficult to imagine a steam engine, coal furnace or turbine as ‘mystic, esoteric’ objects, I would say that this is certainly not the case in regard to present manifestations of information technology. It is possible to regard the dream of Artificial Intelligence, Artificial Life or the cybernetic web of communication devices both on and off the planet as ineluctably connected with a mystic, esoteric worldview.

Entertaining for the moment the idea that Spengler was indeed a visionary (if only as a relatively harmless *Gedankenexperiment*), the idea that the machine has become increasingly immaterial, its *raison d’etre* ‘withdrawn into the interior’, is singularly apposite in regard to what may well be the most important postmodern mythologem, the computer. Although the machine I am using to write this dissertation is undoubtedly a material object (we shall not go too deeply into the implications of the meaning of ‘material’ just yet), its function, its *meaning* as an object lies purely within the realm of ideas. Paralleling the ghostly *cogito* of Descartes, it is this invisibility of its functioning -- the ‘transformation of information’ -- that distinguishes the essence of the computer from any one of its particular physical manifestations. It engenders an attendant set of ideas such that we may legitimately regard the
computer as a mythologem central to a contemporaneously developing mythology. This mythology has its own special world ('cyberspace'), its guardians (the Rand Corporation, DARPA), it's ne'er-do-wells ('hackers') and a plethora of secret handshakes, protocols, heroes and villains.

In this chapter I want to explore the provocative morphological shifts within the 'imaginary of the machine' occasioned by the creation of the computer and consequently connect this to a central mythologem of the Hermetic tradition, the *anima mundi*. The essential nature of a computer -- *any* computer -- is an idea; an idea the history of which can be dated from about the mid-17th century. Although the idea of the computer essentially derives from this period, few of its original proponents (Leibniz or Pascal for example) could have imagined the great changes such an idea would occasion in the imaginary associated with the machine. From a physical object the very definition of which lay within the realm of Descartes' *res extensa*, the machine in the form of the computer is now envisioned as a virtual simulacrum, an object the operations of which lie within the liminal region between the physical and the intellectual. Computer scientist Frank Tippler describes the computer as an exact 'emulation' of an 'ideal' universal computer:

An emulation is an exact simulation, an absolutely perfect copy. Everybody's computer emulates other computers, although the average person is not aware of that. In any running computer there are several computers there. All but one of them are virtual computers, perfect imitations of other computers. Writing commands into your machine, you see the physical machine, but in reality an emulation of another computer exists inside this machine. But it only exists as bits of information.

Although Tippler is probably not aware of it, his description is strongly reminiscent of Hermetic and Neo-Platonic considerations of the relationship of the One to the many; of lesser monads to the one, supreme monad. It has become a truism of contemporary computing science to consider that while the CPU (Central Processing Unit) and the various buffers etc. of Von Neumann architecture computers (*vide infra*) exist at various physical locations on the circuit board, their functioning *qua* functioning is quite literally virtual and does not occupy the 'physical' space of the machine. The imaginary of the contemporary computer therefore recapitulates such conceptions as Leibniz' metaphysical monads.

The history of the idea of the computer contains within it a central, seemingly inexorable 'slippage' concerning the very notion of computation: once considered a capability purely and uncontestably human, the notion of computation seems now to have fallen squarely within the province of the machine. What would have once seemed a kind of Rylean 'category mistake' has now, in terms of mathematical and computing science, become a truism. As most forcefully argued by mathematician Martin Davies, this theory goes so far as to state that,
previous to the idea of the ‘Turing machine’ (the essential idea behind contemporary computing devices) there was no adequate definition of computation at all, and such a definition had to wait until Alan Turing invented his now famous mechanical conception of computation. For Davies computation is essentially mechanical, with the unequivocal implication that when a human being ‘computes’, this activity is equivalent to the operations of a machine. According to this view a considerable part of what it means to be human has been given over to the machine, with the consequence that we were evidently just deluding ourselves in believing that this was a purely human activity. All along, in fact, the activity of computation was actually in the realm of the machine.

**Rarefaction of the Imaginary**

It was only in the mid-twentieth century that the idea, the dream of a universal computing device, was realised -- in the form of John Von Neumann’s *Eniac* (1945), the first stored-memory serial digital computer. From this computers first instantiation, the 19th century concept of a machine the functioning of which was determined by the transformation of mechanical energy -- thermodynamic, hydraulic, *big piston* power -- was irrevocably pushed to the side as the esoteric, immaterial nature of the *transformations of information* came into technological consciousness.

We can push the notion of Spengler’s imagined prescience even further. In the late 20th century it appears that the advent of the Von Neumann-architecture computer was only the larval stage, as it were, of something of greater consequence: the construction of cyberspace. The vast network of interconnected computing devices has yielded the sort of omnipresent omniscience indicated by Spengler’s vision of late Faustian machinery. How was it that he could have been so close to describing the contemporary nature of things from so far away? The explanation can be found in an examination of the imaginary that early produced intimations of future technologies.

Already in Spengler’s era the imaginary of both machines and human communication were undergoing profound changes. Spengler’s times were witness to the adoption and/or completion of the vast network of the railway system in the developing West, a model of the ‘communication network’ par excellence. Allied with this was the consolidation of the telephone and telegraph systems. New archival systems such as the long-playing record, piano rolls and photography were becoming increasingly available to the general public, with the radio soon to follow. Telegraphs, telephones and radios were a new kind of machine -- they seemed to embody the very world of electrical fields, lightning-like instant communication between bodies and invisible matter-energy exchanges that had been described by a succession of scientists, from Faraday and Maxwell in the mid-19th century to Einstein in the early 20th. The imaginary that had been so fruitful for Sigmund Freud, drawn
from the world of thermodynamics and hydraulics, of forces under great pressure, of release
valves, vents and pistons was, even with the first publication of *The Interpretation of Dreams*
in 1900, beginning to yield to another world constitutive of an imaginary more rarefied, more
elementary, increasingly invisible.

Western consciousness, in other words, was already ‘primed’ for the appearance of the
electronic computer. With the failure of the Michelson-Morley experiment in 1887 to discover
any trace of the ‘luminiferous aether’ (thought to be the physical substrate that carried
Maxwell’s electro-magnetic waves), hope of ridding the physical description of the world of
the ‘occult quality’ of the propagation of forces across a vacuum was finally dashed -- the
conclusion being that Newtonian mechanics were simply not enough to account for material
effects. If we couple this event with J. J. Thomson’s description of the atom in 1897 as
consisting of corpuscles (later called electrons) orbiting a space the size of which was,
relatively speaking, astronomical -- the atom being mostly ‘vacuum’ -- then we find that by
the beginning of the 20th century the concept of ‘matter’ as the stuff that one could see and
touch, that was palpable and ‘massy’, had all but disappeared, or at any rate had become so
rarefied that the words use in physical descriptions necessarily acquired a considerable
ambiguity.

We observe, then, the emergence of new elements in the imaginary of the machine. An
imaginary that encompassed the dreams of the scientific/Enlightenment project, yet would cast
them in a new light. The two great 20th century interpretations of the physical world, Special
and General Relativity and quantum mechanics, the former the culmination of the classical
worldview, the latter the eclipse of this worldview, are greatly contributory to this new
imaginary. Unlike Einstein’s Special and General Relativity Theories or the revelations of the
sub-atomic world discovered in quantum physics however, the physical manifestation of the
universal computer had one thing going for it that the other revelations did not: it already had
a relatively long intellectual history such that its immediate, almost intuitive impact as a model
for human cognition was almost a foregone conclusion.

And this was not all. Proof of the computers abilities to reflect the immaterial, geometrical
evanescence of reality was quickly to come to hand. Soon after Von Neumann set *Eniac* to the
task of working on physics equations at the Los Alamos Theoretical Physics Division in
relationship to the development of the first atomic bomb, the world would hear of the results
of the first atomic test. Einstein’s depiction of reality as the product of the curvature of
‘spacetime’, of the sub-atomic constituents of matter as being an infinite but closed field of
post-Newtonian forces, had suddenly and horrifyingly become concrete.
For Spengler of course, machines were becoming ‘less human’ because they no longer seemed to embody the concept of force the origin of which is ultimately derived from the experience of human corporeality. Following his Nietzschean outlook -- the glorification of the strong, the will triumphant of the Übermensch -- Spengler disdained what we might now call the Neo-Cartesianism represented by the new technology, a technology defined by the ghost in the machine, the immaterial essence of humankind, rather than the exertions, tensions and release of levers and gears, of muscle and bone. This new imaginary is still with us, yet it is an imaginary in a problematic relationship with the object around which it constellates -- the computer, and by extension, cyberspace. Popularly the ‘cybernetic revolution’ easily accommodates the notion of a machine just as Spengler described it, but at the level of the expert this imaginary suffers some interesting convulsions.

The development of one aspect of the imaginary of the universal computer -- artificial intelligence -- is the subject of this chapter. To begin a critique of the very notion of artificial intelligence the ideas of a contemporary computing scientist will be examined in an attempt to provide [a] evidence of their place within a continuity of figuration such as is provided by the Hermetic concept of the anima mundi and [b] an examination of some recent morphological shifts within the related field of cybernetics.

**The Singularity and Big Numbers**

A recent idea in computing science has the shape of a bad joke. You see, there is good news and there is bad news. First the good news.

The good news is that by the year 2030 C.E. a greater-than-human intelligence will have been created such that all the needs of human society will be taken care of -- all technology will be optimally improved (in fact it will surpass anything that lesser human intelligence is even capable of creating), and all problems -- intellectual, societal and (I presume) spiritual will be answered once and for all.

The bad news is that we will all most likely become enslaved -- and more likely summarily destroyed -- by this same unforgiving, omnipotent cyber-intelligence.

Science fiction perhaps? Not if one computing scientist is to be believed. This future scenario has been proposed by mathematician/computing scientist and author of several influential science fiction novels, Vernor Vinge. But in regard to this particular future scenario he is deadly serious. The simultaneous apotheosis and annihilation of human culture/history will be determined by the advent of what Vinge calls the ‘Singularity’, a super-human intelligence that will come about as the result of one of four possible events, or perhaps a combination of them. His choice of the term ‘Singularity’ is employed, no doubt, to engender resonances
with the terms use in theoretical physics. In contemporary theoretical descriptions of a ‘Black Hole’, the singularity is the infinite-mass point at the centre of the Black Hole where all the known laws of physics irrevocably collapse and where time and space no longer have any meaning. Like this ‘cosmological singularity’ (as it is called), Vinge’s ‘Technological Singularity’ similarly initiates a world where all the paradigmatic modes of social, political and technological interaction break down and are erased. It is the reification of the cliché of ‘the end of civilisation as we know it’, just as a Black Hole is the destruction of reality as we know it.

The first event that will possibly lead to the Singularity is the immanent development of a computer that is intelligent and ‘awake’; in other words the fulfilment of the dream of Artificial Intelligence engineers. The second event may be that large computer networks, coupled with their human users will, by reaching a sort of combinatorial catastrophe point -- a density of information exchange -- suddenly become ‘awake’ as a creature greater than the sum of its parts. The third event is basically a less ambitious interpretation of the second: present human/computer interaction may become so ‘intimate’ (Vinge’s word) in the near future that these human users must be considered superhumanly intelligent. The fourth event, somewhat unrelated to the preceding three, is that the biological sciences may find means to greatly improve human intelligence.⁶

Vinge states that the first three possibilities depend on improvement in computer hardware, and, if we are to take the improvements in computer science over the past fifty years as any indication, then the approach of a technology powerful enough to support the Singularity is not far off (he predicts about 35 years, i.e. 2030). He recognises that AI scientists have been saying similar things about the exponential acceleration of the hardware/software equation necessary for the realisation of artificial intelligence for about the past thirty years -- and that they have been consistently (and greatly) off the mark -- so to (inadvertently, I suppose) throw his lot in with them he provides his own apocalyptic ‘useby’ date. Compressed into Vinge’s GOFAI⁷ scenario are a number of implicit assumptions, assumptions that he acknowledges only briefly when he states that those dedicated to the idea of machine intelligence assume that intelligence does not depend on a biological substrate and that algorithms are somehow essential to the existence of minds.

Central to his argument for the future instantiation of a machine intelligence is the improvement of computing power, of the ability of a computer to ‘crunch’ numbers at a far greater rate than is possible with present technology. Implicit in this requirement is Vinge’s assumption that it is the computational power of the human mind/brain that is primarily responsible for human intelligence. Attendant to this is the idea that computers are already like human minds, but like poor cousin Clem from the swamps, they are just too slow to pass an
IQ test. Leaving aside for the moment the question as to whether computers and human minds are alike in their essential computational nature, it is important to realise that Vinge (and others who believe in the immanent creation of an artificial intelligence) sees a continuum that spans from what is basically a fancy calculator (today's computing devices) at one end to an intelligent machine (the Singularity) at the other. This exponential curve is determined by computer hardware power (that is, more calculations in less time); or in prosaic terms, more is better. According to this view, greater computational power will inevitably lead to a mind.

What evidence is there that this is so? Why is it that the computational equivalent of 'critical mass' should determine a *qualitative* change in a machine? We know that certain natural phenomena, at a given level of complexity, undergo what is called a 'phase change' -- water changes to ice, for example. A peculiar aspect of phase changes is what is called 'critical slowing down': when water changes into ice, initially the change happens very fast, but then the changes become slower and slower. Contemporary theorists in both 'chaos' and information theory posit that at some level the water is *calculating* the matrix structure needed to complete the phase change, and the increased complexity of the calculations accounts for the slowing down of the process. When I referred earlier to a 'given level of complexity', the sense intended is the technical sense of complexity as the *interface between order and disorder*, the contemporary 'twilight zone' of mathematical modelling where quantitative operations somehow transmogrify into qualitative change. It should be remembered however that this transmogrification is a component of the model -- which might or might not account for the changes in the object it is modelling (i.e. other unknown factors may account for the phase change in the phenomenal object).

One of the ways in which a phase change can be characterised is that the models/methods one uses to describe the 'before' and 'after' states are different -- the methods used to analyse laminar flow are not the same methods used to analyse the lattice structure of ice, for example. Yet the manner in which one analyses the operations of a computer would presumably remain unchanged when directed at the operations of the Singularity; after all, human programmers would be responsible for its early development (according to Vinge of course that time is now) and therefore an attentive examination of the details of its software design plus a careful comparison of the before Singularity (B.S.) and after Singularity (A.S.) power out-put of the computer would presumably account for the advent of the Singularity. A new algorithm would then emerge, the significance of which would (literally) shatter research projects utilising such superseded notions in mathematical physics as Planck's Constant or Landauer's physical minimum for informatics.

Although he does not explicitly discuss it, the concept of emergent properties is one of the key factors behind Vinge's conception of the Singularity. Emergent properties are qualitative
changes in a system that appear once a certain 'critical mass' is reached. As such, the concept of emergent properties is like a 'catch all' phrase that covers all phenomena for which scientists have no explanation; at least no explanation that conforms to strictly mechanical laws. The notion of emergent properties therefore marks the liminal territory where Newtonian mechanics and biological notions of the organismic meet. In apparent defiance of the Second Law of Thermodynamics, certain systems -- particularly living systems -- seem to display an increasing order in proportion to their complexity. Signalling its import for biology, the idea of emergent properties was inherent in late 19th century observations of bee and ant colonies. No-one would grant the individual bee any great intelligence, and in fact observations of the behaviour of bee hives supports the view that the actions of individual bees is little more than a mechanical response to the necessities of the hive. Yet this swarming mass of individual drones manages to co-ordinate and sustain what is in the end a very sophisticated living system. Writer Maurice Maeterlinck, in his *The Life of the Bee* called this sustaining co-ordination the 'spirit of the beehive':

> [I]t is the spirit of the hive that fixes the hour of the great annual sacrifice to the genius of the race: the hour, that is, of the swarm, when we find a whole people, who have attained the top-most pinnacle of prosperity and power, suddenly abandon to the generation to come their wealth and their palaces...Where has this law been decreed?...Where, in what assembly, what council, what intellectual and moral sphere, does this spirit reside to whom all must submit, itself being vassal to an heroic duty, to an intelligence whose eyes are persistently fixed on the future?'

Where indeed does this systematic co-ordination come from? It certainly does not derive from the queen bee -- she apparently just lies at the centre of the hive and reproduces, and when the bees swarm and travel to another hive, she merely follows all the others. In 1911 entomologist William Morton Wheeler thought he had come up with an answer: the hive is an organism in itself, all its individual bees add up to something much greater -- a huge swarming animal:

> Like a cell or the person, it behaves as a unitary whole, maintaining its identity in space, resisting dissolution...neither a thing nor a concept, but a continual flux or process.  

This 'beingness' of the hive, its organismic nature, is something that is only present when you have a certain mass of individuals; if you try to find the 'beingness' in any individual bee, you will not find it.

Even at a less complex level than that of a bee or ant colony, the idea of an emergent property is known in engineering. If a number of dynamos are set in train, but each activated at different times, the rhythms of all the machines will be 'out of sync.' After a period of time however one finds that all the dynamos are following a single rhythm, a single pulse that did
not derive from any one dynamo. The phenomenon is called ‘virtual governance’, and is seemingly a purely mechanical example of emergent ‘behaviour.’

So it seems that, at least in fields outside computing science, the notion that some sort of qualitative change could emerge from a quantitative description of processes is well known. For a computer however, the necessity of attaining a critical computational power threshold seems to be the key. Landauer’s\textsuperscript{11} concept that there are physical (that is, thermodynamic) limitations on the power of computation is acknowledged by Vinge himself: it may well be that in the early 21st century the hardware performance curve will level out. Hardware would be extremely powerful, ‘giving an analog appearance even to digital operations, but nothing would ever ‘wake up’ and there would never be the intellectual runaway that is the essence of the Singularity,’ maintains Vinge.\textsuperscript{12} This ‘power-curve’ that maps the birth of the Singularity has a strong intuitive appeal -- an appeal, one suspects, drawn from analogy. Whatever intelligence is -- and the definition varies depending on whether one were to ask a school teacher, psychologist, biologist or computer programmer -- it surely is integral to all living things. And, in the natural world at least, intelligence is not discontinuous: there is no catastrophe point in advance of which intelligence begins and anterior to which intelligence does not exist. All living things, from the simplest uni-celled creature through the animals of the savanna to \textit{homo sapiens} are possessed of degrees of intelligence.

If one substitutes ‘psyche’ for ‘intelligence’ in the above description, one obtains a clearer perspective on the artificial intelligence project. The ‘power-curve’ of intelligence is like the continuum imagined in the panpsychic hypothesis. Everything has a ‘little bit’ of mind, and the higher up the scale one proceeds, a greater complexity comes into play and consequently more ‘mind’ is in evidence. In the light of this equivalence of conception, it seems quibbling to insist on a clear distinction between mind and intelligence. Whatever is alive is possessed of some degree of mind, and all minds are intelligent: they learn, they remember, they put that which was experienced in the past to use in the future. In the panpsychic hypothesis an amoeba does this as does an invisible electron. In the AI scenario, a thermometer displays intelligence to a lesser degree, but equal in kind, to a Cray super-computer. Like a computer or living being, a thermometer reacts to an outside stimulus (heat), and adjusts its internal equilibrium accordingly. It is this internal adjustment in response to external stimuli that is the essence of ‘life-like’ responses in the eyes of AI researchers.

In the AI project, just as in the pansyicon view, life and psyche become equivalent. Mind, then, becomes a transcendental principle simultaneously overarching and entirely interpenetrating the phenomenal world.
This conception was early adumbrated in the *Hermetica*, where the divine nous was represented as the distinguishing ground of the visible world:

Who is more visible than god? This is why he made all things: so that through them all you might look on him. This is the goodness of god, this is his excellence: that he is visible through all things. For nothing is unseen, not even among the incorporeals. Mind is seen in the act of understanding, god in the act of making.\(^{13}\)

Leaving aside the demiurgic aspects of this quotation (‘god [is seen] in the act of making’), if ‘mind (nous) is seen in understanding’, then it becomes clear that a particular concept of mind informed Hermetic philosophy: psyche was all pervasive; for it was evident to the Hermetic philosopher that ‘all things’ display some degree of understanding. Further elaboration of this concept led to the notion of affective resonance between all things in the world: the philosophy of ‘correspondances’ so beloved of Agrippa. In the Hermetic view there existed a global ‘understanding’ constituted by the correspondance of all things with each other.

Preceeding the initial quotation above, *Corpus XI* states that the entire universe is like thoughts within god. The text furthermore encourages the Hermetic philosopher to ‘make himself equal to god,’ and provides keys to accomplishing this task:

Make yourself grow to immeasurable immensity, outleap all body, outstrip all time, become eternity and you will understand god.\(^{14}\)

This passage has unmistakable resonances with Vinge’s own description of his omniscient Singularity. It too, would demonstrate an intellectual ‘immeasurable immensity’, immeasurable because its capacities would be far beyond the ken of lesser humankind. Vinge states that the ‘essence of the Singularity’ is the fact that it will be an ‘intellectual runaway.’ In this respect it is the perfect answer to the call expressed in *Corpus XI*.

Vinge’s Singularity resembles Ficino’s understanding of the Hermetic Adam as described in the *Pymander (Corpus I)*. Ficino notes the similarity between the *Pymander’s* description of the creation of the first being and the account in *Genesis*,\(^{15}\) but he goes further than an orthodox reading of *Genesis* would allow when he states that the Hermetic Adam is possessed of the same creative powers as his creator. As Yates describes Ficino’s conception,

This Egyptian Adam is more than human; he is divine and belongs to the race of the star demons, the divinely created governors of the lower world. He is even stated to be ‘brother’ to the creative Word-Demiurge -- Son of God, the ‘second god’ who moves the stars.\(^{16}\)
The Singularity too would be possessed of the same creative powers as its creators (that is, computer scientists); it surely would be modelled after human cognitive capacities, but would exponentially outstrip them, becoming (as Vinge clearly imagines), a 'second god.' It is this hyperbolic, apocalyptic imagery that distinguishes Vinge's Singularity from the careful, measured ideas and hopes of his AI scientist peers. And it is his insertion into the machinic imaginary of a hyperintelligence that represents the 'vanishing point' on the great curvature of psyche that marks his vision as an unheralded eruption of the Hermetic worldview into the AI research project.

That which makes the AI view of the psychic continuum different from the Hermetic conception is any assumption that the curve is also a mapping of computational ability -- this is an assumption made only by AI enthusiasts. For Vinge and his fellow AI thinkers, the challenge is to find the Cartesian point on the curve where a mind 'kicks in' because of a quantifiable, digital complexity.

Virtual Mind
Reading Vinge's thoughts on the Singularity, one could easily get the impression that 'hardware power' is all that is really needed for this cybernetic Frankenstein's monster to emerge. Yet we can take it for granted that software design is a concomitant in this creation, for all GOFAI dreams have their foundation in this software/hardware operational duality, the architectonic for the Artificial Intelligence research project since John von Neumann's equating of computers and brains in the late 1940's. The essence of this duality is simple: a mind/brain, like a computer, is a program run on a physical substrate.

Software is basically a series of linked algorithms designed to sort input to appropriate output. Hardware is the physical base that supports the running of this software program. The upshot of this is that minds/brains do not have to be the product of carbon-based life-forms (animals), but can presumably be 'run' like software on any appropriate 'platform', including a computer. And a computer does not have to be a machine composed of integrated circuits powered by electricity (as indeed they are now), but can in theory be created from any material base capable of mimicking the operations of a Universal Turing machine (William Gibson and Bruce Sterling in their novel *The Difference Engine* depict an alternative 19th century in which Babbage's 'Difference Engine' [a mechanical computing device] is powered by steam, for example). The importance of software design in AI is made clear by recalling the early influence of the computer metaphor in modelling the mind.

The most influential psychological project of the 20th century, behaviourism, benefited greatly from its historical proximity to the creation of the first serial digital computer. Its methodology was essentially derived from the operations of a computational device: animal
behaviour was the result of sensory 'input' going into a 'black box' (the mind/brain) and being matched to appropriate 'output' (the observable behaviour of the animal). In strict positivist fashion, no debate was entered into concerning what happened to the sensory information once it was inside the black box of the mind/brain, only the correlation of input to output was significant and scientifically justifiable. The AI project was born of the realisation that without a theory of what was happening inside the black box, true scientific understanding of the mind/brain was impossible. GOFAI theory eventually emerged in all its simplicity -- software engineering was the theory of the mind/brain. If you could write the software for a mind, your theory of mind was the very program itself.

Proponents of GOFAI generally hold to what has been called the 'functionalist' approach to modelling/making\(^{17}\) a mind. In this view, software is the *virtual structure* that governs its material instantiation. This virtual structure is wholly algorithmic in nature, and could in theory be run on any appropriate device; it is the 'shape' of the software that produces the overall *gestalt* of a mind. A functionalist would hold, for example, that it is not the *appearance* of a tornado that allows us to recognise it for what it is, but that its virtual structure (its program) allows us to infer the presence of the phenomenon. The 'tornadoness' of the tornado is the result of a certain set of instructions that govern its material substrate. In the same way software, the programme of the mind/computer, is the *virtuality* that gives the *actuality* of the hardware its function as a mind/computer.

The essential problem with this canonical functionalist description of the software/hardware operational distinction is that it is totally arbitrary. At the level of the mechanical device itself, the program is isomorphic with the logic gates that instantiate it. Any given 'bit' of information is realised in the physical description of the device. At this level, making a distinction between what is actually (the logic gate) and what is virtually (the logical operation) is superfluous. The problem is that this distinction is too often regarded as a difference in kind rather than the operative convention it really is. Yet the degree to which this conception is defended within the AI project reveals, one suspects, the continuing force of Hermetic panspsychic notions. Like proponents of functionalist theories, the Hermetic philosopher regarded all things as being potentially capable of revealing some degree of mind. A rock or magnet may be besouled just as a more 'animate' creature clearly is. A functionalist believes that it is a particular structural organisation within a system that constitutes mindfulness, it is an abstract specification (like software) that may in theory be instantiated in any number of heterogenous materials.

**The Intelligential and the Actual**

The idea that science presents a model of reality rather than explores its essence is a very recent innovation. Jacques Le Goff believes that the modern period only really began in the
mid-19th century; it is perhaps no coincidence that Emile Meyerson states that the final rejection of metaphoricity in scientific descriptions occurred in the same period. It is within this time-frame as well that we witness the rise of the idea of scientific ‘modelling.’ The recognition that a scientist ‘models’ reality, rather than discovers its essential nature is the result of the rejection of the metaphysical tradition in philosophy and the beginnings of the attempt to systematise a positivist programme for the exact sciences. It is also an explicit rejection of one of the strongest characterisations of the medieval worldview, claiming, in effect, that there is no ‘language of nature’ written into the fabric of things by God, the decoding of which is the natural scientist’s prerogative.

In the contemporary AI project however we unexpectedly find a generally unacknowledged return to the pre-modern(ist) natural scientific outlook. A number of interconnected ideas support this reading. Firstly, there is a return to a discussion of the virtual/actual distinction in the form of the hardware/software duality. This is a distinction that, until its recent computer science ‘reincarnation’, has been absent from philosophical debate since at least the time of Kant. Not only has the distinction returned as an explanatory principle, but it has returned in its original form.

Under the influence of the Platonic conception of the division of the intelligent and phenomenal worlds, Scholastic philosophers considered that the virtual was more real than the natural, phenomenal world. In fact, the virtual was the Real. Before its quite recent rise in popularity (owing to the hold on the popular imagination of the idea of ‘Virtual reality’), the word ‘virtual’ meant something not at all real; something approaching the real, but never quite attaining it. This ‘process’ aspect of the virtual was quite absent from its original use: the phenomenal world in all its transitory becoming was an illusion, and the virtual was the unchanging, incorruptible Being of reality. Functionalist theories operate on a similar level when they privilege the virtual, algorithmic software over and above the particular hardware in which the software operates.

In terms of AI, the return of the virtual/actual distinction could not be more dramatic in its striking resonance with Hermetic conceptions. The fact that AI attempts to make or ‘model’ a mind, a psyche, significantly distinguishes it from all other ‘computer driven’ projects. Just as in the Hermetica, mind or nous has once again entered centre stage.

Implicit in both the advent of Vinge’s Singularity and the AI project is the idea that the virtuality of algorithmic software is embedded in the actuality of the hardware of computational devices and that an isomorphic relationship obtains between them. This isomorphic relationship is like that obtaining between Platonic conceptions of the relationship
of the intelligential to the phenomenal. Without the primary, intelligential objects -- the *virtual* Ideal Forms -- the actuality of the phenomenal would be ‘inoperative.’

The theory of the isomorphism between software/hardware in the AI project imagines a continuum of software complexity and hardware computational power leading inexorably to an artificial mind, a continuum in which the virtuality of computation will somehow transform into the actuality of cognition. Afterall, an AI researcher will say, when you play a game of chess with a computer and the computer wins, it did not *simulate* beating you, it *actually* beat you. This conception underpins the claims of ‘strong AI’ and contrasts with the lesser, positivistic claim of ‘soft AI’ that a machine can only mimic or model cognitive processes. It is the belief in ‘strong AI’, of a Platonic collapse between the intelligential/virtual and the material/hardware, that most clearly resonates with Hermetic views.

The first extended explication of the relationship between the virtual and the actual is found in the works of Plato. As is well known, Plato attempted to explain the fact of cognition through invoking the idea of an intelligential world behind the world of appearances. In this way he hoped to explain the fact that we can have ‘ideas’ about objects/events in the world despite the fact that the data provided by the senses is always inconstant. How is it that we can have an idea about a dog -- *know* its ‘dogness’ -- when every dog we see is in actuality different? The explanation is that there are paradigmatic (Plato’s work is the origin of this term) forms behind the ever varying manifestations of phenomena, determining their ‘species’ (as a later Platonised Scholasticism would say) and our ability to apprehend them. So what we have is a one-to-one correspondence between the intelligential Idea and any given phenomenal object, an isomorphic relationship. Furthermore, the intelligential realm is immaterial and their phenomenal forms ‘material.’ How, therefore, can the one influence -- have a causal relationship with -- the other?18 Plato’s answer was that the one ‘participated’ in the other -- and ever since scholars have been debating among themselves as to exactly what Plato meant by this term. An involved discussion of the Platonic notion of participation would considerably de-rail this chapter; suffice it to say that the problem of ‘participation’ has been (usually unknowingly) revived when it is held that there is a parallel obtaining between software information and its embodiment in computer hardware. Where or when does one become the other, or more precisely, how does a logic-gate *represent* a computation?

Allied strongly with this rejuvenation of the idea of the virtual structure behind the real (the functionalist approach to AI) is the notion that the language of the virtual is binary code. The ‘bits’19 of information in a computer are really ‘virtual information’, just as the helical structure of the DNA molecule is a code, and the replication of this code into the RNA molecule is a process of ‘translation’ -- or at least so we are led to believe. What does this plethora of codes, languages, information and translations in both computing science, AI and
molecular biology mean? As a first approximation, it might seem that it represents a return to the metaphoricity of pre-modern (i.e. pre-mid-nineteenth century) natural science. Are we then witnessing another ‘slippage’ -- as with the idea of computation itself -- towards a redeployment of seemingly anachronistic locutions, re-instating, as a consequence, certain ‘confusions’ of thought that late 19th century scientists had taken great pains to eradicate once and forever? A strictly positivistic reading of this phenomena might have one believe that this is the case.

But what does it mean to say that the DNA molecule is a ‘code’? Strictly speaking, DNA contains no code, in the very same way that a computer does not ‘compute.’ Human beings compute -- they add, subtract, multiply etc. -- but a machine ‘allows’ differentials of voltage through electronic ‘logic’ gates which we interpret as the process of computation. Two things are important to note here: firstly one must acknowledge how difficult it is not to use anthropomorphic concepts like ‘allow’ and ‘logic’ in the description of mechanical phenomena. Secondly, a code is dependant on an anterior system -- a language, or more specifically, a human language. Without doubt to speak of the ‘binary language’ of DNA, or the ‘language of art’ is to speak metaphorically. Strictly speaking language is only produced by and used by human beings. There is no ‘DNA code.’ This is just loose metaphor -- a metaphor which has become so entrenched in scientific thinking that some researchers assume its reality. Like the code-breakers employed in WWII to break the codes of the opposing sides, DNA researchers see themselves involved in a battle as to who will break the code of living tissue first. In regards to this initiative (the Humane Genome Project), Harvard geneticist Richard Lewontin could not be less sanguine:

First, DNA is not self-reproducing, second, it makes nothing and third, organisms are not determined by it.²⁰

If this is indeed the case, then why the contemporary international effort to discover -- that is, fully ‘map’ -- the human genome? The notion that the DNA molecule is a ‘code’, that this code is binary, and that this code determines the growth of all individual cells in a body, is a continuation of the dream of the mechanisation of nature. With the rise in importance of the biological sciences in the late 20th century, the mechanical description of states, events and processes came to be seen as inadequate: the mechanical jargon -- representing the ‘billiard-ball’ determinism of the Newtonian/Laplacian worldview -- was giving way to a more ‘organismic’ system of description. The idea of a serial, binary system of orders emanating from the DNA molecule re-introduces the mechanistic/deterministic worldview into biology, making it safe once again for a strictly mechanical, positivistic description.

Even if a strict positivist must accept as a ‘contingent evil’ the fact that anthropomorphic locutions will inevitably slip into any supposedly objective description of phenomena, it is by no means certain that what a computing machine is doing is replicating the process of human
computation. This sounds like a deliberately contrary thing to say. Afterall, a great deal of work has gone into the idea of mechanically reproducing the ‘laws of thought’ (which George Boole once famously ascribed to binary computation), but it is nonetheless true.

The attempt to reconstruct the reasoning process of human beings is fraught with a crippling difficulty: the evident multiplicity of possible logics. A computer scientist may claim to model the process of deduction in a computer, but how may we know that this is in fact the process of our thought? There really is no way of knowing, despite the claims by AI enthusiasts like Marvin Minski to the effect that he and others have already accomplished this task. We can certainly produce a computational system which will give us verifiable answers every time we use it (2+2=4, is a simple example of such an algorithmic process), and indeed the historical construction of the logical process from Aristotle to today is a fine example of humankind’s desire to do just that, but the number of possible logics debated in this century alone demonstrates that we have several competing explanations for the same determinations. The ‘logic’ instantiated in the logic boards of computer hardware represents one manner of acquiring determinable results, but it is by no means certain that this configuration of electronic circuits mirrors the ‘laws of thought.’

Vortices of the Hermetic Imaginary
Can the entire project of developing a machine intelligence be undermined by an extended critique of its metaphorical confusions, by pulling apart its dis-analogies? Although this has been the intention of many thinkers, particularly those expanding upon Wittgenstein’s lead in regard to the intelligibility of regarding a machine as being able to ‘follow a rule’, these critiques have had little affect upon a project largely funded by the U.S. military.21 No amount of analysis will halt what Vinge himself recognises as the ‘technological imperative’ to create bigger and better computing devices.

I am certainly not advocating that such a Wittgensteinian critique should be abandoned. It is just that the terms of this pursuit seem to be missing the most interesting aspect of the entire AI project. The fact that these anthropomorphic ‘contaminations’ seem so prevalent in the discourse of AI research is a sure sign that the researchers are unwittingly engaged in a project that is inextricably linked with an imaginary that includes such seemingly disparate elements as the ‘electrical myths’ of Mary Shelley’s Frankenstein and eccentric 18th. century theologian Oetinger’s ‘electrical theology’, as well as the pneumatic anthropologies of Kabbalistic, Neo-Platonic and Hermetic thought. At the very least the emphasis on psyche or mind at the centre of the AI project seems to indicate an unacknowledged desire to transcend the boundaries of a strictly mechanical/material science.
Vinge imagines an apocalyptic catastrophe point upon the computational curve that signals the emergence of the Singularity. This point is actually a break, a disjunctive moment when all that has gone before is irrevocably jettisoned. The Singularity, as the name implies, will be utterly unique and unprecedented. Within the AI project the disjunctive moment of the Singularity signals the idea of, and desire for, the form of psychic transport particularly associated with the ecstatic. Deriving from the original Greek, *ek-stasis*, ecstasy literally refers to the experience of ‘standing outside one-self.’ The term is linked with a lexical family of words such as displacement, change, deviation, alienation, *délie*.\(^{22}\) Couliano suggests that the semantic key to its function is perhaps found in the single term *disjunction*.\(^{23}\) The ecstatic state implies a radical discontinuity of perception, a breaking off from one world to another.

In terms of ecstatic religion, this radical break was between prosaic, quotidian consciousness (termed ‘Apollonian’ by Nietzsche) and that induced by the ecstatic ritual itself. There is, as both Nietzsche and Spengler have averred, a world of difference between the Apollonian and Dionysian consciousness, yet the ‘moment’ when the one becomes the other -- in terms of the ecstatic ritual or practice -- oscillates around something like the ‘specious present’, the non-moment\(^{24}\) where the two fields are united.

It may at first seem quite odd to think of the studious demeanour of the computer scientist as being in some way equivalent to the aspirations of a participant in the Dionysian cults. I agree that it is a monstrous conceit -- but it evokes powerful and useful analogies. The ecstatic state can in part be characterised by the experience of the loss of the self, of subjective consciousness. Implicit within modernist science we observe the same desire: the search for an instrumentality that will erase the subjectivity of the observer and reveal the Real. For both the ecstatic and the scientist, reality is that which is revealed when there is no observer. What is missing from the computer scientist or laboratory boffin’s pursuit however -- but ever inheres in the dionysiac’s quest -- is simply the experience of the ‘open’ relationship to the phenomenal that characterises the ecstatic state: the bodily and intellectual sense of ‘flow’ or ‘streaming’ within a sensory economy that makes little distinction between self and world. At a certain level of description the embodied experience is primarily one of moving through a streaming space, attenuated with sensations/communications produced by an essentially open relationship to the phenomenal field. Accordingly, the boundedness of the human bodily experience -- the Cartesian paradigm -- is really only a secondary, after-the-fact reconstruction. I suggest that the metaphorical contaminations of scientific discourses are the necessarily vestigial traces of this primary experience of the body; they are sites of disturbance that reveal supposedly abandoned territory.

The ‘smuggling in’ of incoherent echoes of this pre-modern, pre-Faustian worldview is a signal characteristic of contemporary AI research. Much of the bad thinking associated with this project is the result of computer scientists’ ignorance of the proximity their ideas and
aspirations bear to the way of thinking that could be of most help in illuminating their work: the Hermetic tradition. An examination of two of Vinge’s tropes will reveal what I mean. Both provide sites of disturbance, small vortices of deliré that lead one to the ‘other side’ of the AI discourse.

The key term in Vinge’s dream of the Singularity, a word that simultaneously defines and undermines his visions, is the word awake. According to Vinge, one day a computing machine will simply ‘wake up.’ This implies, of course, that all machines like it had previously only been asleep. Clearly for Vinge all contemporary computing devices are sleeping, their potential powers lying dormant. This is the metaphorical space of virtuality (revived/revised as functionalism) itself: the intellectual realm of paradigmatic patterns sleeping as potentiality within matter.

What is interesting about the word ‘awake’ is its initiatic character. The mystery cults, particularly those most influential on Western thought\(^25\) -- the Mysteries of Eleusis and the Chaldean Mysteries -- had as their central symbol the idea that the initiate would undergo some sort of symbolic death and resurrection into a second life. Previous to this death and rebirth, the initiate was considered to be ‘asleep.’

In the early 20th century the teacher G. I. Gurdjieff was particularly fond of the idea that most human beings were -- despite appearances to the contrary -- ‘asleep’ and that the most urgent spiritual task that could confront the seeker was to endeavour to become ‘awake’:

A man may be born, but in order to be born he must first die, and in order to die he must first awake...When a man awakes he can die; when he dies he can be born.\(^26\)

These words of Gurdjieff summarise a long tradition that sees spiritual transformation as depending upon a pivotal experience of awakening or rebirth. Rather infamously, Gurdjieff tried many tactics to shock his followers into this state of wakefulness. According to Gurdjieff most people had no central, supervenient principle that could be called a ‘soul’; most people were simply a succession of discontinuous processes (impressions, desires, activities) in time. A central soul could be constructed however, and the key to this construction was first to become awake:

Attachment to things, identification with things, keep alive a thousand useless I’s in a man. These I’s must die in order that the big I may be born.\(^27\)

He qualifies his conception of being ‘awake’ in this manner:

It is impossible to awaken completely all at once. One must first awaken for short moments. But one must die all at once and forever after having made a certain effort ...[after] a certain decision from which there is no going back.
This would be difficult, even impossible, for a man, were it not for the slow and gradual awakening that precedes it.\textsuperscript{28} Gurdjieff’s model of becoming spiritually awake is clearly modelled on phenomenal experience. Before fully waking up individuals usually experience a period of hypnopompic activity; before being fully asleep they usually pass through the hypnagogic state. Both of these transitional states are modifications of the waking state, and may be characterised as being a ‘little bit awake’ as opposed to being fully awake. We \textit{gradually} accede to consciousness, as Gurdjieff says -- we do not abruptly attain instant consciousness under any circumstances (the alarm clock may abruptly bring us out of sleep, but no-one would honestly say that directly after this event they are ‘fully conscious.’)

Vinge gives no direct indication that his Singularity would go through a similar process of awakening, yet his implicit assumption that present day computing devices are lesser instances of mindful entities within the Great Chain of Computation, and that their computational abilities are increasingly on the ascent, approximates Gurdjieff’s model of a graduated progress towards awakened consciousness. All present aspects of the AI project -- investigations into linguistic and logical structures, analysis of vision and perception, the creation of heuristic ‘search spaces’ for particular problems -- are, according to Vinge’s logic, already producing a (very) sleepy intelligent being; all it requires is the initiatory ‘break’ or disjunctive moment that will reveal the presence of an active intelligence.

This \textit{deus in machina} can be more fully characterised in terms of the Hermetic tradition by recalling one of the key ideas implicit in Vinge’s model: that of emergent behaviour. The concepts of emergent behaviour and virtual governance, far from being a decided break with the mysticism (or, at least, mystery) of Maeterlinck’s ‘spirit of the beehive’, are really only morphological mutations of the underlying mythologem that allows each to be formulated -- that of the \textit{anima mundi}. A hyper-intelligence supervenient upon lesser intelligences, all of which both participate in and are modelled upon it, the \textit{anima mundi} is one of the central motifs and operational principles of both Hermeticism and late Neo-Platonic thought. From an AI perspective, the operational tenet that an exact simulation of a process \textit{becomes} that process (after the logic of Leibniz’s ‘identity of indiscernibles’ postulate), can be used to re-interpret the Hermetic outlook: all sublunary intelligences becoming exact simulations of the one hyper-intelligence of the \textit{anima mundi}.

The AI project, in this light, begins to look remarkably like the 20th century equivalent of the alchemical quest, the search for the \textit{lapis philosophorum}. 

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Orthelius, a commentator on the works of 16th century alchemist Michael Sendivogius, describes the *anima mundi* and its importance in the alchemical work in this manner:

The *spiritus mundi*, that lay upon the waters of old, impregnated them and hatched a seed within them, like a hen upon an egg. It is the virtue that dwells in the inward parts of the earth, and especially in the metals; and it is the task of the art to separate the Archaeus, the *spiritus mundi*, from matter, and to produce a quintessence whose action may be compared with that of Christ upon mankind.\(^{39}\)

Orthelius mentions also that many regard the world spirit as the 'third person of the Godhead'\(^{30}\) -- the Holy Ghost or Spirit. Traditionally the Holy Ghost was seen as the intermediary power between God and Christ, in other words, it was the liminal field of play where one world could be described in terms of the other, the communicative borderland between the discarnate (deity) and incarnate (Christ) aspects of the world. For the Hermeticist, 'spirit' and 'matter' were not two distinct categories of being -- in this they are distinguished from both Plato's and Descartes' extreme separation of *soma* and *psyche*, *res extensa* and *res cogitans* -- but rather two complementary *modes* of being. Yet to make the operation of these complementary modes tractable they needed a tertiary function that could negotiate the field of play. This third term, I would say, is the equivalent of the contemporary idea of complexity -- the intersection of chaos and order, matter (Chaos\(^{31}\)) and *logos* (reason, order). Neils Bohr's famous 'complementarity' reading of quantum states is very much in the same spirit as the Hermetic.

**Hour of the Swarm**

Neurophysiologist Peter Arhem, in discussing the relationship of artificial intelligence research to neurophysiology states that,

The principal question is really a conglomeration of questions. Is it possible in principle to study biological intelligence by studying artificial intelligence? Is it possible in principle to study the human mind by studying the human brain? And at the base of these questions: How is the mind related to the brain; how is the mental related to matter?\(^{32}\)

If there is a fundamental question behind the AI project, Arhem's delineation surely hits the mark. Adopting this perspective, it seems to me that what the AI project unequivocally demonstrates is the surprising longevity of certain (primarily Western) philosophical distinctions and their attendant questions, each of them attempts to answer a more fundamental question - *what is the relationship between thinking and the world, of mind and matter?*
The traditional intermediary between mind and world is language. AI research has wrestled with the seemingly intractable problem of constructing not only a mind, but also the ‘rules and representations’ that might make up a human language. So far the project has been driven by the assumption that language is in principle amenable to formalisation, that is, that it has a syntactic structure that enables the production of individual speech-acts and this syntax itself resembles logical formalisations. Hence language, thought (logic) and mind are, in the GOFAI scenario, ineluctably linked together.

**Hoffmeyer**

While this conception of the AI research project has not exactly come to a standstill, the expected results have certainly not been forthcoming. A recent reconceptualisation of the entire relationship between minds, language and thought has been suggested by molecular biologist Jesper Hoffmeyer in his paper, ‘The Swarming Cyberspace of the Body’, offering perhaps a new approach to the set of interlinked problems encountered by AI research. His reconceptualisation can be summed up in one sentence:

If signs (rather than molecules) are taken as fundamental units for the study of
life, biology becomes a semiotic discipline.  

For Hoffmeyer, bodies are ‘swarming entities regulated through the distributed problem-solving capacity of billions of communicating agents’ (that is, cells, tissues, organs etc.) such that the body can be regarded as a ‘bio-cyberspace’, similar in form to the cyberspace experienced by millions of users connected to the Internet. As a consequence, Hoffmeyer says that from this viewpoint,

Intelligence...is a virtual reality constructed by an animal body.

The structure of this virtual reality is language itself, or more specifically, semiotic activity. What is unique to Hoffmeyer’s viewpoint is that semiosis is not regarded as the privileged activity only of human beings. The basic unit of the sign, unlike that of the Saussurian tradition where the triadic relationship of signifier, signified and referent (with the latter considered almost insignificant in terms of theoretical value) are all predicated on a human percipient, becomes a distinction between orders of sound, odour, movement, colour, electrical fields, waves, chemical signals and all manner of possible significant activity among living beings. All this activity constitutes what Hoffmeyer calls the semio-sphere, and the semio-sphere is as much a function of the body as it is of the mind.

In particular Hoffmeyer suggests that intelligence is a product of the ‘swarm activity’ that is the body -- the body understood as a swarm of cells and tissues, the activity of which is the constant interchange of signals (chemical, electrical, mechanical and molecular) between all ‘units’ (cells, tissues, organs) of the body.
Hoffmeyer states that a body is in reality a ‘swarm of swarms’,
...a huge swarm of more or less overlapping swarms of very different kinds.
And the minor swarms again are swarm entities, so we get a hierarchy of
swarms. These swarms are engaged at all levels in distributed problem solving
based on an infinitely complicated web of semetic [Hoffmeyer’s term for
semiotic interactions that are determined by evolutionary history] interaction
patterns...36

This hierarchical swarm-being constitutes a sort of bio-cyberspace: just as the millions of
users of the Internet are connected, forming a ‘swarm’ of intelligences, so the body is a sort
of collectively constituted reality,

a virtual reality from the point of view of the individual entity. From this point
of view intelligence is a virtual reality constructed by an animal body!

[Hoffmeyer’s italics.]37

It should be remembered that one of the possible births of Vinge’s Singularity is that the
international Internet and its millions of users may someday become an intelligence greater
than the sum of its parts, a ‘swarm of swarms’ as Hoffmeyer has imagined. The notion that
‘intelligence is a virtual reality constructed by an animal body’ again places mind or psyche at
the pivotal centre of discussion, and aligns Hoffmeyer’s’ conception with the functionalist
revival of the Platonic virtual/actual distinction. The notion that the constitution of a living
body is a swarm of lesser swarms, these lesser swarms themselves examples of yet other
swarms (presumably down to the molecular level) is of the essence of the panpsychic
hypothesis, where intelligence is hierarchically distributed among every actuality. In effect
Hoffmeyer has further rarified the imaginary of the machine by suggesting that Von
Neumann’s serial stored-memory digital computer is an example of a lesser swarm entity the
creation of which was necessary for the appearance of the greater whole — the ‘cyberspace’ of
the Internet. This inadvertent revival of the essentially Hermetic notion that sublunar
intelligences are all virtual simulacra of the one great hyperintelligence of the anima mundi is
clearly significant. We are observing, in other words, a contemporary morphological shift, a
necessary deformation in terms of late 20th century ideas and imagery concerning the
machinic, of the particular ideal object constitutive of the anima mundi.

**Hermetic Bio-Semiosis**

Despite demonstrating the same sort of rhetorical sleight-of-hand that plagues discussions in
AI research -- for Hoffmeyer DNA is a ‘text’; the DNA molecule is ‘digital’, living cells are
‘analog’ etc. -- his revision of the semiotic economy (or ecology, as he would have it) is a
positive step in the direction of reviewing the field of mind/body questions. Of particular
interest to me is the (inadvertent, I am sure) recovery, in part, of the Hermetic attitude to
semiosis. The Hermetic weltanschauung (strongly influenced by the Stoic view) regarded the
phenomenal world as being a sort of general semiosis. Distinctions between bodies, selves and environment were to a certain extent fluid and open, and were characterised by a constant exchange of signs and inscriptions across what we now would generally regard as the bordered worlds of mind, body and environment.

Resonances of the Hermetic worldview are uncovered when Hoffmeyer utilises a term created early in this century by Jacob von Uexküll in one of the first works of theoretical biology, *Umwelt und Innenwelt der Tierre* (1909). The term is *Umwelt*, which Hoffmeyer interprets to mean ‘subjective universe.’ Unfortunately Hoffmeyer has misinterpreted Uexküll’s term. *Umwelt* refers to the particular surrounding world of an organism -- all animals live in the same world, but each has a particular environment in which it interacts. The ways in which the animal interacts with its *umwelt*, the responses elicited by this exchange, create the special inner world of the organism, the *Innenwelt*. It is this latter term that comes closest to Hoffmeyer’s ‘subjective world.’ Uexküll proposed a further term, *Gegenwelt*, to cover the manner in which higher animals (those possessed of a central nervous system) are able to ‘mirror’ or maintain a ‘counter-world’ of representations of the environment, representations that differ with the constitution of different nervous systems.

The importance of Uexküll’s definitions is that they are not hard distinctions, but interacting worlds that should be read as modes or ways of seeing determined only by the relative situation of the organism. Interestingly, Uexküll saw organisms as cognitively limited by their respective situations, the situation of each allowing the creation of a world of possible experience and ‘bracketing out’ others. By a process of logical extension Uexküll proposed that it was likely that there were higher dimensional worlds that human beings are constitutionally prevented from seeing, just as the uni-celled organism is unaware of the stars above. This latter aspect of his thought is in many ways reminiscent of the worldview that held before the advent of the idea of Darwinian Natural Selection in the mid-19th century -- that which Lovejoy has called the ‘Great Chain of Being.’ In this view all living things are arranged in a hierarchical system with the deity at the top, followed by angels, human beings and so on, down to the lowliest bacterium. In contemporary ‘communication science’ parlance we might say that each creature is locked in their position in the Great Chain according to their ability to process information: the more a creature is able to process greater amounts of information, the higher up the Chain its position.

The notion that there is a triadic relationship between worlds of experience is evidently very ancient. The Hermetic schema envisioned as a base model, as it were, the three interpenetrating worlds of the celestial, the terrestrial, and the *gegenwelt* of human beings, the latter known as the sublunar *mens*. In traditional Chinese philosophy we find the distinction between the worlds of *tian* (heaven), *ren* (humankind) and *di* (earth). The most important of
these *loci* is *ren*, the microcosmic site of interaction between the heavenly and earthly forces. The recognition of the importance of this *gegenwelt* was a central mystery of the Gnostic tradition, especially as manifested in later Hermeticism. An early Gnostic text summed up the mystery in this way:

...this is the great and abstruse mystery, namely that the power which is above all others and contains the whole in his embrace is termed man.\(^3\)

This passage is an early indication of what would become a central tenet of Hermeticism -- that the divine *mens* and the terrestrial *mens* somehow reflect, interpenetrate and guarantee the veracity of each other.

**Bateson**

A strong influence on Hoffmeyer’s work are the ideas of Gregory Bateson. Hoffmeyer specifically mentions a paper of Bateson’s first delivered in 1970 under the auspices of the Institute of General Semantics. In this paper, ‘Form, Substance and Difference’,\(^4\) Bateson proposes that it is possible to define a ‘Pythagorean evolutionary theory’ predicated on the idea of informatics/cybernetics rather than the vagaries of ‘substance’. Rather than Mind being at the top of the great Chain of Being, says Bateson, we should, following the pioneering efforts of Lamark in his *Philosophie Zoologique* (1809), invert this order and assume that Mind (*mens*) is the basic ground of life. Of course Bateson has a particular conception of Mind, a conception influenced by cybernetic theory. He first asks what is it in the world (the ‘territory’) that gets into the mind (the ‘map.’)\(^5\) For Bateson the ‘thing’ that gets into the mind is *difference* -- in terms of a map this could be a difference in altitude, surface or what have you -- and difference is a prototypically abstract matter.

He notes that in the ‘hard’ sciences effects are attributed to forces -- impacts, collisions and the array of mechanist causal explanations that boil down to an exchange of energy. The world of communication, on the other hand, cannot be so characterised.

The whole energy relation is different. In the world of mind, nothing -- that which is not -- can be a cause.\(^6\)

He provides an example: if you fail to complete your tax return, then the Taxation Department will be spurred into action even though you *did nothing*. ‘The letter which never existed is no source of energy’,\(^7\) as Bateson says, yet it can cause an energy system (the Tax Inspector) to be galvanised into activity. Any psychological theory, therefore, that hopes to demonstrate its value on analogies drawn from the exact sciences (that is, on the exchange, at some point, of energy) is non-sense. For Bateson the phenomenal world is an infinitude of abstract, non-energetic differences, only a limited number of which are ‘selected’ by the mind: these are what we call ‘facts’ or ‘ideas.’

In fact, what we mean by information -- the elementary unit of information -- is a *difference which makes a difference*, and it is able to make a difference
because the neural pathways along which it travels and is continually transformed are themselves provided with energy...We may even say that the question is already implicit in them. Bateson claims that it is the contrast in coding and transmission of difference inside and outside of the body that impels us to speak of an 'external' and 'internal' world. These two modes are not mutually exclusive however: "The mental world -- the mind -- the world of information processing -- is not limited by the skin." It is a world, however, that has 'jumped loose' (as Bateson says) from the conventional understanding of the physical world.

Bateson's development of this position is very interesting. Like Hoffmeyer and Vinge, Bateson develops his ideas from within the 20th century cybernetic tradition, a tradition that began with extended meditations on the mind/machine analogy. Norbert Wiener's 1948 book Cybernetics, which began the cybernetic tradition, was subtitled 'Control and Communication in the Animal and Machine,' signalling both Wiener's conflation of machinic and organismic models and his interest in using these as examples of communication or information exchange. But Bateson goes further than Wiener when he places his analysis in the context of traditions seemingly far removed from 20th century mind/machine models. These traditions include both alchemy and Gnosticism.

Bateson recounts how Carl Jung, undergoing a period of 'epistemological confusion' (Bateson's description) sat down and wrote his Septem Sermones ad Mortuos, an event from which Jung dated all his later insights into the psyche and 'Collective Unconscious.' In what amounts to an extended piece of psychic automatism, Jung invokes the notion that there are two worlds, two 'worlds of explanation' as Bateson describes them: the pleroma and the creatura. Jung's conception of the pleroma is essentially derived from the originally Gnostic notion of the deus absconditus -- that a paradoxically 'full' (pleroma literally means 'fullness') void is the ground of our being:

Nothingness is the same as fullness. In infinity full is no better than empty.
Nothingness is both empty and full....This nothingness or fullness we name PLEROMA.

Bateson recontextualises Jung's Gnostic-inspired distinctions in terms of his informatic/cybernetic reading of the mind-body problem. He therefore equates the pleroma with the Real, a world where events are caused by 'forces and impacts,' a world without distinctions or 'differences' -- the world the description and investigation of which is supposedly the object of the hard sciences. Even so Bateson states that it is oversimplifying matters to say that the hard sciences are therefore exclusively concerned with the pleroma and that in contrast the sciences of the mind deal only with the world of the creatura, a world characterised by the play of difference. It is a matter of how one chooses to look at phenomena. He uses the example of Carnot's heat engine: from one point of view (the
pleromatic), the operations of the engine can be classically described in terms of the increasing entropy incurred with the transformation of heat energy into mechanical work. From another point of view (that of the creatura), the system may be described as a sense organ the operations of which are determined by temperature differences -- differences which we may call 'information' or 'negative entropy.' In the case of Carnot's engine, it 'is only a special case in which the effective difference happens to be a matter of energetics.' It is possible, in other words, to look at the world as if it were a living organism, a giant system of systems, each of which can be described in terms of information exchange rather than simply the exchange of energy.

The creatura is thus the world seen as mind, wherever such a view is appropriate. And wherever this view is appropriate, there arises a species of complexity which is absent from the pleromatic description: creatural description is always hierarchic.

This hierarchical ordering is to do with the classification of differences, the difference between difference. Bateson is quite aware of the vertiginous road down which this conception could lead -- he mentions in passing that the notion of set theory devised by Bertrand Russell early this century to 'contain' (as much as is possible) paradoxes of infinite regression might help in this regard -- but some sort of notion of interlinked systems is always necessary when invoking the thermodynamic/cybernetic model. Thermodynamics is, after all, concerned with the dynamics of closed or semi-open systems. An open system, characterised by maximum entropy, is a system exhibiting no information at all. In fact this state of affairs cannot be described as a system at all.

Serres
In what may be regarded as the extreme amplification of Bateson's ideas (although he makes no reference to Bateson's work), Michel Serres has examined the notion of systems, cybernetics and levels of description (the hierarchies of difference, in Bateson's conception) in his 'The Origin of Language.' For Serres, 'matter, life and sign are nothing but properties of a system' and an organism, situated inextricably within this nexus, is characterised not by homeostasis (since stability, in organismic terms, means death), but by that which he calls homeorhesis. A neologism derived from the combination of the Greek words for 'same' and 'flow', homeorhesis is utilised by Serres to emphasise the idea of the organism as being in continual movement, constantly exchanging information within and without its 'system' -- a term which Serres, like Bateson, considers to be misleading.

Both a syrrhesis (rather than a system) and a diarrhesis, the organism is henceforth defined from a global perspective. Not actually defined (the word means in effect the opposite of open), but assessed, described, evaluated, and understood...[an organism] is the quasi-stable turbulence that a flow produces, the eddy closed upon itself for an instant...
Serres proposes, in a manner similar to Bateson, that the differing levels of information exchange operating between cells, tissues, organs -- all homeorhetic systems -- are like a series of interlocking Chinese boxes, 'and this series is the organism, the body.' More importantly,

Each level of information functions as the unconscious for the global level bordering it, as a closed or relatively isolated system in relationship to which the noise-information couple, when it crosses the edge, is reversed and which the subsequent system decodes or deciphers. This series, the units of which have as their 'outside edge' the chaotic din of energy/signal transformations, are filtered, level following level, by the 'subtle transformer' of the organism until, finally, we reach the level of 'eros and death.' For Serres the Freudian unconscious is this last 'black box', 'the clearest box for us since it has its own language in the full sense. Beyond it we plunge into the cloud of meaningless signals.'

The idea of an organism being a 'quasi-stable turbulence' (Serres) temporarily 'coming together' within the flow of semiotic differences (Bateson) recalls a fundamental conception of the creator of cybernetic theory, Norbert Wiener:

'We are not stuff that abides, but patterns that perpetuate themselves.'

If we substitute the term 'self' for 'organism' in the above determinations, then we also get a pretty good approximation of the central tenet of Buddhism: that there is no abiding self, but only a temporary aggregate of sensations and perceptions subject to the laws of karma. None of the above-mentioned theorists (to my knowledge) explicitly acknowledge the influence of Buddhist thought on their work, so I will assume that this particular manner of describing the relationship of beings to the phenomenal world is but further evidence of the periodic return of certain cognitive schemas across cultures and epochs.

**Hermetic Informatics**

The final upshot of the envisioning of the organismic within the thought of these contemporary thinkers is that observer and observed become varying 'nodal points' within the same field of information exchange. Observer and 'dispatcher' are merely two functions supporting a single equation.

The observer as object, the subject as the observed, are affected by a division more stable and potent than their antique separation: they are both order and disorder....I do not need to know who or what the dispatcher is: whatever it is, it is an island in an ocean of noise, just like me, no matter where I am.

In the thought of Serres, Bateson and Hoffmeyer the distinction between the semiotic level of description (the classical province of the mens) and the description of the physical world in terms of 19th century thermodynamics collapses. By insisting on the foundational structure of communication and information exchange in any description of subject/object interactions,
their determinations recapitulate the interpenetrative communicative order operating between the divine and the terrestrial foregrounded in Hermetic thought. Furthermore this is no historical accident, no anomalous atavism in the progressivist account of the accumulation of scientific knowledge. Bateson, Hoffmeyer, Vinge and Serres all emphasise imagery and structural relationships that display clear resonances with Hermetic notions of the interrelationship between individual minds and the *anima mundi*.

There is a strong ethical drive behind Bateson's conception, something which he makes no effort to conceal. The combination of technological mastery and the Darwinian conception of 'survival of the fittest' have brought the world to the brink of ecological catastrophe. If the organism and its environment are not seen to be ineluctably connected as a *single site of exchange*, a place of 'virtually stable turbulence within the flow' rather than the organism attempting domination of its environment according to the Baconian command/obedience couplet, then the scientific ideology of mastery will simultaneously see its closure with the inevitable destruction of all negentropic systems.

While it would be going too far to ascribe some sort of understanding of the destructive affects of technology and Darwinian evolutionary theory so far before their historical arising to Hermetic thinking, it is certainly true that a kind of 'global heuristic' structured much of its ideas. The idea that the world was a gigantic living organism was central to Hermeticism: trees and vegetation were the hair of this great being, rivers and streams the arteries and veins that carried its blood. It was a worldview celebrated by poets and natural scientists alike. And it was an envisioning that was clearly aware of the twin modes of description open to an enquirer: the one in terms of signs and words (information, difference), the other in terms of physics. 'And indeed what are the heavens, the earth, nay every creature, but Hieroglyphics and Emblems of [God's] Glory?', asked Francis Quarles, his sentiment echoed by Donne:

> The World is a great Volume, and man the Index of that Booke; Even in the Body of Man, you may turne to the whole world.  

In this light we can readily discern the reclaiming of the idea of the Hermetic microcosm in Bateson's and Serres' conceptions. The province of signs, language and difference, squarely placed on the other side of the Cartesian divide in terms of the investigative territory of the physical sciences (at least since the formation of the Royal Society), has been re-injected into the realm of the scientific imagination. The Book of Nature (pleroma) and the Body of humankind (creatura) become one enfolded network. Far from being a new and radical approach, I suggest that this is really only a reclamation of an abandoned worldview. Perhaps it was inevitable that a re-connection should be made between 'energy' and 'mind' in cybernetic theory, considering that the coupling of the two was an idea inherent at the beginnings of mechanical science, as the ideas of Johannes Kepler demonstrate.
In his *Harmonice Mundi* Kepler devoted an entire section to ‘The Earth as a Living Being’, a section doubly significant in that it contains notions that directly lead to his statements describing the ‘dynamic power’ (*vis*) of matter as ‘energy.’ Conventional accounts of the history of scientific conceptualisation credit Kepler with replacing the concept of matter as being besouled with that of the notion of physical energy. But as M. H. Nicolson points out, this new notion is intimately connected with Kepler’s belief that the world was a living being. According to Kepler the earth itself was possessed of a soul and this world-soul reflected the *anima mundi*, the cosmic soul.

[The earth-soul reflects in itself the image of the zodiac and of the firmament, evidence of the interrelation of the homogeneity of terrestrial and celestial things.]

Kepler himself cast horoscopes while being simultaneously engaged in natural scientific theorisation. The concept of the zodiac is one of the most ancient of sign systems, a system with variants over many different cultures and epochs. I believe that it is not too much of a conceit to maintain that the system of astrology is akin to the modern conception of cybernetics: both attempt to describe the interrelationship of the pleromatic and creatura worlds in terms of a systemic set of differences and relations, finally positing the ‘homogeneity of terrestrial and celestial things.’ On the level of information theory, Kepler held that one can formalise the activity of the deity with recourse to a set of (geometric, arithmetical) calculations that map the relations between the stars and terrestrial events. In this regard Kepler is the contemporary of Bateson. Both see a set of complimentary descriptions operating at the thermodynamic and informal levels. In terms of the thermodynamic world, God is the essence of energy says Kepler, and as ‘the essence of the flame is in its burning, so the essence of the image of God lies in its activity, its energy.’ Rather surprisingly, centuries later the ‘father’ of cybernetics, Norbert Wiener, would use an analogy strikingly similar to that of Kepler:

[The individuality of the body is that of a flame rather than that of a stone, of a form rather than a bit of substance.]

Anachronistically glossing Kepler’s analogy through contemporary cybernetic theory, one may say that that which was significant for Kepler (that which revealed the essence of God) was energetic differences, just as it would be for Sadi Carnot and Wiener in terms of the modern(ist) scientific tradition centuries later. It is difference that marks the presence of a communicative order of description over and above one that solely relies on descriptions of mechanical and material interaction.

It would be possible, one should imagine, to make explicit the morphology of the concept of energy from Kepler’s time until our own. This morphology would include, naturally enough, Kepler, Galileo, Newton, Carnot, Clausius, Lord Kelvin, Norbert Wiener and Claude Shannon. It would end (with the proviso that this ‘is the story so far...’) with Bateson,
Serres and Hoffmeyer's ideas. It is of course far beyond the scope of this chapter to attempt such a description, but this point needs to be stressed: there is a continuity that takes the historical form of the occasional appearance and disappearance of certain ideas that we may call Hermetic. They constitute many-sided forms that has their own objective existence as ideal objects.

**Negentropy and the Intelligential World**

Serres' conception of bio-cyberspace as a hierarchy of levels, each of which represents the unconscious of the one anterior to it (a system, therefore, of serial unconsciouses) finds an extension in the work of theoretical physicist Olivier Costa de Beauregard. In his conception, there is a negentropic psychic 'underside' of the physical universe -- the unconscious, as it were, of the pleroma. This parallel universe, coextensive with the Minkowski-Einsteinian space of four dimensions, is a 'source of information', in fact the source of all possible knowledge -- an anima mundi, no less. Indeed Costa de Beauregard regards the individual consciousness of animals and humans to be crystallisations of this hyperconsciousness, just as in the Hermetic view.\(^67\) In regard to this theory, Marie-Louise von Franz hypothesises that the time may not be far off when physics and depth psychology (of the Jungian persuasion) will 'join hands' and the full significance of Jung's alchemical studies become apparent.\(^68\)

What does Costa de Beauregard intend by his inadvertent revival of Hermetic ideas? It is clear, not only in Costa de Beauregard's work, but many others as well, that a decided ambiguity surrounds such terms as entropy, probability and information. I think it fair to say that this ambiguity is keenly exploited by many cybernetic theorists, as well as scientists whose work relies on the linked concepts of entropy and probability. Shannon's definition of information as being a probabilistic function of a transmission system is the perfect example. Following Von Neumann's advice, he equated this probabilistic function with the thermodynamic concept of entropy. In expressing the wisdom of this equivalence, Von Neumann evidently assured Shannon that 'no one knows what entropy is, so in a debate you will always have the advantage.'\(^69\)

The problem with the concept of entropy is that it cannot, on the surface, be an objective quality. Disorder is really in the eye of the beholder -- what may seem chaotic to you may not appear to be quite so chaotic to me. A late work by Jackson Pollack exhibits a great deal of 'order' to me, but to another it may well appear to be a totally chaotic field of drips, splashes and blotches. Is entropy then an objective state of the world or a subjective reading of it? Costa de Beauregard's answer is that entropy, read as an aspect of probability, is both. For him probability 'operates as the hinge between matter and mind, where one is knotted to the other, and reacts on the other.'\(^70\) It should be remembered that 'probability' in Costa de Beauregard's usage of the term is equivalent to Shannon's characterisation of 'information' as
a probabilistic function. Although expressed in slightly different terms (yet which are, as I read it, conceptually equivalent), Costa de Beauregard’s notion is strikingly similar to that of Bateson: probability (information) operates within the field of difference or the semio-sphere.

Costa de Beauregard further aligns his depiction of a parallel negentropic intelligent world with the apparent ‘atemporality’ of the unconscious. This subliminal world demonstrates similar characteristics to that of the unconscious (incorporating, as it must, the experimental confirmation of Bell’s Theorem of non-locality, the ‘telepathy’ theorem of quantum mechanics) in that it operates on the threshold below observable phenomena; that where the molecular world of classical physics phases into the sub-atomic, quantum world. We should note the positioning of this threshold: it demarcates the macroscopic world of ‘classical’ Newtonian physics from the probabilistic, indeterminate and invisible world of quantum mechanics. One world is aligned with that of macroscopic matter, the other (the quantum world) with mind. Yet Costa de Beauregard breaks the tension between these two thresholds when he states that probability -- that is, the laws of Shannon’s entropy/information couple -- is the ‘hinge’ which in itself inclines us to interpret reality either way. Similarly for Bateson the choice is simple: describe the phenomenal in terms of the creatura, in terms of differences/information, and we not only ‘save the appearances’ but gain a more wholistic understanding of the structural integration of mind in nature.

As Bateson demonstrates, information has no energetic component. Yet it can have causal effects just as at the pleromatic level of description. A scientist committed to an all-embracing mechanistic weltanschauung will say that at some level there must be a causal property to thought (difference) that takes the form of an energy exchange between ‘material’ components (this, incidentally, is the essence of Landauer’s concept of the thermodynamic limits to computation). Both Bateson and Hoffmeyer re-vision mind-body dualism by imagining biocyberspace as a hierarchy of relationships, and rather than a causal, mechanical process, this constitutes something like a process of symbolic/logical entailment, in as much as logic can be loosely defined as a systemic set of relations.

For Serres, both the subject and its environment/world are but modes of the one object, itself a moment of density in the entropic stream:

Nothing distinguishes me ontologically from a crystal, a plant, an animal, or the order of the world; we are drifting together toward the noise and the black depths of the universe, and our diverse systemic complexions are flowing up the entropic stream, toward the solar origin, itself adrift.

An essential element in Hermetic philosophy, as clearly demonstrated by Kepler, was the realisation that everything was interconnected, and to a certain extent (recalling Bateson’s ‘wherever such a view is appropriate’), penetrable by the coursing energies of all other
objects, both sublunary and celestial. In contemporary terms, the Hermeticist saw what we would regard as inanimate objects as possessing ‘information processing’ capabilities: rocks, animals and precious stones were transmitters of complex celestial influences (recalling Serres’ ‘diverse systemic complexions.’)

The only thing really missing from Bateson, Hoffmeyer and Serres’ conceptions is what may be described as the essentially ‘erotic edge’ to considerations of the phenomenal world as being mindful and somehow ‘alive.’ This erotic undertow was well acknowledged by many Hermetic thinkers, particularly Ficino and Bruno. We find a trace of this however in Vinge’s idea that the mutual interaction of human operators and their cyberspace counter-parts (both human and computer) may produce a new besouled human/machine -- the Singularity -- an entity like Hoffmeyer’s ‘swarm of swarms.’ Vinge’s conception suggests an act of intimacy that is quite out of place in regard to his other much more sober alternatives for the birth of the Singularity. We may interpret this scenario even more hyperbolically perhaps: it presents an ‘erotic encounter’ between the network and its human users. This should be seen as nothing less than an (unintentionally) transgressive metaphor that reveals the dream of the essentially erotic and intimate interconnectivity operating between the Hermetic philosopher and the world.

**Conclusion**

In this chapter I have attempted to examine certain specific ideas produced by both cybernetic theory and its later ‘off-shoot’, Artificial Intelligence research. I have endeavoured to demonstrate that part of the dream of AI -- and specifically Vinge’s conception of the Singularity -- seems to exhibit an atavistic yearning for the Hermetic idea of the *anima mundi*. The transgressivity of Hoffmeyer, Bateson and Serres’ interpretations of cybernetic theory -- by which I mean the fact that they all attempt to erase the ‘classical’ border between ‘mind’ and ‘matter’ -- furthermore reflects what appears to be a return to pre-modernist conceptualisations of the micro/macrocosmic coupler. Recognition that, at the very least, similar conceptualisations were fundamental to the Hermetic worldview, would perhaps prevent contemporary explorations from being too chauvinistic about their ‘radical innovations.’

Isaac Newton’s utilisation of the representative theory to underpin the modern(ist) scientific project, in which mathematical entities stand in a supposed strict relation to forces and bodies in the phenomenal world, has become the canonical method by which scientific research has authenticated itself. The universal acceptance of this manner of theorising within the scientific community has staunchly avoided exploring the implications of extending its purview into that of the mind -- that is, until the development of the cybernetic and AI projects. No doubt Newton, ‘the last of the Magi’ would have greatly approved of this utilisation of his
method, but it is of course far from certain that more recent scientists -- less close to the
eclipse of the Hermetic worldview -- would similarly approve.

Ernst Mach held to the conviction that all great contributions to science, all great theories,
were not so much closer approximations to a final description of reality as they were insights
into the psychology of the scientists who produced them. In this view, the history of science
is really the history of a succession of individual psychologies writ large as it were, a notion
suggesting perhaps that some scientific theories at least might be considered
psychopathological. A worldview that idealises the 'pleromatic' as composed of dead,
mindless matter has become reified into a world in which the reality of the death of
ecosystems has become all too apparent. One hypothesises that the thinking of Hoffmeyer,
 Bateson and Serres represents a reaction to what they see as the psychopathology inherent in
the excesses of modern(ist) science. As opposed to this way of thinking, each of the
foregoing thinkers have attempted to provide a rational (in the Platonic sense) re-description
of the grounds upon which future scientific theorisations should develop. This perhaps
represents the beginnings of an (unknowingly) rediscovered imaginary that supplants one of
actants over and against objects and ideals of algorithmic certainty of outcome, with one of
inter-subjective exchanges governed by the mystery of probability, negentropy and
difference.

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2 Two machines (computers or fax machines) must first engage in what is called a 'handshake' procedure
in order to 'recognise' each other in an exchange.
3 Anyone interested in contemporary computer technology will immediately recognise as 'computer
heroes' the names of John von Neumann or Alan Turing for example.
5 Davies, Martin, 'What is a Computation?' in Mathematics Today: Twelve Informal Essays, ed. Lynn
Sheen (NY: Springer-Verlag, 1978.)
7 GOFAI = Good Old Fashioned Artificial Intelligence, an acronym invented by Richard Haugeland to
sum up just the sort of computer intelligence envisioned by Vinge: a computer (probably in the form of
good-old-fashioned Von Neumann architecture) that is not merely modelling human intelligence (the
'weak AI' proposition), but actually is as intelligent -- or more so -- than any human counterpart.
8 The discussion of phase transitions and the characterisation of 'complexity' are indebted to
mathematician/computer scientist/novelist Rudy Rucker's discussion of the same in his The Rudy Rucker
Video.
10 Wheeler quoted in Kelly, 9.
American 253:1 (1985.)
12 Vinge, 91.
15 It is more than likely, of course, that the original author of the Pimander was quite familiar with the
Biblical text.
16 Yates, 27.
17 In the jargon of AI, 'modelling' a mind is called 'weak AI' as all that is being attempted is a simulation
of mental activity. The aim of 'strong AI' is to actually make a mind (as opposed to merely simulating
it.)
18 It was a truism of ancient Hellenic thought that 'like knows like' and, as a corollary, that only like
could have a causal influence on like. Plato's division between kinds of stuff (material/non-material) was

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therefore quite problematic.

19 A contraction of ‘binary digits’, a term created by the ‘inventor’ of Information Theory, Claude Shannon.


22 This partial list is drawn from Couliano’s ‘delire’ as ‘delerium’ as the term has a particular usage in contemporary Continental cultural theory that is somewhat lost by the substitution of the English word.

23 Couliano (1984), 23.

24 The ‘specious present’ is defined as the least temporal interval such that two modifications of experience, separated by that interval, may nevertheless seem to the subject to be co-present in consciousness.

25 Influential in that two of the most important thinkers of the West -- Plato and Aristotle -- were initiated into the Eleusian Mysteries, and several lesser thinkers -- Ficino, for example -- were well versed in the mystery tradition. To deny the huge influence of these thinkers on Western thought, and through them the no doubt subtle influence of the mystery tradition, is simply unarguable.

26 Gurdjieff quoted in Ouspensky, 217.

27 Ouspensky, 217.

28 Ouspensky, 219.

29 Orthelius quoted in Jung, 430.

30 in Jung, 429.

31 That is, the Platonic/Hellenic idea of Chaos as the primary state of the kosmos, before the intercession of the logos.

32 Arhem, 181.

33 Hoffmeyer, 16.

34 Hoffmeyer, 16.

35 Hoffmeyer, 19.

36 Hoffmeyer, 20.

37 Hoffmeyer, 22.

38 Hoffmeyer, 16.


41 Bateson is referring to Korzybski’s famous adage, ‘The map is not the territory.’

42 Bateson, 452.

43 Bateson, 452.

44 Bateson, 453.

45 Bateson, 454.

46 Republished as The Human Use of Human Beings (see bibliography.)


48 In choosing this example, Bateson is of course drawing attention to the historical link between the development of the concepts of thermodynamics (pioneered by Sadi Carnot) and 20th century information and cybernetic theory’s use of such terms as entropy and negentropy.

49 Bateson, 456.

50 Bateson, 456.

51 Bateson, 457.


53 Serres (1982), 73.

54 ‘To flow together.’ Diarrhesis means ‘to flow through.’

55 Serres (1982), 74-75.

56 Serres (1982), 80.

57 Serres (1982), 80.

58 Serres (1982), 80.

59 Wiener, 130.

60 The pleromatic realm which philosopher of science Donna Haraway considers as exhibiting the characteristics of Coyote, the trickster. Vide Chapter IV of this dissertation.

61 Serres (1982), 82.

62 Serres (1982), 83.
John Donne, from his *Sermons*, quoted in Nicolson, 59.
Kepler quoted in Nicolson, 150.
Nicolson, 150.
Wiener, 139.
A (very) brief recounting of Costa de Beauregard’s conception is found in Marie-Louise von Franz’s *Introduction to Aurora Consurgens* (London: Routledge & Kegan Paul), x.
Von Franz, *Aurora Consurgens*, x.
Quoted in Campbell, 31.
Costa de Beauregard in Cambell, 33.
Quite clearly the world of quantum phenomena is invisible. The fact that scientists can produce photographic plates that purport to reproduce the trajectories of sub-atomic particles in no way compromises this characterisation.
Serres: ‘All I know, but of this I am certain, is that [the object under observation is] structured around the information-background-noise couple, the chance-program couple or the entropy-negentropy couple.’ [Serres (1982), 82.]
Serres (1982), 83.
II

Body Doubles

Soul and body are not two substances that act one upon another, but two functions which pass into one another. The soul is not so fleeting as the wandering consciousness, the body is not as stiff as a corpse. The soul is formed in this transition, in transition the body becomes alive.

Karl Joël

That the soul and body are formed or structured in transition, that they are constituted by a process or movement rather than composed of discrete substances, is a key aspect of ideas I hold to be central to Hermetic thinking. As outlined in the previous chapter, the notion that mind (soul, psyche) is part of a process (a ‘pattern that perpetuates itself’, as Wiener says) rather than a material structure is also a key concern of certain 20th century cybernetic thinkers. This demonstrates a recuritance of concepts that one first apprehends within Hermetic thought, and, conceptually at least, represents a significant shift away from the dominant quantitative methods of modern(ist) science. Furthermore the determinations of the cybernetic thinkers, and the relationship of their ideas to Hermetic concepts and figuration, take the form of an imaginal entailment, a logic inherent in the continuing imaginary of Hermeticism that impels one to hypothesise that they form the outlines of a single ideal object known first to Hermetic thinkers as the anima mundi.

The Hermetic notion of the subtle, pneumatic body was constructed over a great period of time. It was a complex syncretic process drawing on Platonic, Aristotelian, Stoic and folk-astrological ideas that would ultimately create a unified conception of a pneumatic economy inclusive of the ‘bodies’ of the stars, animals, humankind and inorganic nature. What is significant about this syncretic construction is that bodies are imagined not as machines or dull substance but rather as the product of mutual influence, a set of relationships. Just as any geometrical figure is ultimately reliant on a set of precisely defined relationships rather than any particular figure inscribed for the eye, so Hermetic corporeity becomes a series of relationships and processes only recognised within an inclusive economy: not the intellectual economy of plane geometry, but the pneumatic economy of Hermeticism.

The long-lived idea of the subtle body is a rich alternative to modernist conceptions of the body as machine. In fact one can say that one of the most important (yet overlooked)
battles waged in the 17th century was a battle between the ancient view of corporeity as composed of several interacting 'envelopes' and processes and the newly emerging Cartesian view which saw the body as a sophisticated clockwork device.

As is well known, both Descartes and Hobbes thought that the human body was basically a sophisticated machine. This machinic imagery would eventually overtake the province of the mind as well (in sharp contradiction to the strict Cartesian division between ethereal mind and machinic body) when Freud utilised hydraulic and 'steam-age' imagery of the build up of internal pressures and release valves (the steam engine) in his descriptions of the mind. This imagery would in turn be transmogrified into the figurations of the cybernetic era, as examined in the previous chapter.

When we imagine the (human) body in the late 20th century we more than likely conjure up an image consisting of its objective appearance and machinic articulations: its four limbs and their possible movements, its head and torso. We see its objective shape and imagine its interior articulations in terms, perhaps, of a Hollywood cyborg: partly machine, partly 'organic' -- a cybernetic organism. This manner of imagining the body in terms of its objective shape plus the imaginary of its mechanical workings would have been quite alien to ancient thinkers, and not only because of the comparative lack of references for a mechanised body. They were certainly aware of the objective form of the body, as any number of ancient frescoes and sculptures will attest, but for many thinkers this aspect of human corporeity was of comparatively little importance. Along with the objective form of the body we also possessed one (or more) subtle bodies, but these certainly were not imagined as being 'human-like.' When Plutarch describes the luciform bodies of the dead in his On the Delay of Divine Justice, he describes them as being surrounded by a 'flame-like bubble' and he proceeds to describe their many-hued coruscations. For Plutarch and others following the Neo-Platonic tradition, the human body was suspended within a subtle, scintillating sphere.

This subtle sphere was primarily a vehicle; that is, over and above its figure (its shape) there operated the important concept of its function as a medium of transmission and passage. The subtle body was an important part of the 'spiritual technology' of pan-communication that constituted the Hermetic pneumatic worldview.

As a consequence of this conception of a pneumatic communicative economy it becomes possible to read the figuration of the subtle body as the intermediary that unites mind, nous, with the greater world. It is proposed that the subtle body's functioning within the micro/macrocosmic couplet of Alexandrian/Hermetic thought is a logical 'connective' figuration that naturally follows from the characterisation of nous or mind as the virtual
simulacrum of a greater hyperintelligence, the *anima mundi*. It follows therefore that it’s full significance within the history of ideas may only be properly explicated by taking into account its functioning within the domain of signs and signifying activity.

**Vertigral Architectonics: An Introduction**

To further clarify the use of the notion of ideal objects as an hermeneutic tool, a neologism needs to be introduced and defined -- vertigral architectonics. *Vertigral* is a descriptive that enfolds two words: vertical and integral. It was first suggested by Eugene Jolas in his magazine *Transition* in the 1930’s. In his essay ‘Vertigralist Workshop’ Jolas attempts to describe a ‘new kind of creator’ who anticipates that the horizontal consciousness which, through naturalism, has dominated the past hundred years, will be followed by a psychic revolution, through which the creative man [sic] will look at life in terms of high and low, in terms of antinomies in fluctuation, in terms of a systole and diastole between the irrational and the super-consciousness.³

Furthermore, this individual re-develops in himself ancient and mutilated sensibilities that have an analogy with those used in the mythological-magical mode of thought...with prophetic revelations, with Orphic mysteries, with mystic theology such as that of Dionysis Areopagita, with the Kaballa, Tao, Hindoo philosophy, with Egyptian wisdom, with gnostic rapture, with mantic experiences...⁴

By shifting the emphasis from the horizontal trajectory (to which he ascribes the ‘flattening’ effect of naturalism in human discourse) to that of the vertical, Jolas is proposing a return to pre-modernist sensibilities. What may be called ‘vertigral architectonics’ is an expansion of the structure of the Alexandrian *mentalité*, explicated by Hans Jonas and other scholars, into a hermeneutic tool by which certain manifestations of consciousness may be seen to be operating within an imaginary that integrates human beings and the cosmic through the instrumentality of the body considered as a pneumatic communication device. Concerning the fundamental vertical orientation of Alexandrian and Gnostic thought, Jonas has noted,

[The Gnostics considered] the existing system of the universe as a power structure which determines the actual condition of man. The emphasis here is on its stratification along a vertical axis, on the antithesis of the heights and the depths, on the distance between the terrestrial and the divine world, and the plurality of worlds in between.⁵

As he has stated elsewhere, Jonas considers that the hierarchical ordering of the Alexandrian/Gnostic *kosmos* is a necessary concomitant within an imaginary that views existence as an essentially abstract, continuing ‘power struggle’ between human beings
and the demiurgically created world. Unlike Jonas, the notion of vertigrality in this dissertation does not necessarily imply a relationship between competing ‘powers’, but rather implies a set of relationships in a state of perpetual and oscillating communication.

Most importantly, the concept of ‘body’ within the vertigral scheme is a greatly expanded notion to that of the post-Galenic, Cartesian corpus that has so dominated Western thought throughout the modern period. Jolas’ call to examine the pre-modernist vertical trajectory central to certain ideas and practices of ancient and non-European cultures seems to be an early 20th century call for the re-integration of these ideas and practices into contemporary discourse. This constitutes what one may now recognise as a ‘postmodern move’ that attempts to re-vitalise certain epistemological and ontological questions by advocating a re-examination of pre-modernist ideas within the context of the postmodern era. This strategy can be characterised as a ‘postmodern move’ as it is an active, conscious displacement of the grand récits (in particular the sustaining narratives associated with the modern(ist) scientific project), in an effort to discover something of value in knowledges that have been suppressed or abandoned by modernity. As a consequence certain discourses may perhaps then be rejuvenated through what might be characterised as a process of deliberate ‘derailment’ before the speeding train of mechanism crashes into its inevitable dead end. It is simultaneously a call to recognise the plurality of knowledges and the means whereby such new epistemic systems may be formulated.

In her paper, ‘Desire, the Body and Recent French Feminisms’, Elizabeth Grosz states that the body is

central to the understanding of materiality, spatiality and corporeality [and that] the human body is the implicit object and norm of all scientific and philosophical discourse, whether or not the sciences recognise and acknowledge this.

While the sciences of the modern period may not recognise this, certainly individual scientists were persuaded of it. Ernst Mach for example considered that the visual, tactile and auditory modes each defined a particular ‘space’ and that these spaces furthermore were the physiological origin of conceptions of geometrical and phenomenal space. Mach considered that the notion of ‘surface’ has a similar source: our own skin. He wrote,

The space of the skin is the analog of a two-dimensional, finite, unbounded and closed Riemannian space.

For Mach, all symmetry was derived from the left and right orientation of the human body. Even the Cartesian co-ordinates \((x,y)\) had their origin in this corporeal schema.
It is the idea of symmetry that is one of the sustaining, ordering principles behind the continuing influence of the Hermetic imaginary. Absolutely central to the modern scientific project,\textsuperscript{10} the concept of symmetry is the modern equivalent of the Pythagorean \textit{harmonia}. Originally referring to a carpenter's joint (recalling ideas of integrated structure and stability), Pythagoras and his followers expanded upon this idea to formulate some of the earliest ideas of harmony and balance in the cosmos -- in fact the word cosmos (\textit{kosmos}) itself was coined by the Pythagoreans for this very notion.

The notion of the subtle body is a logical figuration the function of which serves to unite intellectual and human cognition, the terrestrial and the cosmic. As such it is a necessary part of an imaginary that pictures the \textit{kosmos} as a vast symmetrical arrangement of intercommunicating forces. No matter how it was pictured or imaged in the 'mind's eye', it is the functional relationships which this figuration supports that are a key to understanding its symmetrical functioning within the Hermetic imaginary.

\textbf{The Vertical Index of the Subtle Body}

Mircea Eliade once reflected that,

\begin{quote}
It is as if the gods had created the world in such a way that it could not but reflect their existence; for no world is possible without verticality, and that dimension alone is enough to evoke transcendence.\textsuperscript{11}
\end{quote}

This verticality is also integral to an extended conception of human physiology found within an Hermetic imaginary that constellates around the 'subtle' equivalent of the human central nervous system, another system similarly constituted for reception and communication.

The imagery and ideas associated with a pneumatically mediated communicative economy and its attendant concept of the subtle body were a mainstay of the Western corporeal imaginary up until the late 17th century. Couliano has noted that the concept of a subtle corporeity, refined into the notion of the \textit{sensus interior} (that which Aristotelian called the 'common sense'), has had a truly remarkable longevity. Conceived of as the intermediary instrument between the body and the soul, and composed of a sidereal pneumatic substance, the \textit{sensus interior} was re-discovered by Scholastic philosophy and continued as an important concept up until the 18th. century where it perhaps saw its last appearance in the opening passages of Kant's \textit{Critique of Pure Reason}.\textsuperscript{12}

It was the explanatory power of the concept of the subtle body that made it such an enduring concept. It at once explained the constancy of the soul, its origins and destination, and its place within a world imagined as being suffused with similar subtle
essesnces. For the last couple of centuries the idea of a subtle essence that enables human beings to communicate with all other bodies has disappeared from serious consideration, yet, considering the remarkably long history of the concept, this may yet prove to be merely a temporary hiatus. Contemporary science would certainly view the idea of a subtle essence as but one more aspect of the animistic worldview that was successfully rejected in favour of the mechanical worldview of modern(ist) science. Contrary to the opinion that both applauds and hypostatises the notion of a disjunctive scientific/materialist break with the animistic past, I regard the imagery of the pneumatic economy as fundamental to a project that would re-examine the bases of contemporary natural science. In this re-examination the pneumatic economy would no longer be predicated on the interactions of a ‘subtle’ material medium, rather it would be predicated on what it so closely resembles: the communicative/cybernetic notion of a world constituted by information exchange.

Esoteric, Hermetic conceptions of the body/mind duality tend to be non-reductionist. Unlike the materialist/mechanical thesis of modern(ist) science in which all observed phenomena are the result of the ultimate constituents of the world remaining at rest until impelled to move under the impact of contiguous ultimate constituents, esoteric thought relies on an imagery of intercession and transmission. The Tibetan Bardo Thödol, the so-called ‘Tibetan Book of the Dead,’ is careful to note that the various demons and apparitions that the deceased may expect to encounter following exitus are projections of the mind itself, yet this equivocal ontological density should not mislead one accustomed to think in terms of an opposition between ‘reality’ and the ‘mental’ into thinking that, therefore, these are just psychic representations or ‘projections.’ The care with which the notion of ‘substantiality’ is avoided in discussions of the Real in Tibetan Buddhist psychology can be assimilated with contemporary cybernetic notions of difference and the consequent differential constitution of the phenomenal. By this I mean that phenomena become meaningful not because of any difference in material constituents, but because meaning is the result of the non-material apprehension of difference. A logic gate in a computer operates because of voltage differential. The gate ‘opens’ or ‘closes’ according to whether voltage is encountered or not. The meaning of this activity is not to be found in the presence of absence of voltage, but in the fact that meaning is implicit in the differential constitution of the logic gate. In using the term ‘differential’ to describe the constitution of the phenomenal, I am suggesting the idea that phenomena are the result of the intersection of two communicative orders: consciousness and the Real. If human beings are indeed ‘patterns that perpetuate themselves’, then the Real may be similarly constituted as Λογος or ‘pattern’, and the intersection of both is what constitutes the phenomenal world.
This idea of the differential constitution of the phenomenal should be seen as an alternative to the naive realism most of us carry around in our heads, the inevitable result of over three hundred years of the dissemination of the worldview of materialist/mechanical science. Yet not all contemporary scientists were/are committed to the naive realist viewpoint. Albert Einstein was well aware of the 'differential' alternative; in fact he was responsible for according the idea a certain rigour in the form of Einsteinian 'field theory':

From the relativity theory we know that matter represents vast stores of energy and energy represents matter. We cannot, in this way, distinguish qualitatively between matter and field...matter is where the concentration of energy is great, field where the concentration of energy is small...There is no sense in regarding matter and field as two qualities quite different from each other. We cannot imagine a definite surface separating distinctly field and matter.\(^{14}\)

In the newly emerging jargon of the 20th century physicist (a jargon which he was instrumental in both conceiving and promulgating), Einstein clearly saw that a sharp division between 'matter' and (non-material) 'energy' or 'field' was an inadequate description of reality: there is no 'definite surface' that divides them, as he says. Yet it is the difference between 'matter' and 'energy' that makes all the difference in the world in terms of scientific formulae. Again, it is the differential constitution of Einstein's conception that is important here. If he had thought in terms of the later developing 'information' or 'communication' sciences, he would perhaps have formed his remarks in a similar manner to that outlined above. Following the vertigial schema, one suggests that Einstein's conception of the 'field organisation' of the phenomenal world in which there can be no clear distinction between the 'material' and the 'immaterial' is akin to Tibetan Buddhist accounts of the world which also reject the (immaterial) subject and (material) object reification seemingly so pervasive within late Western thinking. The Hermetic idea of the subtle body similarly maintained a rarefaction of what has become the modern(ist) notion of matter and corporeality. This rarefaction, or perhaps more appositely, liquefaction of substance ('matter') is a distinguishing mark of the Western esoteric tradition in which Neo-Platonic and Hermetic ideas have generated such a profound affect.

**Origins of the Pneumatic Economy**

Aristotle's attempt to reconcile the extreme separation of mind and body advanced by his teacher Plato led him to define a tertium quid, a third substance that could mediate the seemingly insuperable metaphysical divide between the two kinds of **ousia**, body (**soma** or **physi**s) and soul (**psyche**). With Aristotle the soul's relationship to the body is still one of superior faculty to its inferior, but the problem of communication between the two
ontic categories is reconciled. Aristotle proposes the existence of a *proton organon* (primary instrument) of the soul located in the heart. It is composed of the same substance as the stars,\textsuperscript{12} fiery spirit (*pneuma*), yet it is so subtle as to approximate the condition of the soul, while still being a 'material' as such so that it may have contact with the corporeal world as well. The soul transmits its vital activities to the body by means of this pneumatic organ, and the body communicates sensory information to the soul by means of the *phantasmata* produced by this same *proton organon*. Pneuma, then, was conceived of as an intermediary principle, half-way between the material world and the immaterial soul. It was the principle of communication between the two most fundamental *ousia*, soul and body.

It is significant that Aristotle regarded the pneumatic organ as the primary or original instrument. Aristotle seems to be implicitly privileging the function of communication above all others in his conception of the *proton organon* as the instrument which transported and ordered the phantasms. The phantasms transmitted by the *proton organon* may be regarded as representations of sense data that could be understood by the soul as, owing to the total ontological abyss between the two orders of being, the soul would be quite unaware of the activities of the body without this phantasmic language. As a consequence, Couliano notes, 'the phantasm has absolute primacy over the word.'\textsuperscript{16} The phantasm, then, is the very condition of cognition itself, over and above the physical production of speech. Consequently there exists what may be regarded as two 'grammars': a grammar of speech and a grammar of phantasms, a strict order with contemporary parallels in Jerry Fodor's conception of a 'grammar of thought' for example. What is interesting about this model is that the phantasms were conceived of as being a sort of image, constituting what Fodor would call the basic elements of the 'mentalist' of cognition. The Epicureans called these images *eidola*, linking their conception with the Ionian/Platonic notion of *eidos*. Lucretius speaks of the eidola (often translated rather cumbersomely as 'idols') specifically as images and the word 'image' is etymologically connected with *eidos*. Importantly Lucretius regarded these *eidola* as material bodies, even if 'extremely thin', as he says.\textsuperscript{17}

The Stoic philosophers replaced the concept of the *proton organon* with that of the *hegemonikon*, which also resided in the heart. Couliano characterises this concept as that of a 'cardiac synthesizer', referring to Galen's later description of the function of the *hegemonikon* as *synaisthesis* or synthesizer of pneumatic currents.\textsuperscript{18} The *hegemonikon* receives all the pneumatically transmitted information from the five senses, all the 'comprehensible phantasms' (*phantasia kateleptike*) that can be understood by the intellect, and produces *typosis en psyche*, 'impressions in the soul.'\textsuperscript{15} The process of perception was this: a current from the pneumatic circulatory system would travel to, say,
the pupil of the eye from where it would enter into contact with the air itself (according to the Stoic philosophers the pneuma was composed of the same stuff as the air, i.e. ‘like knows like’) creating a ‘certain tension’\textsuperscript{20} which widens into a cone, the eye being at the apex and the base of the cone constituting the field of vision.

We know that Aristotle did not himself create the theory of the phantasmic pneuma, but was himself indebted (as was Plato) to both the 6th century physician Alcmaeon of Croton and Empedocles of Agrigentum of the 5th century B.C.E.\textsuperscript{21} These two Sicilian physicians both held that the pneuma was a subtle vapour that travelled in the arterial system while the blood was relegated to the venal system. We observe here the earliest intimation in the West that sensory data were transmitted through a complex system -- the primitive forebear of the 18th century recognition of the functioning of the nervous system.

It is interesting that the Stoic thinkers very early realised that a communicative system composed of phantasms received by the senses required some sort of supervenient principle in order to organise the phantasms into the coherent picture of the world human beings ordinarily perceive. Galen later proposed that the \textit{hegemonikon}'s synthetization of the pneumatic phantasmata occurred in the brain rather than the heart, a theory still held, \textit{mutatis mutandis}, today. The Galenic and Stoic need for a 'central processor', a \textit{hegemonikon}, is paralleled in contemporary neuroscience where one of the most pressing problems facing the mind-brain identity hypothesis is to solve the so-called 'binding problem.' Since the late 19th century neuroscience has made strong progress in discovering and mapping some of the brain sites responsible for such faculties as sight, hearing, taste, depth perception and a host of other fine discriminatory abilities. Yet what the cognitive neurosciences have not yet found is a physical brain 'site' where all these multifarious faculties and abilities are put together to form overall perception, or even an explanation as to how this is achieved. There exists no explanation, in other words, of how sense data are 'bound together' to form the coherent perceptions of the world we ordinarily share. We observe here the reappearance of a very old problem, a problem with a transhistorical logical and ideal dimension which has periodically and necessarily engaged thinkers from ancient times up until the present.

\textbf{The Subtle Body as Psychonaut}

The ancient (most likely Babylonian) idea that the position of the (then known) seven planets had a direct influence on the lives of human beings at the time of birth had an important corollary: that of the descent of the soul through the heavenly spheres. The most important development of this idea is found in the Neo-Platonic concept of the \textit{okhema}, the vehicle of the soul, which seems to be a combination of three elements:
suggestive passages in Plato’s *Timaeus*, Stoic conceptions of the *pneuma* as mediating perceptions in general and Aristotle’s conviction that the sensitive and nutritive aspects of the soul had their seat in the pneuma, which was itself ‘analogous to that element of which the stars are made.’

In Alexandrian thought the necessity of finding a *tertium quid* that mediated the Platonic division of the intelligential and corporeal realms led syncretically-minded Neo-Platonists to propose a number of pneumatic envelopes for the rational soul. Proclus’ account of the descent of the *okhema*, (‘chariot’ or vehicle) in company with its soul describes how it acquires vestments (*chitones*), increasingly material, of which it must divest itself if it is to re-ascent and recover its ‘proper form, after the analogy of the soul which makes use of it.’ That is, just as the soul needs the vehicle for its transport, acquiring the ‘irrational principles of life’ and ‘faculties tending to temporal process’ on its way down, so the vehicle must accrue material encrustations in its accompanying downward journey, shrugging them off on the return trip. Unlike the negative accounts of *ensomatosis* of the Gnostics (in which evil Archons [‘rulers’] transfer some of their corrupt aspect to the weary psychonaut, endeavouring to prevent the soul from returning from whence it came), Neo-Platonic renditions attribute certain *qualities* only to the intellect in its descent: the faculty of contemplation and practical intelligence (which, having its origin in another world altogether, the intellect would surely need) and the ability to stimulate procreation of children and the growth of the body -- in other words to instil the Aristotelian *dynamis* during its earthly existence.

In fact Proclus noted the existence of two ‘vehicles’, one lesser, one higher. These two vehicles were a response to two traditions concerning the subtle body, one of which saw the sidereal body as being an essential element always accompanying the soul, the other (as in Gnosticism) seeing it as an acquired element during the souls decent through the Spheres or Aeons (as described for example in the Gnostic/Hermetic *Poimandres*) and which would be subsequently jettisoned on the souls re-ascent. The original, congenital *okhema* is the *soma augoeides* (‘luciform body’) or *astroeides* (‘star-born’), the *proton soma* (original body) which is demiurgically besouled. Incorruptible and eternal, it corresponds, according to E.R. Dodds, ‘to the enduring root of unreason in the human soul which survives every purgation.’ The lesser *okhema pneumatikon* is composed of the four elements, ‘vehicle of the irrational soul proper’ it survives bodily decomposition but is destined to be recombined with the *ouranos*, the celestial spheres.

It is clear that this systemic topology adheres to the logical necessities of the micro/macrocospic couplet, which is characterised by its double movement, a ‘dual projection that leads to the cosmization of man and to the anthropomorphization of the
universe’ as Couliano observes. It is clear too that the idea of a subtle body logically followed from a world envisioned as a network of interpenetrating subtle influences, a world which was in its essentials composed of various gradations of psyche or mind-stuff.

A Challenge to Cartesian Corporeality

Many of the ideas concerning the pneumatic economy were transmitted to Europe during the period of the ‘12th century Renaissance’ mainly through Latin translations of Arabic versions of the work of Galen and other writers. The great college of translators working under the eye of the archbishop Raymond in Toledo also produced translations of the works of Avicenna, who was perhaps the major source of the Aristotelian ideas of phantasmic synthesis in the early Medieval period. The idea of the subtle or star-born pneumatic body was revived and elaborated by Renaissance scholars as well, principally by Marsilio Ficino, whom one can say without too much exaggeration was almost single-handedly responsible for the efflorescence of pagan ideas we call the Renaissance.

Just at the time when the Western world was transforming from a world view structured by the micro/macrocospic couplet to that determined by the results of empirical science, the concept of the subtle corporeity saw a renewal in the work of the ‘spiritual contemporary’ of Ficino, Henry More and his fellow Cambridge Platonist, Ralph Cudworth. It is the ideas of these two thinkers, and their debates with their contemporaries that allows one to note that early on in the transition from pre-modern to modern(ist) science there was a struggle between opposing imaginaries, and the very idea of subtle bodies was at stake. The new, impending imaginary of corporeity was the machinic imaginary of Descartes, Newton and Laplace, the contested imaginary was that inclusive of the Hermetic subtle body and its natural environment of a pneumatically constituted world.

This battle between two imaginaries and two ways of describing the world is paralleled in our own times when one considers that that the Cartesian/Newtowonian view of bodies and forces is no longer adequate to explain the paradoxical activities of sub-atomic particles. If this is indeed the most fundamental level of physical description (and it is currently held to be by most physicists), then we assuredly know that a purely mechanical explanation of phenomena is inadequate. We too face a crisis which surrounds the inadequacy of referring to physical bodies which are subject purely to mechanical interactions with other physical bodies. The impoverishment of this level of description was very early realised in the 17th century by both More and Cudworth.
Both Henry More and Ralph Cudworth seem to have clearly perceived the impending struggle between two opposing worldviews, and each attempted to re-validate aspects of the Hermetic worldview within the transition between imaginaries. Dean Ralph Cudworth published his *True Intellectual System of the Universe* in 1678. In this work Cudworth attempted to systematise Hellenic and Platonic concepts of the pneumatic and sidereal bodies in a manner never accomplished (and perhaps never intended) by their originators. Cudworth was caught up in that newly emerging trend to present *systematic* expositions of a philosophy, a trend that is best illustrated in the work of Descartes, Leibniz (who was strongly influenced by both the ideas and the attempts at systematicity of the Cambridge Platonists) and Kant, and which is in contradistinction to Scholastic works which operate on a rhetorical model best characterised as ‘Aristotelian.’ While his work was much admired in its time, by the early 18th. century it was disparagingly characterised as superstitious and credulous. This change in attitude towards Cudworth’s ideas was not only the result of the increasing persuasiveness of Newtonian mechanics in the early 18th. century, but also because Cudworth’s attempt to develop a comprehensive system out of Neo-Platonic notions and to reconcile these with Christian beliefs was regarded as deluded. Cudworth’s detractors, clearly possessing a short historical memory, seemed to have forgotten that Saint Augustine had attempted the very same project centuries earlier, and that it was this attempt which furnished the greater part of the Christian West’s philosophic outlook.

Cudworth’s work was partly an attempt to discredit the new Cartesian, mechanistic ideas that were particularly championed in England by Thomas Hobbes, whose *Leviathan* had been a best seller. Hobbes’ idea that everything in the world -- including human perceptions and passions -- could be explained with recourse to only two concepts, motion and atoms, left both Cudworth and Henry More considerably underwhelmed. Both thinkers attempted to resuscitate ancient ideas and systematically synthesise these with the emerging ‘new world’ of natural science.

As Descartes was responsible for the re-introduction of the Platonic extreme separation of psyche and body into European thinking, it is not surprising that More was one of Descartes’ first champions in England. And it was the nature of ‘spirits’ that was the central point of contention in the extended correspondence between More and Descartes. More believed that Descartes’ definition of matter as simple extension was too limited, for according to More both spirit and matter were possessed of extension. For More, matter should be defined as the ability of bodies to be in mutual contact with each other with the additional distinction of its impenetrability, while spirit on the other hand is penetrable and cannot be touched. Spirit then, is a substance such that it cannot be apprehended by
the senses, and which can occupy any number of loci, unlike bodies which can only occupy one locus at a time.

Following Plato, More believed that, unlike matter, spirit was indivisible:

...Spirit can be no more separable, though they be dilated, than you can cut off the Rays of the Sun by a pair of Scissors made of pellucid Crystall.34

The property of dilation was an innovation on More’s part: dilation and contraction were related to what he called the ‘essential spissitude’ of the spirit, a property entirely missing from matter. More called this ‘spissitude’ or spiritual density, the fourth mode or dimension of the spiritual substance. It was this fourth dimensional property that allowed spirit to pass through bodies, or allowed several ‘spirits’ to occupy the one body at the same time. As examples he used the varying intensity of light, or the semi-occult ‘magnetic forces’ which William Gilbert had discerned at the turn of the century in his On the Loadstone and Magnetic Bodies, and finally there was ‘attraction’ (soon to become the ‘universal law of attraction’ of Newton) which seemed to pass through bodies unimpeded, as Galileo had recently demonstrated.

What is notable about this characterisation of spirit is that it not only includes the Cartesian definition of matter within its properties, but it also extends the primary properties of spiritual substance, thereby dismantling the inverse relationship between res cogitans and res extensa advocated by Descartes. More’s ‘spissitude’ makes spirit a material substance (in the sense Cartesian of extension) which extends into four dimensions, an interesting advancement of the Hermetic notion of the refined ‘material’ nature of pneuma that combines ancient ideas with the 17th century obsession with geometrical demonstration.

More’s imagery of the spirit clearly invokes the Neo-Platonic conception of the pneuma as being a unitary substance that links the four elements of which bodies are composed, yet which is itself, to use More’s vocabulary, ‘indiscernable.’ Its spissitude allows it to be part of the geometry of the phenomenal world, yet undetectable by the ordinary sensory apparatus. More, in utilising the notion of an unseen fourth dimensional extension to matter was clearly siding against Aristotle (who explicitly denied the possibility in his On the Heavens) and mathematicians like John Wallis, who still regarded the concept of a fourth dimension as a ‘Monster in Nature, less possible than a Chimera or Centaure’,35 while simultaneously invoking a geometrical argument after the manner of Descartes to shore up his ideas. Having thus combined Neo-Platonic ideas of the subtle body with geometrical demonstration, Henry More may perhaps be regarded as the first thinker to initiate the beginnings of what would become the non-Euclidean
geometry that would so radically undermine the Newtonian worldview in the late 19th century.

Lest the foregoing discussion of Henry More's ideas seem totally absurd in terms of contemporary sensibility, I would recall the initial general scientific response to Newton's Theory of Universal Attraction, the majority of which was of a similar tenor to that of G. M. Bose, Professor of Philosophy at the University of Wittenburg:

Shall action at a distance be granted? Will you then prevent a star from acting as a talisman at a distance? Rejoice Melancthon, the horoscope returns... Soon the Thelassian witch, horrid with wrinkles and bristles, raging, shall return.\(^5\)

Professor Bose was of course referring to the Hermetic pneumatic economy that, among other things, explained such things as 'action at a distance.' As the new philosophy sought to rid the world of such occult qualities, how could Newton's conception of universal gravitation possibly be correct? We see here the inadvertent recognition by Prof. Bose of the morphology of an ideal object that includes in its fourth dimensional entirety such notions as the Stoic pneuma, the communicative entity of the subtle body and Newtonian universal gravitation as it unfolds over recent history.

**Corporeality and Semiosis**

We observe the formal structuring principal of the vertigral schema first emerging within the canon of Western thought with the emergence of the principle of the micro/macrocospnc couplet. Contemporary scholarship suggests that the idea that a reciprocality obtains between the individual psyche or soul and the heavens pre-dates both Platonic and later Aristotelian conceptions considerably. The idea that the soul is a 'spark of sidereal essence' was known to Heraclitus. That its origins lay in the heavens and that it will one day re-ascent was a generally held belief among the earliest Ionian iatromantes,\(^37\) who held that at the moment of exitus, following the most primary of logical relationships in Hellenic thought, 'like returns to like.' This early problematising of the soul's relationship to the body is often treated as one of the greatest intellectual catastrophes that was bequeathed to the West. No doubt this is true in many respects. Yet what is continually overlooked in contemporary critiques\(^38\) of these early conceptions is that they are embedded within a rich imaginary that sees embodied perception as just part of a wholistic set of figurations that unite humankind directly with the essential nature of the world.

It was in the Socratic period that the concept of psyche achieved a degree of sophistication that was lacking in earlier periods. Plato's innovation in this developing psychocosmography was primarily a negative one. The *Phaedrus* recounts the fall of the
soul from the heavens to the prison of the flesh below. Implicit in this scenario is a 'correspondence between essence, value and direction in space' such that what is highest -- beyond the ninth Sphere -- is superlative: subtle, essential, eternal and at rest, while that which lies below is dense, accidental, corruptible and restless. The critical determinations of what would become the Western philosophical tradition -- substance, accident, form and matter among others -- are thus aligned within an imaginary that privileges the vertical trajectory of the human psyche, this vector determining the value and ground of future philosophic discourses.

Undoubtedly this developing psychocosmography drew much of its substance from the astrological arts, a fact that significantly expands any characterisation of the pre-modernist corporeal imaginary. Popular Hellenistic astrological texts first emerged in the third century B.C.E., and while many of these texts were only concerned with the 'dross of vulgar horoscopy' as G. R. S. Mead puts it, many reified the philosophic notion that the 'relative positions of the celestial bodies in the aether at any moment were...indices of the harmonious interaction of invisible spheres, with appropriate fields of vital energy', all this conceived of as an 'interior economy of the world-soul'. We observe here consolidation of the Hellenic view of the strong affinities between psyche, pneumatic substance (the 'quintessence') and the stars. We also observe the notion that all these affinities may be 'mapped' in some manner, after the model of an astrological chart.

The influence of iatromathematics (medical arts concerned with the influence of the stars) on Plato's thought has been little commented upon in 20th century scholarship. One finds, for instance, Voegelin noting that the term eidos (one of the terms Plato used for his concept of the Ideal Forms or archetypes behind phenomena) had a general currency in Plato's time and that there is no reason to think that Plato would have used it in any other way than the Athenian norm. In Plato's time,

The eidos or idea, [was] the combination of symptoms that characterises a disease, the combination that later (Galenus, Aretus) came to be called the syndrome, the clinical picture.

Originally the terminology was used by the Ionian iatromantes of the 5th. century B.C.E. to describe the successive stages of illness: eidos were the first signs of the onset of disease which would then reach the point of crisis, whereupon the illness would 'turn' one way or the other. The Parmenidean and Hippocratic use of the term semeion (σημεῖον) and its synonym tekmerion (τεκμηριόν), were both first utilised to mean 'clue' or 'symptom'. These terms were not applied to (spoken or written) words: the names of things were referred to as onoma (ονόμα), and the distinction between sign and referent had to wait for its first exploration in the work of Plato and Aristotle.
Particularly in Hippocrates’ case, ‘signs’ were evidence of corporeal balance or imbalance -- they denoted the physical/spiritual health of an individual. Evidently, then, the earliest uses of the notion of ‘sign’ in the West were directly connected with the body.

What Voegelin and other classical scholars fail to note however, is the iatromantic notion of the interconnection between an individual’s health and the disposition of the planets and stars. The Ionian crisis was the point where the influence of the stars finally determined the patient’s illness for better or worse, it was an astral event, or more precisely, an event which could only be described in a language that mediated two interpenetrating orders of being: the sidereal and the corporeal: macrocosmic and microcosmic. This concept of the sign as a vertigral index confirmed the parallel operations of the two orders in the minds of the Ionian physicians. For Plato these ideas confirmed the vertical orientation of his ontology and epistemology.

Plato was also well aware of the Pythagorean usage of the word theory (θεωρία, theoria) to denote the contemplation of the intelligential world that was at a far remove from that of sensual experience. He was quite aware that this term had its origins in the Pythagorean practice of contemplating the heavens for ‘signs’ -- indications of changes in the relationship of the stars to human beings that determined the inconstant nature of physis. It was this specialised shift in the meaning of the terms eidos and idea, initiated by Pythagoras but made more explicit particularly by Plato, that would allow the later Stoic philosophers to announce a general semiostis operating in the phenomenal world. This naturally, logically followed from the conception of the world as a vast living mind, an anima mundi. This general semiosis would later be confirmed in the Christian West by St. Paul when he stated: ‘For since the creation of the world God’s invisible qualities -- his eternal power and divine nature -- have been clearly seen, being clearly understood from what has been made.’ (Romans 1:20) Here St. Paul gives scriptural authority to what would later become the late Medieval, pre-scientific concept of the ‘Book of Nature’: the idea that God’s signs are immanent in the world. We should note, then, that this early confluence of the observance of astrological events, siderial medicine and the beginnings of the idea of the sign, of semiosis, are all -- in a non-trivial manner -- intimately connected. The sense of this intimate confluence would eventually be carried through, centuries later, to the beginnings of modernist science with Francis Bacon’s announcement of his ‘new organon’, which he himself characterised as the ars indicii or ‘art of indications.’

It seems that this early Western notion of the interpenetration of the two orders of the celestial and the corporeal (this liminal site of interpenetration being the original domain of
the semiotic) is not unique to the Mediterranean origins of Western thought. Vajrayana (Tantric) Buddhism also holds to the idea of what Alex Wayman has called an ‘inner zodiac’ where celestial bodies are equally held to reside in the body (or its subtle equivalent, as Wayman notes⁴⁶) as well as the heavens. Furthermore the Buddha’s ‘glorious body’, Sambhoga-kaya (equated with the concept of the subtle body by many scholars including Conze and Waddell), is noted for bearing 32 ‘marks of a superman’, 80 subsidiary marks and to radiate light on all sides.⁴⁷ It is this luciform body, rather than the Buddha’s earthly body which is generally depicted in all forms of Buddhist iconography.⁴⁸

The foregoing observations regarding the imaginary of Vajrayana Buddhism are not intended to be tangential. The logic of vertigrality would insist that similar conceptions of a subtle body must be generated in non-Western cultures, and these similar figurations would follow a similar logic of development to that of Western conceptions. A vertigral reading of conceptions of corporeity would suggest that at the beginnings of both the Western and Buddhist canons corporeity existed as a complex notion in which the ‘physical’ was ineluctably bound up with the realm of signification and communication, and that this latter was represented by the pneumatic medium of celestial influx and/or the notion of a subtle body attendant upon the physical corpus. ‘Meaning’, then, must somehow be connected to the experience of embodiment, or perhaps more exactly, embodiment must be the condition of meaning. This problematising of the body by way of its relationship to celestial influence (and thereby signifying activity) is one of the keys to understanding the pre-modernist corporeal imaginary in its vertigral dimension.

Is there indeed a vertigrality or similarity of conceptions regarding the subtle body between Vajrayana Buddhist and Western cultures? It is the task of the last section of this chapter to demonstrate just such a similarity and vertigral connection, and to demonstrate that the Vajrayana Buddhist subtle corporeity holds a similar position as a figure of communication within Tantric thought.

**Tantric Luciform Corporeity**

The general problematics of the body discussed in the early Western tradition and revived by the Cambridge Platonists are echoed in Buddhist belief systems, and the manner in which corporeity and the subtle economy are regarded in the culture of Vajrayana Buddhism in particular provides certain useful tools for re-evaluating and revitalising these notions for the development of a postmodern hermeneutics.

The Mahayana Buddhist tradition maintains that the birth of the Buddha, his life and death -- even his enlightenment -- were not real, but a ‘show’ to awaken people. The Buddha’s
body on earth was a phantom body, as the being(s) known as the Buddha (the historical Buddha was the fourth in a succession of Buddhas — according to the Vajrayana system there are one thousand Buddhas for this millennium) is actually composed of several interconnected bodies or kayas.

Classical Buddhism admits of three bodies (tri-kaya): the Dharma-kaya, the ‘Law-body’, ‘formless and self-existent’; the Nirmana-kaya, or transformed-body (that is, the form of the historical Buddha, Gautama Siddhartha) and the Sambhoga-kaya, the ‘Compensation-body’, ‘usually named Lochana or glorious’. Of this last, the early Lamaism researcher L. Austine Waddell notes,

It is singular to find these Buddhist speculations bearing so close a resemblance to the later Greek theories on the same subject, especially in

the plain resemblance to the σωμα σωφοιδες or luciform body, to the

Lochana (Rajana) or ‘Glorious Body’ of the Buddhists.

Waddell is curiously undilatory when he ascribes theories of the luciform body to ‘later Greeks theories’ (he neglects to mention whether this refers to the Socratic period or later Neo-Platonic thought), but suggests that one should ‘refer to Cudworth’ for a full exposition on the subject. With the efflorescence of research into the Tibetan Vajrayana system in the latter 20th century, we no longer need to refer to the syncretic ideas of Dean Ralph Cudworth to help us grasp the concept of the luciform body, but can instead rely on direct expositions of the system. Yet it should not be forgotten that Waddell’s reference to Cudworth is essential if one hopes to trace a vertigral history of the subtle body.

In Vajrayana (Tantric) Buddhism the path of Tantra is that of, among other things, the practise of certain psychosomatic exercises the aim of which is to attain the ‘clear light of bliss.’ These practices are known as mahamudra, usually translated as ‘great seal’. In the original Sanskrit, the word mudra has several possible meanings: the hand/foot/body gestures of dance; symbolic language in general (including iconographic representations), and ritual activity. Concerning the latter, mudra play a very important part in the rituals and practices of Tantric Buddhism, particularly the Vajrayana path and the esoteric (Jap: mikkyo, Chin: mizong) Tendai and Shingon sects of Japanese Chan (Jap: Zen) Buddhism. Even the most austere of mystical regimens followed by Zen sects utilise at least one essential physical mudra: that of zazen (Ch: qing zuo) or ‘quiet sitting’, the actual structure of which is also utilised in Vedic yoga where the posture is called vajrasana, or ‘diamond-thunderbolt posture.’
Regarding the importance of the concept of mudra in esoteric Buddhist practice, Mircea Eliade notes the ‘symbolical valorisation of ritual gestures’ in the most ‘highly evolved mysticisms’, pointing out the significance of gesture in Persian (Iranian) mysticism as well.\(^5\) Eliade points out that the trade and cultural relationship between China and Iran is quite ancient, and at least one Buddhist scholar who visited China in the second century C.E. was also well acquainted with Iranian magic and astrology.\(^5\) Eliade’s point is to suggest a direct link between Iranian dualism, Gnosticism and Buddhism. According to the notion of the ideal object, a vertigral tracing of the concept of the subtle body implies that such historical validation is unnecessary. Esoteric practices should, even without any ‘physical’ contact between cultures, produce a similar imaginal logic in regard to corporeity and in particular, the subtle corporeity.

But what is the nature of these gestures, of mudra? Are they merely ‘symbolic’ in the contemporary Western sense of an economy of arbitrary assignations (the Saussurian concept of the sign), or does the role of mudra in certain oriental practices portend something quite different? I propose that an attentive examination of this one signifier — mudra — will provide a greater insight into the subtle corporeity as (a) an ideal object that demonstrates the Oriental imaginary of the body to be a dynamic and expansive construct in contrast to the Western modern(ist) imaginary of the body and (b) that in a similar manner to that operating within the Hermetic imaginary, this dynamic and expansive imaginary suggests an as yet untapped resource for developing an alternative hermeneutic in regard to the very notion of embodiment.

Geshe Kelsang Gyatso, a contemporary Vajrayana (Tibetan Buddhist) scholar, states that the ‘great seal [mahamudra] refers to emptiness’, and quotes the statement of the Buddha in the King of Concentrations Sutra: ‘The nature of all phenomena is the great seal.’\(^5\)

Gyatso explains:

Here, ‘nature’ refers to the ultimate nature of all things: their emptiness, or lack of inherent existence. Such emptiness is called the great seal because phenomena never move or change from the state of lacking inherent existence.\(^5\)

Meditation on the ‘seal’, that is, the ‘immobilisation’ of all dependant things, is for the purpose of liberation from the cycle of existence. The notion of ‘emptiness’ (Tib: stong pa nid) is central to Vajrayana Buddhism (as indeed it is to many schools of Buddhist thought) and is derived from Nagarjuna’s teaching that the essential nature of all dharmas (phenomenal existents) is sunyata, void or empty. As Tibetan scholar Herbert V. Guenther translates the term, sunyata or stong pa nid means ‘no-thing-ness’, all existents being inherently insubstantial.\(^5\) The sense of ‘seal’ (mudra) in Gyatso’s commentary is clearly the sense of being sealed in to this state of inherent ‘no-thing-ness.’
Yet there are further elucidations of the nature of mudra in the mahamudra path: Gyatso relates that, to attain the ‘clear light of bliss’, the practitioner must ‘penetrate the vital points of another’s body’ through the practice of the ‘action seal’ (karmamudra) and the ‘wisdom seal’ (jnanamudra). The ‘action seal’ is the designation of the partner in this form of meditation, a meditation that involves two meditators -- male and female. Gyatso explains that, at a certain stage of accomplishment, the practitioner should engage in this practice which ‘more forcefully’ encourages the ‘winds’ to enter the ‘central channel’ (vide infra) of the subtle body. The ‘wisdom seal’ is also a (female) partner, but not a physical one, rather it is a visualised female ‘consort.’ According to Gyatso,

> The embrace of a consort is very helpful in bringing about a complete loosening of the channel knot at the heart-channel wheel.60

Elsewhere Gyatso notes that the heart-wheel channel is the precise location of the mind. This is the ‘root mind’ or ‘resident mind’, the ‘very subtle mind’ which survives discorporation and is distinguished from the ‘gross’ and ‘subtle’ minds.61 We observe here a gradation of ‘mind-stuff’ similar to the Hermetic view which holds to a similar gradation between gross physical bodies and less material, more ‘subtle’ vehicles of the mind or psyche.

Even at first glance these Tantric conceptualisations appear to be inextricably bound to conceptions of corporeality much greater than those of the West, and which constitute a ‘thread’ or ‘continuity’ (one of the etymological derivations of the term tantra), throughout the system. The scholar and Buddhist teacher Chögyam Trungpa explains that all Vajrayana practices accept the body as the ‘basic being’ which is ‘highly workable and full of all kinds of potentialities’62 and that the mudra of mahamudra does not indicate a ‘symbol’ (a sign, writing) as such, but a certain ontological level of realisation:

> Eyes are the mudra of vision and nose is the mudra of smell. So it is not a symbol in the sense of representing something or being an analogy for something. In this case, mudra is the actualisation of itself. The idea is that physical activity has been seen as something workable; it is something very definite and at the same time highly charged with energy.63

Within Tantric Buddhism (and indeed, the Hindu Tantric systems) we can discern a certain constellation of meanings that accrue around this one signifier, mudra. We know that it is a ‘seal’ in the sense of ‘sealing up’; it is a ‘sign’ of something, a form of inscription that somehow has an ontological weight much greater than what we in the West would normally ascribe signs in general, and the technical designation of the female consort in Vajrayana practices. To a Western scholar unfamiliar with certain oriental ideas this would appear to be a very paradoxical term indeed. On the one hand it refers to nothing -- the ‘emptiness’ of the universe, sunyata -- and at the same time it alludes to

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sets of physical practices and the body itself (including its total ‘occult’ or esoteric corporeity.)

Yet the sense of paradox in these determinations is the fault of the Western mind alone, the result of just over three hundred years of thinking predicated on an imaginary of the body imperiously inserted within the imaginary of the machine. It is the continuing force of this historical admixture of one imaginary with another which must be re-analysed if one is to avoid a sense of contradiction and paradox in regard to Buddhist conceptions. Speaking of an early 18th. century Japanese text which elaborates the relationship between Zen and the ‘Ways’ by which enlightenment may be accomplished, Trevor Leggett notes that in the text one and the same word may have many and varying meanings:

For instance, the changes of the seasons are said to be the Way of Heaven, to be changes in the universal ki, to be alterations of yin and yang, manifestations of the heavenly principle, or finally transformations of the heart.\textsuperscript{64}

He then notes:

To a Japanese thinker of the time these transformations would not have been felt as necessarily contradictory; they might all be true on different levels.\textsuperscript{65}

In a similar manner, this ‘modal’ manner of regarding certain ideas pervades Tantric Buddhist literature and practices; the question of ontological and/or logical paradoxes surrounding the various senses of the word \textit{mudra} would be regarded as ‘low level’ thinking indeed.

One of the main reasons that Western scholars find certain oriental ideas so paradoxical, and therefore so difficult to accept, is that the West has an abiding concern with substantiality, with the idea that there must be a ‘material’, substantial ground to phenomena and all talk of phenomena. This is of course an historically contingent condition, but the mere recognition of its contingency does nothing to alleviate the concern. Toshihiko Izutzu notes that Western conceptions of the nature of substance (and hence, corporeality) are central to discussions of both the nature of identity and the logical principle of contradiction. In contrast, he says,

Eastern philosophy combats such a conception of the empirical world by trying to ‘liquefy’, so to speak, the ‘essential’ solidity of things.\textsuperscript{66}

The ontological implications of the principle of contradiction are deliberately rejected in much of Buddhist philosophy. This perspective adumbrates Nicholas of Cusa’s stand (in the 15th. century) against ‘the present predominance of the Aristotelian sect, which considers the coincidence of opposites a heresy, whereas its admission is the starting
point of the ascension to mystical theology.'\textsuperscript{67} The rejection of the principle of contradiction leads not only to a ‘mystical theology’, but also to a greater facilitation of contemporary theoretical physical ideas as the experimental confirmation of Bell’s Theorem (of non-locality) in quantum mechanics fully attests. Perhaps the greatest import of the experimental validation of Bell’s Theorem is that the ‘last stand’ of classical Newtonian physics in support of local causality (expressed so succinctly in the famous Einstein-Podolsky-Rosen paper\textsuperscript{68}) has been conclusively undermined, forcing a reassessment of the entire edifice of Newtonian mechanics. Consideration of the implications of quantum theory has led at least one contemporary physicist to bluntly declare that while Newtonian physics may provide ‘excellent approximations of the truth’, this is of comparatively trivial moment in face of the fact that, ‘Classical physics is false.’\textsuperscript{69} But it is the historical ascendency of this mechanical philosophy, and its continuing hold on the popular imagination, that makes it so difficult for anyone educated in the West to accept any explanation that does not ultimately rely on a description of discrete entities coming into mechanical contact with each other and of the operation of simple forces upon equally simple ultimate constituents (‘atoms.’)

Within Buddhist conceptions affects are attributed to the confluence of certain relationships rather than the hypostatisation of (material) entities. Trungpa therefore utilises the term \textit{mudra} in the sense of inferring the \textit{ontic potentialities} (cf. previous quotation: ‘The idea is that physical activity has been seen as something workable; it is something very definite and at the same time highly charged with energy’) within the sense faculties, the question of signifying activity ultimately possessing a corporeal ground or origin. If we compare the earlier quotation of Trungpa’s with one drawn from the work of Gyatso, we find, I think, confirmation of this conception:

[T]he direct valid perception by an eye consciousness only arises in dependence upon (1) a visual object and (2) the visual sense faculty, or eye-sensor. If there is a visual object present but no eye sense faculty, then an eye consciousness cannot arise.\textsuperscript{70}

In other words, without referent and sense faculty (and this clearly should not only be construed as its physical embodiment), there is no mind or consciousness. The structure becomes that of a \textit{field} of potentialities as opposed to the Cartesian disjunctive ontic categories of \textit{res extensa} and \textit{res cogitans}. We observe here, one suggests, conceptions strikingly similar to those of Bateson discussed in the previous chapter. In both Bateson’s cybernetic ideas and Tantric conceptions, observer and observed become nodal points of the one extended field of ‘information-exchange’ activity. There is envisioned an overall ‘ecology’ of information in which bodies do not logically exist as substances and nor do minds: everything is continuously in process and everything becomes potential for ‘input.’ In (Western) jargon this ecology of information might be seen as a process of
entailment, yet one which is not burdened by the Aristotelian law of contradiction. In a similar manner Michel Serres' image of the observed as that of a 'dispatcher' or transmitting machine intends to clearly stress the active nature of the Real rather than the traditional passivity ascribed to classical Newtonian/Laplacian objects.

In both early Western thinking and contemporary Vajrayana Buddhist thought the notion of corporeality is evidently of central importance, and this corpus is a site of complex systems of energy/sign interchange. For Tantric Buddhists, the body is much more than l'homme machine of Descartes' famous successor, La Mettrie: it is a subtle system composed of 'channels, winds and drops.' There are three channels: a central channel that runs from the root of the genitals to the top of the head, and two channels on either side of it which follow the same path. These channels demonstrate a vertigial correspondance with those of Vedic yoga, where the twin channels (Sk: nadi) on either side of the central are known as the 'sun' and 'moon' channels. During their course they intersect with a series of energy centres or 'wheels' called in Sanskrit chakras ('wheels'). As previously noted, Gyatso locates the 'very subtle' mind in the heart chakra. This location is by no means culturally specific to Tibet. From Aristotle onwards -- indeed, up until medieval times -- the mind was thought to reside in the heart. Mystical Islam locates consciousness in the same place, and classical Chinese culture used the character xin ( ) to mean both 'heart' and 'mind'.

At various places in the Vajrayana subtle corporeity the twin channels weave in front of the chakras, forming 'knots.' At each of these places a single knot is formed, but at the heart chakra three interlinked knots are formed which is why the meditator needs the 'added power' of the consort to dissolve this particular impediment. The heart chakra is particularly important as it is the source for a vast system of channels (72,000 in all) which permeate the body and transport the wind and the 'red drops of the speech' and the 'white drops of the body'. The 'winds' consist of five 'root' winds and five 'branch winds'. As Gyatso himself notes, these winds are equivalent to the prana of Vedic culture. In addition to Vedic conceptions it also shows definite similarities with the qi of traditional Chinese medicine, the 'winds' of kebatinan mystical Islam and the psyche (ψυχή the breath, from ψυχεῖν, to breathe) of ancient Greece. Each of these traditions holds that the air we breathe is the substrate of a much more subtle energy. Each culture also proposes that certain practices utilising control of the breath -- pranayama in Vedic yoga, qigong in Chinese yoga, dikr in mystical Islam -- will lead the practitioner to at least a greater understanding of the ontic potentialities of the human form.
Guenther has carefully attended to the Vajrayana use of such ideas as ‘channels’ (Sk: nadi), ‘winds’ (vayu) and ‘drops’ (bindi). Unlike more literal-minded translators and scholars he realises that these terms operate, as I have indicated, on several modal levels. He notes,

Linguistic translations render these operational terms by ‘veins’, ‘vital air’ and ‘seminal drop’. In so doing they fail to understand the intentional meaning of these highly technical terms. I do not deny that these terms may sometimes mean what the quantitative language of the physical world point to, but this reduction of technical terms to physical (and physiological) counters overlooks the fact that terms have no meaning in themselves...[nadi] indicates ‘structure’ rather than anatomical sections...[vayu] relates to the vibrations that pass along the structured paths...[bindi] is rather a feeling of expanding and of seeing in a new light and order...

In other words there is a systematic ambiguity that orders a varied yet coherent set of objects within Tantric Buddhist thought. Channels are simultaneously abstract structures - coherent patterns -- and the ‘wind’ or ‘breath’ is the vibratory data travelling within these structures. I use the word ‘data’ in the hope of drawing an analogy between Guenther’s reading of Vajrayana imagery and the ideas of Shannon and Bateson. Both of these latter thinkers had a concern with the overall pattern of communication, drawing attention to the level where the abstract structure of data is privileged over the individual constitution of senders and receivers. In a similar manner the centrality of meditative practice in Tantric Buddhism is regarded as both representing and eliciting the overall abstract structure of the Real; in this way it must be seen as a ‘metaphysical’ system distinct from any individual meditators employing such psycho-physical practices. Buddhist meditation provides the metaphysical system of Buddhism because it is grounded in an ontology that views the corpus as a site of activity, of ‘cosmic’ activity, if you will: it is similar in conception to the metaphysics of the Hermetic field of interpenetration of the microcosmic with the macrocosmic.

In observing the simultaneous understanding/usage of images (wind, drops, channels) and their ‘intellectual’ equivalents (data, expansion, structure) within the Tibetan Buddhist imaginary, one must be careful not to artificially separate the ‘intellectual’ content from the imagistic. The vast system of Tibetan iconography should be regarded as a text which in itself is covalent with any ‘intellectual’ exposition of the subject, and to ignore or remove the imagery from the system would be regarded by Buddhists as an act of intellectual violence. Unlike in the West, where in the 17th century we may observe the struggle of competing imaginaries, in the Vajrayana tradition we see a coherent,
uninterrupted imaginary such that its imagery and its intellectual content become one systemic structure.

**The Celestial Nervous System**
The image of the ‘central channel’ of esoteric Buddhism is common to Vedic Yoga physiology and certain esoteric practices associated with Eastern Orthodox Christianity. It is the analogue, in terms of subtle physiology, of what I have called the ‘vertigral schema.’ In fact, so many cultures and attendant mythologies constellate around this figure that it would be impossible to enumerate them here. To give one example however, I will draw attention to the fact that in traditional Chinese medicine, the spine is called *Tiangun*, or ‘celestial stem.’ This celestial stem appears to be the same object that is referred to in Vajrayana physiology as the ‘central channel’ and it is also the channel within which the pneumatic essence known as *kundalini* is said to ascend according to the corporeal imaginary of Vedic yoga.

Each of these conceptions seem to imagistically invoke a variant of the worldview expressed in the micro/macrococmic couplet -- human physiology is not closed but open (usually at the top of the head[6]), the ‘celestial stem’ pointing directly to the Pole Star, which in ancient times was the constellation we know as *Draco*. At one time it too included the Pole Star as one of its members, but the precession of the equinoxes over time shifted *Draco* away from Polaris so that it now lies within the province of *Ursa Minor*. According to the vertigral schema it is more than likely that an archaic mythologem equating the polar orientation of the Dragon or Serpent constellation (*Draco*) with the ‘polar’ orientation of the central nervous system accounts for the symbolism of the ‘serpent power’ (*kundalini*) of Indian yoga and myths of the serpent as purveyor of *gnosis* in several Gnostic mythologies. It is also interesting to note that the symbol of Asclepius, patron god of medicine in ancient Greece (and the subject of a principal text of the *Corpus Hermeticum*), was that of the serpent, and that the modern medical symbol of the caduceus still clearly reflects this symbolism[7]. Rather than a tube for eating and shitting, as St. Augustine famously described the human body, the esoteric *corpus* is seen as a conduit of celestial and phenomenal energy.

**Conclusion**
The idea that human perception and, indeed, consciousness, may not be constricted to the confines of the human encephalon is a notion held by several cultures outside the European tradition, and, as outlined in this chapter, similar notions lie behind the very beginnings of Western thought. In these conceptions consciousness is imagined as a kind of pneumatic ‘receiver’ of pneumatic ‘information’ which is constantly transmitted by the phenomenal world. Non-Western pneumatological medicine (primarily Chinese, Tibetan
and Vedic) still proposes and operates within a somatopological imaginary that is quite removed from the post-Galenic descriptive codes of modern Western medicine. Much more importantly, these pneumatic systems provide an alternative explanation for somatic processes and illness; these explanations often (in contemporary times) complementing Western diagnoses\textsuperscript{78}, and just as often working in contradistinction to them.\textsuperscript{79}

But the significance of the effectiveness of alternative corporeal imaginaries in the medical practices of other cultures is by no means the only fact that should impel us to further explore the implications of these imaginaries. The deliquescence of materiality inherent in both the concept of the subtle body and the pneumatic economy provide starting points for a critique of modern(ist) science and its reification of the subject/object dichotomy. While Heisenberg’s Uncertainty Principle and Schrödinger’s ‘Cat’ gedankenexperiment have challenged the utility of upholding such a distinction in comparatively recent times, the grounds from which such a critique should be pursued are usually thoroughly embedded in the terminology and concepts of the Western modernist project. The recognition that other cultural traditions -- including most importantly the rejected Western tradition of Hermeticism -- have developed complex systems that very early linked conceptions of semiosis or significance with a ‘quasi-material’ concept of corporeity is further evidence in support of the proposition that the liminal cybernetic ‘realm of difference’ may well be the research area where a thorough critique of Western science can be most effectively be pursued. More than this, the cybernetic project needs to recognise its own precedents in systems of thought found in both the Hermetic tradition and Tantric Buddhism.

Contemporary historian of science Donna Haraway has called for a ‘successor science’ that can account for the ‘radical historical contingency for all knowledge claims and knowing subjects...\textit{and} a no-nonsense commitment to faithful accounts of a ‘real’ world...’\textsuperscript{80} Haraway is of course aware that ‘no-nonsense commitments to faithful accounts’ of reality are themselves historically contingent propositions, subject to the same ideological constraints as all knowledge practices, so it may well be that holding on to such accounts would in effect be continuing to sustain (if in modified form) the ideological hegemony of modern(ist) science. Moreover her insistence on the necessity for some sort of transhistorical, generally acceptable description of the ‘real’ world (admittedly her bracketing of the word within quotation marks signals her recognition of the problematic, constructed nature of a ‘real’ world), begs the question as to whose real world would be recognised as authentic. Haraway’s ‘real’ and the Real are clearly two different propositions, the one socially constructed, the other the metaphysical assumption behind the pursuit of modernist science, yet the breadth by which such a reality may be construed is by no means clear.
Haraway states that,

We need the power of modern critical theories of how meanings and bodies get made, not in order to deny meaning and bodies, but in order to live in meanings and bodies that have a chance for a future.  

It is quite likely that 'modern critical theories' which can analyse the construction of bodies and meanings within an 'earth-wide network of connections' would seek to minimise the importance of the vertiginal dimension in human experience (as Haraway's deliberate use of the words 'earth-wide' would seem to suggest, and in accordance with much of post-structuralist critical theory). It was partly the task of this chapter to excavate an imaginary that might be used to facilitate just such a critique of the mechanical/materialist reifications of contemporary science, but admittedly this imaginary is not in itself enough to announce a 'successor science', nor should it be. Nonetheless I suggest that a critical reappraisal of the early occidental/oriental idea of the pneumatic economy may take the form of an initial problematising gambit such as Haraway and others are seeking. Both the Hermetic corporeal imaginary and the Tantric Buddhist imaginary of the interior pneumatic economy are, after all, models that provide

- the idea/image of the radical interconnectedness of all bodies
- the idea/image of an essentially 'open' relationship to the Real
- the idea/image of the 'self' as a radical heterogeneity of structures both corporeal and 'incorporeal.'

There is also inherent within the Hermetic and Tantric imaginaries the idea of a radical community, a harmony of souls, predicated on the very fact of the pneumatic economy, that makes these conceptions powerful counters to the technological rationalism that has so divided nations and peoples in modern times. Both the contemporary 'deep ecology' movement and the concept of Gaia demonstrate, I suggest, resonances with the Hermetic tradition begun by Ficino's 15th. century promulgation of a pneumatic economy. Admittedly the resonances are not exact: contemporary deep ecology actively seeks to minimise the significance of human beings within the overall dynamics of planetary ecological processes whereas Hermeticism, of course, seeks to uphold human beings' place near the summit of the Great Chain of Being.

Traditionally humankind's place within the Great Chain of Being was based on the sophistication of its pneumatic constitution, in the late 20th century this has been cybernetically reconceptualised (as suggested in the previous chapter) by the idea of the Great Chain of Information. It is this latest morphological shift in the post-17th century machinic/corporeal imaginary that has allowed proponents of 'artificial life' to suggest that computer viruses, for example, are alive in just the same way as organic life. Just as with the proponents of AI, 'a-life' prophets suggest that the material base of living
organisms is of little consequence when looked at in terms of information exchange. A-life scientist Christopher Langton states:

The leap you have to make is to think about machininess as being the logic of organization. It's not the material. There's nothing implicit about the material of anything -- if you can capture its logical organization in some other medium you can have the same 'machine' because it's the organisation that constitutes the machine, not the stuff it's made of.\(^5\)

As with the functionalist conceptions of AI, this is the 'Strong Claim' of artificial life; simulation is not at issue, when one understands the 'logic of the living', then life is artificially reproducible.

[A]ny definition or list of criteria broad enough to include all known biological life will also include certain classes of computer processes, which, therefore, will have to be considered 'actually' alive.\(^5\)

Criteria which support the notion that computer viruses are alive include the fact that computer viruses are patterns -- we should recall again Wiener's notion that we are but 'patterns' reproducing ourselves -- which can replicate themselves within any number of computers; these viruses modify the computer environment in which they are stored to suit their own 'needs' and a computer virus 'senses' changes within its computer environment and 'reacts' to them appropriately.\(^5\)

In the world of a-life there is no need for a Paracelsian archaen, no need for a quintessence that binds all other processes together -- it is the geometry of functions that determine that which is alive or 'dead.' Clearly the significance of this last category is considerably diminished, perhaps elided altogether, in the emerging imaginary of artificial life. But it is this latter possibility that sharply contrasts these new scientific conceptualisations with their pneumatological forbears, for the reality of death only strengthened an imaginary that sought to articulate the panpsychic hypothesis. That which is missing from a-life imaginings, but which is of salutary importance in the corporeal imaginaries of Hermeticism and Tantric Buddhism, is the vertigal dimension. There is no suggestion that the process of life has a purpose, a telos, in the developing imaginary of artificial life. The same criticism may also be made of the 'deep ecology' movement. Again the vertigal dimension, the dimension in which the 'vertical,' pneumatic trajectory becomes integral to any understanding of phenomenal processes is missing: human beings become 'flattened' into the horizontal mapping of ecological connections.

The figure of the subtle body is part of an imaginary that privileges the vertigal dimension of life; this figure is in itself a sign or indicator of an imaginary that may well include within its morphology the informal notions of cybernetics and a-life, but would always qualify them by adding the missing notion of a (vertical) direction within all life.
processes. It is for this reason that ancient ideas of vital energies and the subtle body must not be neglected in the history of ideas. Quite apart from the fact that Aristotle, the Stoics, later Neo-Platonic philosophers and Hermeticists made of these ideas the basis for their respective theories of psyche, the figure of the subtle body provided key notions that would inform and ultimately serve to construct the medieval Christian idea of the soul and hence provide much of the morphology of what would come to be known as 'psychology.'

In the final analysis, the ultimate origin of the figure of the subtle body, whether occidental or oriental, is immaterial: a concern with 'historical transmission' avoids the far more important fact that these ideas are found across several cultures and for quite dramatic periods of time. This leads one to the conclusion that they are most likely analyses and determinations of constants of human experience, these taking the form of an ideal object operating across varying cultures and epochs. The nature and purpose of these constants is outside the domain of this dissertation; it is enough however to recognise their development within an imaginary that sought to integrate signification, celestial influence and a common subtle corporeity within the Real and to suggest that this neglected economy is perhaps one more critical tool in promoting a postmodern critique of late 20th century natural science.

2 Mead, 41.
3 Jolas, 98.
4 Jolas, 98.
6 Cf. Jonas, The Gnostic Religion, 151, where he discusses the Gnostic interpretation of the Pythagorean concept of harmonia as 'the general essence of a power system.'
7 In Flesh/Intervention 21/22 (Sydney: Intervention Pub., 1988), 30.
8 Kern, 133.
9 Mach quoted in Kern, 133.
11 Eliade (1961), 129.
12 Couliano (1987), 5.
13 Of course this is an 'idealisation' of the operation of a logic gate. Such an idealisation was explicated by McCulloch and Pitts (for example) when they endeavoured to compare the operation of a computer's logic gate to that of individual neurons. In fact logic gates and neurons only 'fire' when a certain degree of voltage is detected.
15 We can still find etymological traces of this idea in the 19th century spiritualist and Theosophical idea of the 'astral (Lk. astra, star) body', known to Neo-Platonic philosophers of 5th. century Alexandria as the soma astrooides, the star-like body.
16 Couliano (1987), 5.
20 The phrase is Couliano's.
22 Aristotle, quoted by Dodds in Proclus, The Elements of Theology, 316. Aristotle thought this element to be fire. Later interpretations of Aristotelian hylomorphic theory (influenced by Neo-Platonic ideas) would posit the existence of a fifth element in addition to Aristotle's four. In Medieval Europe the stars
and planets were thought to be composed of this subtle *ether*: it is the origin of our term *quintessence*, the fifth essence.
22 Proposition 209 in Proclus, 183.
23 Proclus, 183.
24 Proclus, 183.
25 As Couliano (1983) describes it, the Gnostics imagined a manner of ‘military regime’ installed in the heavens, replete with monstrous border guards (the Archons) and passports (the secret ‘seals’ and mysterious words, the knowledge of which the Gnostic mystagogues imparted in secret to their followers).
26 Centuries later Paracelsus would call this procreative/vitalistic essence the *arcus*, an idea very similar to the Augustinian rendition of the Stoic *logon spermatikon* as *rationes seminales*.
27 Compare Aristotle’s conception of the pneuma as being transmitted during birth — and being common to all animals. Vide *On the Generation of Animals*, 736, b. 27 ff. In traditional Chinese pneumatology this would be equivalent to the *yuanqi*, or ‘congenital’ *qi* transmitted during conception.
29 Proclus, 320.
30 Couliano (1987), 23. Chinese *Neidan* (alchemical) Taoism has as its apotheosis the uniting of the mortal self with its immortal counterpart, a task accomplished by various alchemical, yogic and talismanic techniques:
31 Taoist magic offered man an inner vision to help him [sic] communicate with the various spirits that inhabit the body. But since the body is a microcosm, all these interior spirits are also spirits of the exterior world. By the use of talismanic calligraphy, the Taoist is able to extract the cosmic emblems from within, and project them around himself as if forming a meditative mandala — his personal image of the universe, with himself at the centre.’ [Legeza, Laszlo. *Tao Magic* (London: Thames and Hudson, 1975), 30.]
This world view, a world view in which the individual is the site of ‘projections’ and macro/microcosmic exchanges, is also substantially reflected in the *Bardo Thodol* and *Vajrayana* Buddhist psychology in general.
32 A. Koyre’s description of More in *From the Closed World to the Infinite Universe*, 125.
33 In his *Advancement of Learning*, Francis Bacon summarised this rhetorical model quite succinctly: ‘Aristotle, after the Ottoman manner, thought he could not reign secure without putting all his brethren to death.’ In Aristotle’s *De Anima* alone, the ideas of Heraclitus, Pythagoras, Democritus, Empedocles and Leucippus are all thoroughly and unapologetically refuted. This model of philosophical discourse as *critical commentary* was to hold, or rather, be transmitted through the Arabic translations to the High Latin universities up until, as I say, the first great ‘systematic’ philosophies of the 17th century.
34 More, quoted in Koyré, 128.
35 Wallis quoted in Kaku, 34.
37 E.R. Dodd’s formulation to describe these early ‘medicine men’: physicians (*iatros*) and seers (*mantis*).
38 I am thinking principally of Jacques Derrida and his followers and the massive *oeuvre* devoted to a critique of the ‘Platonic’ and ‘logocentric’ origins of Western thought.
40 Mead, 9.
41 The English word *influence* still preserves its original meaning (if in a very modified form).
42 Originating in English as a medical term, it referred to the pneumatic affects of the stars and planets on the human physiogomy, where said affects flowed in (influence) from the heavens.
43 Voegelin, 94.
44 Eco (1984), 27.
45 This lost sense of the term is yet implicit in our contemporary usage of such terms as *critical intervention*, *crisis point*, *critical* and *criticism*. Much contemporary ‘criticism’ is an attempt at righting the perceived wrongs, of curing the malaise, of the offending text.
46 Mead characterises the *soma augoeides* (*vide infra*) as the ‘sensible vehicle of purity and truth’, that is, the vehicle of philosophic validation.
48 Conze, 37-8.
49 Conze, 37-8.
50 Waddell, 127.
51 Literally the ‘body of bright light.’
52 Waddell, 127.
53 Waddell, 127.
That is, the physical comportment of the meditating practitioner.

Eliade (1990), 418.

Eliade (1990), 418.

Gyatso, 8.

Gyatso, 8.

Guenther, 45.

Guenther, 126.

Guenther, 137.

Trungpa, 40.

Trungpa, 41.

Legget, 183.

Legget, 183.


Gyatso, 137.

Intriguingly, the colours red and white are also central to European alchemy (where one encounters the fundamental symbolism of the ‘red king’ and the ‘white queen’) and to mystical Persian thought (perhaps the colour symbolism has its origin in early Islam, as the first alchemical texts to enter Europe were translations from the Arabic). As to the possible significance of these two transmogrifying hues, one can only guess, yet they are usually attributed ‘male’ and ‘female’ correspondences.

Gyatso, 23.

The training of batin (spirit) is accomplished through certain breathing exercises in Islamic Indonesian kebatinan. These exercises are connected with the Muslim practice of Dikr, or the ‘remembrance of Allah’ which concentrates on the breath as much as it does on the repetition of the names of God. Like the Aristotelian pneuma, the suble energy of batin is said to derive from the heart.

Guenther, 108.

I am thinking principally of the Hesychast monks. Vide Eliade (1990), 63, where he notes that the methods of prayer utilised by the monks ‘resemble yogic techniques, especially pranayama.’

In Chinese Jingluo physiology, the pneumatic system opens at the top of the head at the acu-point baihui; in Vedic yoga and Vajrayana Buddhism the system opens at the same cranial site.

The association of the symbol of the serpent and healing goes as far back as Sumer.

Doctors trained in the P. R. China usually study both Western medicine and TCM (Traditional Chinese Medicine).

For example, Western medicine still has no adequate explanation as to how appendectomies are regularly and effectively performed in P. R. China without any anaesthesia -- only the use of acupuncture. The theoretical explanation of the efficacy of acupuncture, based as it is on the flow of qi and the subtle channels of the body, the Jingluo, has absolutely no counterpart in the modern West, yet medical operations utilising the procedure have been demonstrated to be as effective as those using chemical anaesthetics -- and without the post-operative side-effects that often attend Western surgery.

Haraway, 187.

Haraway, 187.

Haraway, 187.

I mean radical in the sense of ‘primary.’

Langton quoted in Levy, 117.

Langton in Levy, 326.

Levy, 328.
III

Metaphysical Geometry, Alien Attractors and the Shape of the World Soul

It is the proposal of this chapter that within any imaginary at least in part constituted by transhistorical (ideal) objects, certain distinct figures will function as constellating centres, providing the core structure for further associated sets of figures and ideas. To substantiate this proposal, I provide a detailed examination of two fundamental figurations: that of the circle/sphere and the 'bifurcation set' that is the arboreal emanationist schema. No matter what the image of the circle/sphere or arborial schema actually represent, it is certain that these objects have exerted a profound influence on cognitive functioning.

As an introduction to the importance of imagery in cognitive functioning, and the historical shifts that have attended the history of the iconic, I first examine an important notion proposed by Spengler and Couliano: that the beginnings of the modern era are characterised by the iconoclastic programme of the Reformation, a programme which sought to suppress the phantasmatic imaginary of the Renaissance and of Hermeticism.

The idea that certain geometrical figures have a principle role to play in cognitive functioning, and therefore have an ineliminable functional role within any imaginary, is pursued in the latter part of this chapter by an examination of the ideas of contemporary mathematician René Thom, the well-known originator of 'catastrophe theory' in mathematical modelling. It is Thom’s conviction that all phenomena are governed by the functioning of a limited set of geometrical ‘attractors,’ and that the great diversity of phenomena observed in the world is the direct result of the co-ordinated functioning of these various attractors.

The Progressivist Account of Philosophy

The principles of explanation that underlie all things without exception, the elements common to gods and men and animals and stones, the first whence and the last whither of the whole cosmic procession, the conditions of all knowing, and the most general rules of human action -- these furnish the problems commonly deemed philosophic par excellence, and the philosopher is a man who finds the most to say about them.¹

This is William James’ characterisation of philosophy in his Some Problems of Philosophy (1911). And it is far from being an idiosyncratic characterisation. Up until quite recently this supernal status of philosophy, this uncontested supervenience over the human sciences, would have seemed almost axiomatic. Even Neitzsche, famous for his uncompromising

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attack on philosophy in the West, pursued his excoriation from the position of a philosopher. The idea that philosophy is the guarantor of ‘right-thinking’ in all lesser human pursuits, that it both provides the tools for the discovery of truth and is the final legislator in all such attempts, is inextricably linked to a particular view of its history. According to this view, a view expounded by such diverse Anglo-American philosophers as Bertrand Russell, G. E. Moore, Alfred Ayer and W. V. Quine, philosophy has earned the right to be queen of the human sciences through a long and valiant process of ridding itself of its ties to myth and religion. This progressivist picture of the history of Western philosophy has only really begun to be critiqued in the latter part of the 20th century, and that principally because of the failure of the logicist project earlier this century.

The progressivist account of philosophy is really a caricature of the complexities involved in the various developments within Western thought. The ‘defining moment’ of Western philosophy, the moment where thought was revealed in all its abstract purity, differs according to which ideologue of the progressivist account one might ask, but is generally conceded to have occurred some time within the period beginning in the early 17th century and continuing up until the beginning of the 20th century when philosophers attempted to realise the ground of philosophy in logicism. Whatever historical ‘moment’ is championed, the principal effect of this illusory progressivist account is a rewriting of the mytho-poetic locutions of early philosophers in terms of the modern(ist) analytic tradition.

Philosophy, according to this rewriting of Western philosophical thought, finds its vocation and form in its distinction from other human pursuits: it is distinct from literature, fable, myth, and the fantastic imagery of mystical illumination. Abstract thought is revealed only when the excrescences of imagery, allusion and metaphor are expunged; conscientious attention to this abstractive process assures a thinker of the revelation of the ‘pure shape’ of thought itself. Yet this picture of philosophy is quite one-sided. A close examination of philosophical texts also reveals

statues that breathe the scent of roses, comedies, tragedies, architects,
foundations, dwellings, doors and windows, sand, navigators, various
musical instruments, islands, clocks, horses, donkeys and even a lion...²

as Michele Le Doeuff recounts in her preface to The Philosophical Imaginary. Of course some would say that in philosophy, just as in science, one must occasionally resort to figural analogies to make one’s ideas more clear. The problem with this view however is that the force of many ideas throughout the history of Western philosophy is intrinsically reliant on some such organising figural centre. Rather than a superfluous mnemonic device, figuration becomes a structural necessity.
Yet it is certainly true that we can discern decisive 'moments' in the history of thought that pin-point, as it were, determinative vectorial shifts. Spengler has delineated perhaps one of the most significant when he writes,

the reader will not be shocked if we speak of a Baroque, and even a Jesuit, style in psychology, mathematics, and pure physics. The form-language of dynamics, which puts the energetic contrast of capacity and intensity in place of the volition's somatic contrast of material and form, is one common to all the mind-creations of those centuries.³

This dynamical form-language is one in which the syntax is governed not by figural forms derived from the natural world (as Spengler asserts it was for Classical philosophy), but by an etiolated, geometrical abstraction characterised by its avoidance of images and the imaginal. Following the Renaissance, Spengler suggests, the concept of God loses its 'sensuous and personal traits' (as is evident in the carved images associated with medieval Gothic cathedrals for instance) and becomes increasingly identified with infinite space.⁴ He locates this identification within the 'baroque style of apprehension and comprehension', the infinite/deity identification⁵ being one of his principal representative 'objects [for] physiognomic study.'⁶ Perspectival space, the new tonalities in music and the invention of the Infinitesimal Calculus are all parts of this morphology, as Spengler sees it. All are manifestations of a style of thinking that has begun to move away from the sensuous apprehension of figural form towards an increasing reliance on abstract, even geometric conceptions. This is no more clearly appreciated than if we recall Kant's characterisation of his 'revolution' in thought:

This attempt to introduce a complete revolution in the procedure of metaphysics, after the example of the geometricians and natural philosophers, constitutes the aim of the Critique of Pure Reason.⁷

No matter what one may choose to call it, Spengler's 'Jesuit style' marks an important shift in Western consciousness. And this style is intrinsic to an understanding of the transition away from a manner of thought in which images and the imaginal are vertigral, towards one in which increasing abstraction will account for the Cartesian dream of 'clear and distinct' thought. But it would be a mistake to take Spengler's opposition of the sensuous apprehension of form and geometric abstraction as two completely different forms of consciousness with no possible contact or dialogue, for the imaginal elements of both are found interwoven in that form of consciousness Spengler calls 'Magian.' Here the geometric imaginary of Arabian arabesques, of Byzantine frescoes and Egyptian hieroglyphs all become aspects of a type of consciousness that was inclusive of the Hermetic imaginary. Abstract thought and the sensuous experience of bodies are not necessarily mutually exclusive, as the previous chapter attempted to elucidate. In foregrounding the importance of the contributions
of the Hermetic imaginary, we can apprehend that Magian consciousness takes the form of
the dialectical resolution of the contraries of Spengler’s ‘Classical’ and ‘Jesuit’ thought.

The Eclipse of the Phantasmic
The call to a Christian community based on ideals of purity and the removal of all traces of the
Renaissance interest in the phantasmic is one of the primary characteristics of both the
Reformation and of Spengler’s ‘Jesuit’ thought. Insisting that there was no other authority
than the Bible, the movements initiated by Luther and Calvin mirrored the circumstances
under which the early Jewish religion sought to distinguish itself from the Canaanitic cults: by
reviling graven images of all kinds. The eventual response of the Catholic Church, rather than
violently rejecting the programme of the Puritans, was to follow them in their zeal for a
reformation in the Church. As Couliano notes, it ‘was along the lines of severity and
harshness that the Reformation developed,’ such that by the time of the Council of Trent in
the latter part of the 16th century, the Catholic Church re-assigned the Holy Inquisition to be
overseen by the Society of Jesus. Originally forged by the Dominicans as an instrument
against the Cathar heresy, the Holy Inquisition now became the instrument and overseer of
the ‘Jesuit’ style of thinking proposed by Spengler. For Couliano, both Catholics and
Protestants, Reformation and Counter-Reformation, rather than fighting among themselves,
should be seen as vanquishing a common enemy: the phantasmic culture of the Renaissance.
This censure of the imaginal signals a ‘profound change in the human imagination.’ Not
only that, but this concordance of Catholic and Protestant through the recognition of their
common enemy in the ‘pagan’ Renaissance, is one of the principal foundations of modern
Western culture itself.

This transition is not without its contradictions and anomalies however. The emerging new
science, represented by thinkers such as Bacon, Kepler and Descartes finds its inspiration in
the pagan past, particularly in the Alexandrian notion of the micro/macrocosmic couplet and
its attendant notion of the harmony of the kosmos. The participatory world formative of
Hermeticism was, at this early stage in the transition from Hermetic to modern scientific
thought, by no means moribund. While it is quite true that with the advent of the Renaissance
we observe a new emphasis on the role of the individual, and a particular emphasis on the
operations of the imaginative faculty, the vis imaginativa, we certainly do not see a fully
developed ‘passion for the third dimension’ as Spengler calls it, a Nietzschean ‘will’ that
serves to functionalise the opposition between a Self and the kosmos. The theory of celestial
influx that accompanied a world arranged like a tensile grid of complex polar forces in which
human beings were but temporary communicative nodes still undergirded much Hermetically-
inspired metaphysical speculation.

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Invoking a contemporary metaphor, one might say that in terms of the Alexandrian *mentalité* human beings were regarded more as ‘receivers’ than ‘transmitters.’ In the 16th and 17th centuries equivalent metaphors perhaps would be the *camera obscura* (a chamber which *receives* light) and the magic lantern (a chamber which *transmits* light). Whatever the choice of metaphor, I would maintain that the valorisation of a privileged *cogito* (Spengler’s term is the Faustian *ego*) was still largely absent from considerations of humankind’s place in the natural order. Therefore the world was still a place of interpenetrative communication, where the borders between self and other, *cogito* and *res extensa* were to a large degree mediated by a decidedly diaphanous and osmotic division. In this imaginary, this worldview, the body was influenced by the stars, the humors reacted to the natural elements and the human *mens* reflected the movements of the deity after which it was modelled.

Yet it was the very force of such an imaginary that would eventually lead to its eclipse. Key concepts of this pneumatically mediated worldview came to be refined such that Renaissance theories of ‘natural magic’ were perhaps the first step in shifting the balance towards the command-obedience consciousness that largely characterises the science of the Modern era. Figurations from the Renaissance phantasmic imaginary would pass through the barrier of the emerging scientific culture of modernity, becoming in their passage distorted into the figures of the technological dream of a ‘new world order,’ as Faiivre has recently suggested.

The 17th century ‘metaphysical catastrophe’ (as Gilbert Durand reprovingly calls it\(^2\)) that was the advent of modernist consciousness is a catastrophe perhaps more in the sense of René Thom’s (*vide infra*) concept of catastrophic change whereby two geometrical vectors are enfolded one into another, a process consequently wrought with dialectical tensions. The cusp of this catastrophe may be characterised as a *paradoxical moment* where the tensions between the Hermetic and mechanical philosophies began to define a new object -- Modern consciousness.

An example of the paradoxes inering in this transition can be observed in the spiritual practices initiated by the founder of the Jesuit Order, St. Ignatius of Loyola. His *Spiritual Exercises* are to all intents and purposes a reworking of the mnemotechnical processes of the ‘pagan’ Renaissance for spiritual, rather than temporal, ends. The ‘Memory Theatre’ favoured as an intellective archival device by Renaissance thinkers is, in the hands of St. Ignatius, re-deployed to produce an internal phantasmic theatre whereby the supplicant is encouraged to observe (i.e., create a phantasmic double of) themselves participating in a scenario reliving the torments of Christ or the terrors of eternal damnation for example. The instrument of the *Exercises* is clearly derived from Renaissance imaginal mnemotechnics, but it is put to completely new uses, in active opposition to the phantasmic imaginary of the Renaissance. The very same operational theory was used by the Jesuits in their attempts at
converting the Chinese: to convert the unbeliever one must use their instruments against them: learn the language, understand the 'mind-set', use their arguments against them.

The exercises of St. Ignatius are perhaps the last example of a way of thinking that assumed the necessity of imagery and the imaginal in human cognition. The new science adopted the Pythagorean faith in number and mathematical description, but increasingly rejected the wealth of imagery associated with the Hermetic worldview. The disappearance of the emblematic books, at one time so popular (and instrumental in assuring the maintenance of the hieratic, 'hieroglyphic language' of Hermetic 'commonplaces'\(^\text{15}\)), is a good indicator of the process of abstraction from scientific and philosophical discourse of a once rich imaginary.

The lexicon (imagicon? figuricon?) of images was never completely erased however. In fact from my viewpoint this is a cognitive impossibility. Human cognition relies on images at a very 'deep' level (as a moment's reflection on the imagery of 'profundity' clearly demonstrates). Certain images are almost ubiquitous in their appearances across disciplines. The fact that they do appear in several quite different discourses strongly suggests these images are important organising centres -- 'strange attractors' -- of human cognition. It should therefore be possible to create a sort of 'philosophical bestiary' in which the ubiquity of these pivotal images is demonstrated not only across time-frames in the West, but across cultural/national boundaries as well. Images/figures of this kind may well constitute the semantic primitives that structure the 'language of thought' as contemporary philosopher Jerry Fodor imagines it.\(^\text{14}\) It is possible, following Fodor's supposition, that a limited number of recurring figures are instrumental in the development of systematic thought in general, providing crucial semantic content in the form of basic imagistic relationships. Certainly such figures lay behind much of Renaissance interest in the pneumatic/phantasmic language of the soul and mnemonic-technical rhetorical devices.

Such primitive figures I will call (for reasons that will become clear towards the end of this chapter) attractors. These figures are not of the same order as, for instance, the figures examined by Michele Le Doeuff in her Philosophical Imaginary -- they are not as imaginally rich as Condillac's talking statue or Kant's island of truth. Yet they are as potentially rich, in fact more so. This is because they operate at a more primal level, as the initial 'engines', so to speak, that generate ideal objects. They may be regarded as abstract, geometrical figures that have generated and organised certain discourses in the history of human thought. At least, that is my hypothesis.
The Infinite Circle

The concept of the infinite is surely one of the oldest known to humankind, and it has had an unarguable determining influence on many different cultures. For Spengler infinite space was the ne plus ultra ursymbol of Faustian man. Modernity began when the Aristotelian horor infini, the fear of an actual infinite, was transformed into a yearning for the infinite, a yearning clearly seen not only in the spires of the Gothic cathedrals, but (if Spengler had lived to see it), the interstellar probes of our own time.

Yet since the time of Zeno of Elea the infinite was a notion quite ill-defined, a matter for philosophical discussion and religious meditation rather than precise definition. For mathematicians and logicians this state of affairs was remedied with the work of Richard Dedekind in the late 19th century. In 1872 Dedekind's definition of an infinite set was published in Stetigkeit und irrationale Zahlen:

A system $\mathcal{S}$ is said to be infinite when it is similar to a proper part of itself; in the contrary case $\mathcal{S}$ is said to be a finite system.$^{15}$

In other words, a set of elements $\mathcal{S}$ is said to be infinite if the elements of a proper subset of $\mathcal{S}'$ can be put in a one-to-one correspondence with the elements of $\mathcal{S}$. It is this isomorphic alignment between two series that is the basis for Cantor's 'diagonal argument', the paradox of 'Hilbert's Hotel' and many others.

Early in the 20th-century, mathematicians Stephen Banach and Alfred Tarski produced a remarkable extension of a paradox first noted by the German mathematician Hausdorff in regards to the congruence of separate parts of the surface of a sphere. Extending the paradox into three rather than two dimensions, Tarski and Banach demonstrated that there is a way of dividing up a solid sphere, a sphere the size of the sun for example, such that no two parts of this sphere will have points in common -- that is, they are entirely, geometrically separate -- yet without any modification of these parts, they may all be fit into a similar sphere the size of a pea.

This monstrous paradox was demonstrated in the following manner. Divide the sun sized sphere $\mathcal{S}$ into as many parts as you like with the condition that the separate parts are finite (ie., an integer less than infinity -- the number of parts could be conceivably as close to infinity as is tractable). The separate parts can then be denoted as $s_1, s_2, s_3, \ldots, s_n$ -- the sum of these parts comprises the sphere $\mathcal{S}$. Now do the same with a sphere $\mathcal{S}'$ the size of a pea, such that you get a series $s'_1, s'_2, s'_3, \ldots, s'_n$. Tarski and Banach then propose that if the two spheres have been divided in a suitable manner so that all parts of the sphere $\mathcal{S}$ and all parts of the sphere $\mathcal{S}'$ are congruent (that is, they are of the same size and shape), one can order the twin
series such that $s_1$ is in an isomorphic (one-to-one) relationship to $s'$ and so on. Now this process of congruence will encompass not only all the tiniest portions of the pea-sized sphere, but also the most tiny portions of the sun-sized sphere as well. The paradox is derived from the fact that each part of the sun-sized sphere is completely congruent with those of the sphere the size of a pea -- each part of the two series being of the same size and shape -- and that there is a one-to-one relationship between the two series. In other words, not only can a sphere the size of the sun be rearranged such that it will be exactly the size of a pea, but a ball of plasticine the size of a pea can be rearranged so that it completely fills the entire universe!^{16}

The mathematical problem of ‘sphere-packing’ (building lattice structures composed of spheres) has produced very real and practical uses in the contemporary world of information technology and computer-aided-design (CAD),^{17} and is strongly related to the ‘trans-finite’ mathematics of Banach and Tarski’s paradox. What is interesting about these mysterious infinite and trans-finite mathematical paradoxes is that they have, relatively speaking, only a very short history. It is generally conceded that Georg Cantor (1845-1918) is the person chiefly responsible for the renewal of interest in the idea of the mathematical infinite in the late 19th century. He was not the only individual who was interested in the notion of the infinite series at that time, but it was Cantor who produced the famous ‘diagonal argument’ -- the idea of which led not only to Banach and Tarski’s paradox, but Gödel’s theorem as well -- and the realisation that there is not one, but several infinities: ‘Cantor’s paradox.’

It is in the very nature of the concept of the infinite that nothing about it can be ‘finally’ decided. When considering the infinite series, something will always have to be left unconsidered, unseen -- a mysterious excess must be acknowledged, but never known. It is this unknowable beyond that Spengler recognised as the very pattern of Faustian humankind’s desire: always searching, increasing, exploring, extending -- a mathematics of the Infinitesimal Calculus as opposed to the mathematics of the Classical age. Rather than the closing scenes in the history of the infinite, the set theoretical work of the late 19th, early 20th century are but morphological transforms, new scenes in a drama which attempts to delimit the labyrinthine beast of infinity.

Yet the nature of the beast is not to be found in its mathematical descriptions. As much as it may temporarily satisfy the mathematical mind, the infinite will always be a metaphysical necessity before it becomes a device for the production of equations. To explore further this assertion, we need to have recourse to another paradox of the 19th century.

We owe to Jakob Steiner (1796-1863), in an unpublished manuscript, some of the earliest work concerning the geometric transformation now known as ‘Inverse Geometry.’ Steiner’s discovery was this: imagine two points $P$ and $P'$ lie on a ray (a straight line drawn) from the
centre $O$ of the circle $C$ with a radius $r=0$. Now if the product of the distances $OP$ and $OP'$ is $r^2$, then $P$ and $P'$ are said to be inverse to each other with respect to $C$. The consequence of this is that for every point outside the circle there is a corresponding point inside the circle. But there is a further consequence of this state of affairs best illustrated with another paradox first attributed to Bernard Bolzano (1781-1848): The inside of any and every circle contains one more point than the portion of the plane outside the circle, regardless of how big or small the circle is. As there is also no outside point $P'$ corresponding to $P$ when $P$ coincides with the centre $O$ in Steiner’s illustration, we can appreciate the connection between these two formulations. Not only that, but the very same considerations obtain when this geometry is extended into three dimensions, defining the ‘inverse point’ in regards to a sphere.\(^{18}\)

Bolzano recorded many other important properties of infinite sets in his posthumous *Paradoxien des Unendlichen* (1850). He rigorously demonstrated, for example, that there are just as many real numbers between $0$ and $1$ as between $0$ and $2$, and that there are as many points in a $1$ inch line segment as in a segment $2$ inches long. He seems to have early realised that correspondences exist between the members of an infinite set and a proper subset thereof. Bolzano maintained that there was a link between ontology and a fully developed science based on the objective logical entailment that obtained between the world and scientific theories.\(^{19}\) The ‘circularity’ of the idea of the infinite was clearly something that needed to be curtailed if logical paradoxes (and hence, ‘ill-formed’ descriptions of the world) were to be avoided.

Steiner and Bolzano’s use of circular diagrams is a comparatively late manifestation of an image that has a very long history in the West: the image of the wheel or circle. Banach and Tarski’s sphere is a contemporary re-visualisation of Parmenides’ τὸ ἐν, reality (the One) considered as a giant, unitary, all-encompassing sphere. None of the recent mathematical examples are direct acknowledgments of the ineluctable necessity of invoking such forms, yet they nevertheless participate in the same imaginal field that yields their earlier *metaphysical* equivalents.

Why do we use the symbol of a circle to denote zero in the West? Is it just another example of the arbitrary nature of signs? Both the concept of and the symbol for zero entered Western mathematical thought from India via Arabic mathematics. The word itself is a contraction of the Medieval Latin *zephyrum*, from the Arabic *cifr* which provides the word ‘cipher.’ In Arabic it literally means ‘empty’, a direct rendering of the Sanskrit *sunya*, ‘void.’ The association with some form of secret writing is first found in the French (*chiffre*) and Italian (* cifra*) equivalents. The mysteriousness of the notion of ‘nothing’ having a determinate effect
-- like a sort of secret code, a cipher -- is similar to the mystery inherent in Bateson's concept of information (difference) having effect/affect in the phenomenal world.

'Nothing' and 'something' also seem to be a binary pair. In Nagarjuna's metaphysics sunyata (the void) is the very ground from which any figure must emerge. According to Gestalt psychology, this figure/ground discontinuity is one of the most primitive (in the sense of 'first') operations behind our appreciation of contrast, of difference. In Hellenistic thought, the phenomenal world was preceded by χόος (Chaos), which has the literal meaning of a 'cavity' or 'to gape'.\(^{20}\) From this formless ground, reality emerged. Related concepts in Sanskrit include kha and purna. Kha has the meaning of 'the hole in the nave of a wheel through which the axle runs' (as well as providing the proto-Indo-European root word for 'chaos'), and purna, quite paradoxically, means 'plenum.'\(^{21}\) Of course from a metaphysical point of view, the idea that the plenum and the void are related is not paradoxical in the least, for 'the implication [is] that all numbers are virtually or potentially present in that which is without number; expressing this as an equation, 0 = x -- x, it is apparent that zero is to number as possibility to actuality.'\(^{22}\) This is particularly the case in the aforementioned metaphysics of Nagarjuna, a metaphysics which -- not coincidentally, according to the vertigalist viewpoint -- has often been compared to that of Parmenides in the West.

Coomaraswamy's thesis in his paper, 'Kha and other Words denoting 'Zero' in Connection with the Metaphysics of Space' is that the Indian mathematicians consciously chose their terms for the mathematical concept of zero from an already pre-existing body of related metaphysical terms found in sacred literature (the Rg Veda, Upanishads, Mahabharata) and Hindu and Buddhist philosophy. To demonstrate this connection Coomaraswamy asks the reader to prepare a diagram similar to those mentioned earlier: Draw two concentric circles (in Sanskrit a cakra or mandala) of any radii (but one much less than the other) on a piece of paper and draw a line out from the centre of the concentric circles to the circumference of the outer circle.

With the exception of the centre, which as point is necessarily without dimension, note that every part of our diagram is merely representative; that is, the number of circles may be indefinitely increased, and the number of radii likewise, each circle is filled up becoming at last a plane continuum, the extended ground of any given world or state of being...\(^{23}\)

For Coomaraswamy this diagram represents the logical relationship between 'zero, incommensurable unity and indefinite multiplicity': the blank surface (sunya) is zero because it has no number; the central point (bindu in Sanskrit) is the incommensurable unity as there cannot be a second centre for the two concentric circles; and either of the circumferences
represents an infinite number of points. In Sanskrit, this last is ananta, the endless (anta means ‘end’), an exact equivalent of unendlich in the German.

A further connection in this interesting matrix of symbols is that the symbol of the ouboros serpent (a serpent devouring its own tail; an extremely ancient symbol found in many alchemical texts -- perhaps of Egyptian origin24) is inherent in the name of the man who reintroduced and foregrounded the concept of sunyata within Buddhist metaphysics, Nagarjuna. The name literally means ‘Arjuna of the serpents’ (Arjuna is the name of the prince who is in dialogue with the god Krishna in the Bhagavad Gita). The Buddha himself is often referred to as 'King of the Nagas' -- king of the serpents. Here we recognise again the serpent as symbol of knowledge, or more precisely, gnosis. Whether tempting Eve in the Garden, or inspiring the pythoness at Delphi, the serpent seems to be a symbolic recognition of gnosis across many cultures. The reason for this I think is that the serpent or dragon is a symbol that represents the Central Nervous System including the spine and brain. This symbolism relies not only on the resemblance between the CNS and a serpent or mythical dragon, but also, and most importantly, on the circuit that it represents experientially: the pneumatic circuit of Kundalini (in Vedic yoga) or the circuit of the Du and Ren channels (known as the 'Great Waterwheel' in Daoist alchemy) of traditional Chinese pneumatology.

The concept of circularity within gnosis is inherent in the elaborate cosmo-mythology of the various Gnostic sects. As Hans Jonas has demonstrated, the theoretical content of Gnosticism, the worldview it proposes, contains the process and ends of gnosis within itself. It is a self-referential system that moves around the central axis of the process of a mysterious knowing -- gnosis -- the loss of which is the very the cause of the phenomenal world and the regaining of which is the culmination of the Gnostic path. Gnosis, or rather the lack of it,25 is the cause of the creation of the cosmos through the actions of an ignorant and arrogant Demiurge. And it is gnosis that guarantees the completion of this spiritual/cosmological/historical cycle: true knowledge of the actual nature of reality, of secret names, rulers and mediatory levels of existence, enables the Gnostic to attain salvation.26 Salvation is but the culmination of a process in which we find the 'last things answering to the first, the reversal of the fall, the return of all things to God', as Jonas notes.27 This is a metaphysic of 'pure movement and event' in which the ontological conception of knowledge (gnosis) holds to a dissolving of matter such that, as with Hegel, 'substance is subject.'28

We should also note the circular form, the cyclical nature of time in Gnostic thinking. This links the astronomical/astrological meditations of the Alexandrian thinkers with that of the Gnostic sects. The precession of the heavens was thought to have started from some initial state (that is, pattern of stars) that obtained at the moment of creation and the stars would one day cyclically return to this same state/pattern -- the so-called Great Cycle. This notion
probably dates from ‘before the Magi’, as Doresse says, and gave rise to a cult of Time in many ancient Oriental and Middle Eastern cultures. In these cults time was represented by an anthropomorphic figure who was both the generator of, and ruler over, humankind.\textsuperscript{29} This cyclical, eschatological notion, combined with the concept of celestial influx that engineered moments of isomorphism between the heavens and human physiology would have logically led to the fixing of the macro/microcosmic couplet, probably in early Babylonian times.

It seems to me that we observe again the periodic return of the importance of the cyclical form in the centrality given the idea of circular process within cybernetics, particularly in regard to the study of living systems. Wiener’s notion of ‘feedback’, where the self-regulatory process is sustained by the continual exchange of energy in the form of a loop between organism and environs, mirrors the overall ‘shape’ of both cyclical conceptions of time and the Gnostic process where ‘last things answer to the first...and all things return to God.’ In fact aspects of the Gnostic worldview seem to undergird the central contribution of Wiener’s cybernetic theory, for just as Gnosticism conceives of cosmological events and processes repeated and reflected within the individual self, so too does cybernetic theory consider the process of feedback as occurring both within organisms (their internal environment) and between organisms and their world (outside environment.)

Wiener is one of a small number of thinkers who, inspired by the example of certain mechanical devices, attempted to delinitiate an apparently ‘new’ fundamental principle of nature. Yet the principle of feedback was utilised in the construction of the steam engine long before it was given theoretical treatment. James Watt patented the flyball governor device in 1782. In this device two metal balls attached to a vertical spindle are set in upward motion by the centrifugal force imparted by the spindle, this force counteracted by the force of gravity which tends to keep the balls close to the same shaft that imparts their upward motion. Increases and decreases in the speed of the spindle force the balls up and down. This device is attached to a valve between the boiler and steam engine so that if the speed exceeds a set value the valve closes, and if it falls below this value the valve opens. The principle behind this action, the achievement of ‘homeostasis’ through ‘feedback’, is the same principle behind contemporary thermostats and many other ‘self-regulating’ devices.

It was not until the following century that Clark Maxwell published the first theoretical treatment of such a device in his 1868 paper, ‘On Governors.’ In the 20th century, eighty years after Maxwell’s paper, Norbert Wiener invested the principle of feedback with an explanatory power that neither Maxwell nor Watt could perhaps have imagined. Like Claude Shannon, Wiener endeavoured to equate 19th century thermodynamic conceptions of equilibrium and entropy with the dynamics of information exchange as exhibited by
computing devices of the late 1940's and early 50's. In Wiener's new jargon, Watt's flyball governor becomes one of the first examples of mechanical 'tell-tales' or 'monitors':

It is the function of these mechanisms to control the mechanical tendency toward disorganisation; in other words, to produce a temporary and local reversal of the normal direction of entropy.\footnote{30}

It is the extension of this fundamental concept of Wiener's to living organisms that allows thinkers such as Michel Serres to consider the phenomenon of life as a 'temporary and local' reversal of entropic decay. What is intriguing in this 20th century isolation of a 'fundamental principle' that seemingly pertains to both mechanical devices and living organisms is the centrality afforded 'information exchange' between organism and environment. In this cybernetic view, life is somehow defined by the constant 'monitoring' of the exchange of signals both within the internal organismic economy of an individual and between the environment and the individual. It is the circularity inherent in this conception that may well demonstrate the necessary recrudescence of quite ancient notions of cyclic procession, perhaps figured most famously in the image of the ouboros serpent.

The foregoing discussion would seem to indicate that the figure of the circle was a deep, metaphysical structure long before it entered Western and Arabic mathematical notation. Coomaraswamy's diagram however has another significant feature at its centre. The central point of the twin circles, the bindu, represents the plenum of all possible numbers represented on either circumference (as each circumference is composed of an infinite number of points). In terms of his diagram, any possible radius drawn from the centre 'points to' a point on both concentric circles; therefore each point on the concentric circles has its origin in the central bindu. But this central point is also nothing, zero -- as the very notion of a point is that of a dimensionless, spaceless quantum, as Euclid early maintained.\footnote{31} Also, as Coomaraswamy says,

the mathematical infinite series, thought of as both plus and minus according to direction, cancel out where all directions meet in common focus.\footnote{32}

Coomaraswamy notes that the Hermetic dictum, ‘as above, so below’ is illustrated by the fact that any radius connects the centre with any number of points on the two circumferences. The diagram, then, can be read as an image of the relationship between individual selves and the cosmos.

He notes that it is in connection with the symbol of a wheel (specifically the wheel of the solar chariot) that one finds the most significant ideas that are later manifested in mathematical concepts. The concept of the solar wheel is found in a number of very ancient Hindu texts which see ‘the Year as an everlasting sequence [that] is thought of as an unwasting wheel of life...in which all things have their being and are manifested in succession; 'none of its spokes is last in order', [as the] Rg Veda [says.]\footnote{33} In terms of contemporary thought, the
idea of an ‘unwasting wheel of life’ having its ‘manifestation in succession’ is akin to Clausius’ First Law of Thermodynamics: the energy of the universe is constant; it may transform -- into matter (Einstein’s matter/energy equation), for instance, *manifest in succession* -- but the total amount of energy in the universe is always conserved, *unwasted*.

Hieratic Space

Coomaraswamy points out that the use of verbal terms for space (*kha, sunya* etc). as symbols for zero represent not the physical space of the post-Newtonian era, but a ‘principal space without dimension’, although this space is the very matrix from which dimension arises.\(^{34}\)

Here we can appreciate the correspondence between this conception of space and the primaeval *Chora* of Plato’s *Timaeus* -- and both ‘chaos’ and ‘Chora’ find their root term in *kha*. Not only that, but according to the *Upanishads* the locus of this space is within. Coomaraswamy quotes the *Maitri Upanishad*:

> [W]hat is the intrinsic aspect of extension is the supernal fiery energy in the vacance of the inner man.\(^{35}\)

Furthermore, according to the *Chandogya Upanishad*, this space is in the heart, ‘where is deposited in secret all that is ours already or may be ours on any plane (*loka*) of experience.’\(^{36}\)

It is important to recognise the ease with which we unthinkingly invoke our contemporary (that is, post-Newtonian) concept of absolute space whenever we encounter spatial terms or terms of locatedness. Newtonian space is like the ‘space’ inside a jar or room. This was/is a corollary, in scientific terms, of the (then) comparatively new perspectival space of the Renaissance. Objects within this space no longer varied in size or location in the picture plane according to their importance -- the hierarchic space, in other words, of medieval allegory. Renaissance perspectival space was the representation of an *absolute space* (as we would now say) where objects were situated according to the mechanical exigencies of (for example) Albrecht Dürer’s viewing frame. This frame was an upright wooden easel divided by evenly spaced strings into a grid. This grid corresponded to a similar grid inscribed on the paper upon which the artist would draw the image viewed through the easel. When situated behind this easel, the artist would remain very still while attempting to draw those parts of the scene divided by the grid before him in the corresponding squares of his paper grid -- ultimately producing the illusory space of single-point (‘vanishing point’) perspective.

For Plato and the thinkers whose work is recorded in the *Rg Veda* and *Upanishads, locus* was another word for ‘place’ -- things had their place (*locus*), they were arranged in a particular order (relationship to each other) until they *exchanged places* through the impressing of some force.
The Stoic philosopher Simplicius recounts the words of Theophrastus in explication of this concept:

[S]pace is not a reality by itself but is defined by position and order of the bodies according to their nature and faculties, as is the case with animals and plants and all non-homogenous bodies which either have souls or are without souls but have the nature of a structure....Thus each, being in its proper place, is said to have a specific order, especially as every part of a body desires and strives to occupy its own place and position.  

As a consequence, movement for the ancients was only explicable as an exchange of loci. In contrast, Newton’s absolute space was a space akin to that of the Renaissance painters, an attempt to replace the relational space of the ancients -- a space which was a predicate of individuated beings -- with one which better supported his conception of relative motion, a motion relative to absolute, empty space.

A hieratic space which enfolds a plurality of relations -- a ‘field’ plenum as opposed to an empty container -- lies behind the reception of the mathematical concept of zero in the West. Coomaraswamy quotes Bhaskara, an early 20th century mathematician, describing his conception of ananta:

This fraction of which the denominator is zero, is called infinite quantity. In this quantity consisting of that which has cipher for its divisor, there is no alteration, though many be added or subtracted; just as there is no alteration in the Infinite Immovable at the time of the emanation or resolution of worlds, though hosts of beings are emanated or withdrawn.

Bhaskara clearly was fully aware of the ancient metaphysical background to his mathematical thoughts. According to Coomaraswamy it is by no means surprising that mathematical terminology should have been generated from previous metaphysical terms and ideas, as it is in the very nature of Indian thought to proceed from the general, the universal, to the particular. He notes that the Indian classification of traditional literature upholds this relationship to traditional knowledge (as principally expounded in the Vedas). The sciences of grammar, astronomy, law, medicine, architecture etc. are all identified as Vedanga, the ‘limbs or powers of the Veda’ or alternatively as ‘accessory with respect to the Veda’ (Upaveda.)

At this point one should also note that the traditional Scholastic division of learning into the quadrivium (arithmetic, geometry, astronomy and music) and trivium (grammar, rhetoric, logic), the combination of which produced the seven ‘liberal arts’ reflects a similar relationship in the West. Here the acquisition of knowledge is associated with the celestial archons, the seven stars or their personifications -- an atavistic recollection of the Gnostic programme.
The Shape of the Anima Mundi

The circle and its centre, according to the above examination, represent the interpenetration of the world and the self. We find this particular figuration across a wide range of Western texts. In Dante’s *La vita nuova*, we find Love, the ‘glorious Lord’, saying,

I am as the centre of a circle, to which the parts of the circumference stand in equal relation; but thou not so.⁴²

In *Truths Golden Harrow* (vide chapter IV), Robert Fludd describes the Philosopher’s Stone in this manner: ‘It is the essential or formal centre and circumference, the beginning and the end, the all in all…the middle and central soul of the sun…’⁴³ (One should note in passing the striking parallel with the Vedic concept of the *bindu* and Coomaraswamy’s note that the *chakra* is most often associated with the solar wheel or chariot).

There is a common source for the above images of the circle and *bindu*, ‘centre and circumference.’ The adage, *deus est sphaera cuius centrum ubique, circumferentia nullibi*, first appears, according to Koyré,⁴⁴ in the pseudo-Hermetic *Book of the XXIV philosophers*, an anonymously compiled text of the 12th century, but it assuredly antedates his ascription. The idea of the sphere of Being (in its theological ['God'] and metaphysical [the ‘Real’] forms) is of course first found in the West in Parmenides. It is considerably later however that we find a re-description that approximates the Hermetic adage.

The saying is usually first attributed to Nicholas of Cusa (1401-64) where it is used to intuit the notion of infinite space. Koyré admires the ‘boldness and depth’ of Nicholas of Cusa’s cosmological thought when he transfers to the universe itself the pseudo-Hermetic conception of God as ‘a sphere of which the centre is everywhere, and the circumference nowhere.’ Of course the conception is only ‘pseudo-Hermetic’ for Koyré because it is not explicitly found in the *Hermetica* as they have been collected. Other than that it is quite in keeping with Hermetic thought. We find the alchemist Michael Sendivogius (a considerable influence on Robert Fludd and others) stating,

Nature, then, is one, true, simple, self-contained, created by God and informed with a certain universal spirit. Its end and origin are God. Its unity is also found in God, because God made all things.⁴⁵

The image of the circle/sphere and *bindu* are not explicitly described, but the formative structure, the *attractor*, is certainly present when Sendivogius notes the ‘true, simple, self-contained’ character of Nature. ‘Nature’ for Sendivogius was equivalent to our modern conception of the ‘Real’, and should not be confused with the contemporary usage of the word ‘nature’ to mean the natural landscape. It should also be borne in mind that what Spengler calls ‘Magian’ consciousness is one of the determining characteristics of the alchemical/Hermetic pursuit. The Faustian (Modern) conception of a world governed by
dynamical forces is the antithesis of a consciousness that sees the essence (‘nature’) of the world as truth, singular (‘simple’) and self-contained (spherical).\textsuperscript{46}

Nicholas of Cusa was no doubt strongly influenced by the works of Plotinus. Contemporary scholarship has demonstrated that the influence of Plotinus extended throughout the Medieval period into (and beyond) the Renaissance, a trajectory that was until recently unacknowledged. Scholars have for a long time accepted that the honorific ‘the Philosopher’ was applied by Medieval scholars to Aristotle. It is now thought that when some Medieval thinkers refer to ‘the Philosopher’ they are actually referring to Plotinus and not Aristotle -- in fact this famous epithet may have originally been applied to Plotinus in the first place.\textsuperscript{47} It is likely, for instance, that Plotinus’ image of the soul as being like a mirror was determinant in the Medieval conception of the mind (mens) as the ‘mirror of nature.’

It is in the Sixth Ennead (6.9.8) that we encounter Plotinus’ utilisation of the circle/sphere attractor:

Every soul that knows its own history is aware...that its movement, unthwarted, is not that of an outgoing line; its natural course may be likened to that in which a circle turns not upon some external but on its own centre, the point to which it owes its rise.\textsuperscript{48}

Plotinus firstly wants to distinguish his conception of the soul’s movement from that of the Atomists who hold that all movement is linear, and secondly he wants to establish a limit to its trajectory (as an outgoing line, under ideal circumstances, and in Euclidean space -- the ‘Alexandrian’ space of Plotinus’ times -- continues on forever). For him the soul’s circular movement ‘about its source’ makes it ‘divine in virtue of that movement.’ He further states that the soul is not a circle in the sense of a geometrical figure, but in the sense that it both enfolds, and is enfolded by, the Primal Nature. Consequently the soul ‘owes its origin to such a centre and still more that the soul, uncontaminated, is a self-contained entity.’\textsuperscript{49} It is this circular soul that is part of the ‘centre of all centres’,

just as the centres of the great circles of a sphere coincide with that of the sphere to which all belong.\textsuperscript{50}

What is this ‘sphere to which all belong’? Consider first a contemporary usage of the word ‘sphere’: we talk about a ‘sphere of influence’ and we may be involved in the ‘political sphere’ or something may be ‘outside our sphere of interest.’ The meaning of the term in these colloquialisms is clear: sphere means a delimitable space containing a collection of things. The Sanskrit word loki (our ‘locus’) literally means ‘world’ -- and what is a world but a delimited set of things? The world for Plotinus is the ‘closed world’ (delimited set) of the Aristotelian/Platonic universe, the system of concentric spheres represented by the armillary sphere that stood in every Medieval scholar’s study.
Plotinus’ whole, his ‘sphere to which all belong’ is the great sphere of the *anima mundi*, and the ‘great circles’ of the universal sphere are individual souls and their life trajectories, a series of theoretically infinite events/beings constellated around the central, universal soul (the *anima mundi*). It should be observed that this figuration necessarily implies that the Great Soul and all lesser souls are like fractal dimensions of each other, spheres within spheres or the infinity of 2-D souls (great circles) that together compose the 3-D *anima mundi*. Like the circle and the sphere, the *anima mundi* and individual souls share only a difference of dimension. In terms of its geometric imagery, the ‘great circles’ of the sphere are those which we would now call the geodesics, an imagery that strongly links Einstein’s eventual conception of the universe as the hypersurface of a hypersphere (as considerations of the effects of geodesics in non-Euclidean space aided Einstein in his reconceptualisation of gravity and hence spacetime) with the Plotinian conception of the universe. In other words the insistence of the attractor of the circle/sphere was formative in the shaping of both Einstein’s and Plotinus’ conceptions, irrespective of their completely different temporal and cultural *milieu*.

Furthermore it requires very little imagination to realise the close proximity between Plotinus’ vision of the *kosmos* and that of the contemporary theory of the Big Bang generation of spacetime. Apart from the fact that contemporary accounts factor in time as the fourth dimensional co-ordinate, and regard the universe as dynamical, the Big Bang theory resembles in its broad outline the emanationist schema of Plotinus: a geometrical point of infinite ‘mass’ expanded equally in all directions, an image that naturally conjures up the concept of a sphere. And Einstein, of course, regarded the universe as a closed system in the shape of a hypersphere. For Plotinus the expansion from a supernal point (the Primal Nature) happened outside of time, therefore there was, technically speaking, no ‘expansion’ at all. As with Parmenides, the One Sphere -- self-contained Being -- just *is*, by definition.

It also requires very little imagination to perceive that beyond these textual sources there must be an attractor that is both subsistent and insistent, perhaps one of a very few generators of logical objects that have helped to create the geometrical imaginary. The geometrical image of circle and central point, an image inscribed by a every child, compass in hand, who has studied geometry, is a glyph representing a number of important metaphysical relationships. It is these relationships that are important, and not the fact that this particular symbol is found in many cultures and at different times. As Coomaraswamy indicates, this primal image serves merely as a mnemonic to ground and inculcate the aforementioned metaphysical relationships. It is not surprising then, that we should find this particular image repeated in many forms within the imaginary of Hermeticism. Nor should it be surprising to find it transcending the barrier of the scientific revolution to re-emerge in contemporary figurations.
describing the origins of the universe or its ultimate shape. It is the richness of the Hermetic imaginary, as well as the importance of its central ideal objects, that makes the periodic re-appearance of the metaphysical relationships held within its figurations an almost foregone conclusion.

As a relatively simple geometric figure the circle/sphere was able to pass through the iconoclastic programme of the Reformation without resistance. It is one of a small number of such figures within the geometrical imaginary the simple outlines of which successfully masked the richness of its metaphysical associations and connections. In further support of this idea, I will briefly examine an equally important figure within the geometrical imaginary.

**Arbor Vitae**

Why does a neuron look like a tree or perhaps a rhizome? The key to this seemingly inane question lies in the notion of 'looks like.' A thorough-going positivist would pronounce that we are misled by the phrase 'looks like': a neuron actually looks like what it is, a neuron. But this, I think, would miss the point entirely. It is by no means accidental that we say a neuron resembles a tree, rather it is directly contingent upon the fact that we are emersed in a history of symbolisation constellating around the image of a tree. In short, we think it looks like a tree because we think it has something to do with thinking!

The foregoing needs to be clearly explained. It is possible to hypothesise that the neuron would never have been found if it did not in some manner resemble a tree, plant or rhizome. Imagine rooting around in an encephalon without knowing what you were looking for, idling about as it were. What is inside the brain? you are asked. 'Nothing but mush,' you would most likely reply. Now consider that you already know that human knowledge, human thinking, looks like a tree -- how would you fare if you vaguely hoped to find the physical substrate for human thought in the brain? I wager that you would find the neuron within minutes.

Louis Rougier in his *La Métaphysique et le Langage*, in a remarkably concise passage, attempts to sum up the entirety of Western thought (and that of the Platonic/Aristotelian East).

For centuries Byzantines, Syrians, Jews, Arabs and the Latin West learnt (sic) the same logical system, the same rudimentary ontology comprising 'the tree of Porphyry', that is to say, the ontological hierarchy of species and genus, the theory of categories, the theory of transcendentals, that of substance and accidence, form and matter; creating a common intellectual outlook which consisted of deducing the structure of reality from the analysis of language, discussing concepts instead of observing the facts of experience. They held as adequate the conceptual division which discursive thought imposes on things.
by explaining the world in terms of essences, predicate, substances and
accidents.

It is this common mental attitude which led to the belief in the existence of a
universal reason and its aptitude for elaborating a *philosophia perennis*. 51

Keeping in mind provisos concerning the adequacy of grand generalisations, the foregoing
passage seems to suggest that the central figure of Porphyry’s ‘tree’ may be fundamental to
any thorough-going analysis of the development of Western thought. Yet Rougier probably
gave little thought to the origins of this key image. From whence exactly did this image arise?
I do not mean by this question where did the image of Porphyry’s *particular* tree originate --
the history of its dissemination in the West is reasonably clear. We know that if it was not for
Boethius who treated of it in his translation of (and commentaries upon) Porphyry’s *Isagoge*
(itself an introduction to Aristotle’s *Categories*) then the subsequent development of the
concept of Western rationality and logic as outlined by Rougier would perhaps have never
occurred in the way it has. But why a *tree* in the first place? and is there some *intrinsic*
connection with rationality and logic quite apart from the fortuitous history of translation,
commentary and adoption of rhetorical figures in the early Medieval period?

I propose that the attractor of the tree is another generator (of logical objects) that subtends
many cognitive operations. That the *disputatio* so beloved of the Schoolmen, the arguments
*per genus et differentium* between Peter Abelard and William of Champeaux of the 12th
century, partake of this form (via Boethius) is not, to use the locution of Medieval logic, an
*accident* of history, but an ineliminable characteristic of it. I am not disputing the fact that the
‘Tree of Porphyry’ was a mainstay of Medieval learning, that his *Isagoge* wherein it is found
constituted one of the central texts by which the successive glosses of *littera, sensus* and
*sententia* were taught and consolidated in the developing institution of the University in the
12th century and onwards. This would constitute a rather standard history of the textual,
rhetorical development of the Western intellectual tradition, demonstrating indeed the
‘construction’ of ‘rational man’ after the manner suggested by Michel Foucault.52 Even if this
interrelated series of events and texts, individuals and institutions had never occurred (as
unlikely as that seems), the tree-like object would inevitably appear somewhere in our
intellectual development.

While the figure of the tree-attractor and the circle and/or nested circles attractor are not
logically connected as organising figures (that is, they represent two different strategies for
cognitive organisation), their appearance as figurative mnemonic devices are historically
coincident. Images of both attractors first appeared in the West in the 7th. century. In his *De
natura rerum*, Isidorus Hispalensis (Isadore of Seville) explicitly called for the use of *rotae*
(circles, wheels) to illustrate his ideas, a request that was to have an influence that extended
greatly beyond the illuminated pages of his work.53 Even in Pre-Carolingian times, Isadore of
Seville’s text was often called the Liber rotarum, rather than its original title. One of the main uses of the rotae in this work was to demonstrate and explain the calculations of the ‘wheel of the seasons’, ‘wheel of the month’, the ‘wheel of consanguinity’ (that is, of kinship) and ‘wheel of the planets.’ The turning of each of these wheels ultimately derives from the procession of the heavens. In his Sententiarum Isadore of Seville noted that individuals were ‘another world, created from the universality of things in abbreviated fashion.’ His recognition of the microcosmic/macrocosmic couplet is an important key to understanding the logic of the almost universal use of rotae illuminations in Medieval times. Information about planetary periods was widely disseminated in ‘handbooks’ of the Medieval period, but it was Isadore of Seville who utilised the form of a circle in his rota planetarum to illustrate astronomical calculations. One of the main ecclesiastical uses of astronomical calculations was to date Easter (a ‘moveable feast’) in any given year. This particular calculation gives us the first historical appearance of the word computus in the sense of a mathematical procedure: computus was the name given to all ‘Easter-dating’ material and consequently is another link in a series of associations that paradigmatically links thought itself to celestial observation.

Isadore of Seville was also the progenitor of the use of arbores in his manuscripts. Perhaps the most striking feature of Scholastic philosophy is its insistence on the art of drawing distinctions, and the image that seems to most naturally illustrate this dichotomising procedure is that of a branching tree. The two strongest textual authorities for this image were Boethius’ ‘Tree of Porphyry’ and the Tree of Life (lignum vitae) and the Tree of Good and Evil (lignum scientiae boni et mali) of the Garden of Eden mentioned in Genesis. Probably the earliest use of an arbor is found in Isadore of Seville’s Liber etymologiarum sive originum, in which one finds a number of ‘consanguinity trees’ to illustrate genealogy. This arboreal genealogical structure would be expanded to encompass a large number of discourses in the centuries to come such that his Etymologies would have a profound effect on the way knowledge was imagined. It would be no exaggeration to say that we know that knowing looks like a tree because Isadore of Seville first demonstrated it to be so.

While it might seem ‘natural’ to use an arbor to illustrate the points of bifurcation in the Scholastic dichotomising process, Isadore also used the circle diagram to illustrate contrariety in a wide number of disciplines (this structuring is still put to use today in the ‘colour wheel’ shown to every undergraduate art student, for example). In this schema the rays drawn from the centre of the circle represent divisions of the original point, and rays travelling in opposite directions from the centre represent contraries or opposites. The use of the circle diagram to represent contrariety does not seem so immediately ‘natural’ as that of the arbor to represent dichotomies, but if one considers the originally Pythagorean idea that contraries are necessary aspects of an original unity, then it does not seem so surprising. The central idea in both
structuring processes is that what needs to be imagined is the digital choice between two opposing states of affairs. This is the ‘essence’ of computus, of computation.

At any given time there is only a -- usually quite small -- denumerable set of solutions to any given problem. These solutions may be different in any given age or context, but that does not matter -- the fact remains that the choice of solution is essentially computational: a choice between ‘yes’ and ‘no’, ‘on or ‘off.’ Both the Neo-Daoist and Epicureans sects, for example, saw the pursuance of an effective philosophical life as a choice between two opposing worlds -- one could either choose to enter into politics and the world of social interaction or wholly retreat into nature where only like-minded individuals would gather together into small self-sustaining communities. The Epicureans, and most Neo-Daoists, chose the latter course. While complex considerations informed this decision, this is essentially an example of action determined as the result of a simple binary choice.

The dualistic structure of Gnosticism and Hermeticism is another case of a structural doubling that may be schematised as a binary series:

<table>
<thead>
<tr>
<th>Phenomenal World</th>
<th>True World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manifest Meaning</td>
<td>Secret Meaning</td>
</tr>
<tr>
<td>Analogy</td>
<td>Anagogy</td>
</tr>
<tr>
<td>Body</td>
<td>Spirit</td>
</tr>
</tbody>
</table>

This twin series is by no means exhaustive in regard to the structuring series implicit in both Gnosticism and the core correspondences of Hermetic thought. Rather it is the beginning of a strictly logical process that organises itself around a primordial division: the One (originary synchrony) divides into Two (primal diachrony), a necessary first step in the generation of all extensive sets. This primary division is then subject to further logical divisions, following what we nowadays would call a cladistic ‘decision tree’ model.

This is perhaps best illustrated if we consider the construction of a computer program. Nearly all computer programs, no matter which particular ‘programming language’ is used, follow the basic structures and rules of formal logic. All ‘machine code’ is designed to instantiate a logic of binary decisions that follows the form of: ‘If (a certain input is received) then proceed to line B; if not (the aforementioned input) then proceed to line C’ etc. This simple structure of ‘If...then/If not ...then’ is repeated throughout the length of the program, and this program can be designed to produce anything whatsoever, from a digital image to the complex computations of lattice structures in an artificial crystal. At the core of the functioning of contemporary computers we find Aristotle’s seemingly unassailable metaphysical law inacted:
the 'law of contradiction' predicated on the contraries of being and non-being, here transformed into its cybernetic version of information/absence of information.

The question naturally arises as to why such a division should obtain, why it is the very beginning of logical structures. I believe that here we can adopt Jung’s explanatory mode (although this particular analysis, I think, is not found in Jung) and find the answer in humankind’s earliest perceptions. Elaborate mythologies surround the two principles of Light and Darkness in nearly every culture, from the ‘primitive’ to the most contemporary. These two principles are probably the engine behind the privileging of the function of sight in Western culture, and paradoxically, its denigration in certain philosophical formulations.

Every child eventually comes to distinguish between two worlds. At first these two worlds manifest a certain degree of ‘overlap’, of shared orientation -- the world of participation mystique -- later they are cognised as being quite distinct. Representatives of this primal series are the worlds of Light and Darkness, Inside (the body) and Outside (the body). The mechanism by which these two worlds are effected is of the simplest kind: the opening and closing of the eyes; the subjective reflection of the experience of day and night; eating and defecating, skin as container etc. Eventually the principle of bifurcation asserts its determinative influence and we recognise its operation not only inside us (in the discriminatory process), but outside us as well -- in the shape of a tree, the bifurcating course of a river and its streams, in the necessity of an horizon between earth and sky.

The Seven Catastrophes of the World

It was perhaps in the early Pythagorean and Neo-Pythagorean communities that the notion of number was first given a central role as the formative function behind phenomena. For the Pythagoreans number was much more than the notation necessary to record the results of the addition, subtraction or multiplication of heterogeneous objects, rather number was directly constitutive of all phenomena (an idea found so risible by Aristotle in his De Anima). Despite Aristotle’s ridicule, this notion has had a great effect far beyond the confines of the early Pythagorean communities. We in fact find the idea of the determinative functioning of number appearing throughout Western history. St. Augustine for example held that the human mind is an image of the Trinity, an idea that would be echoed by Jacob Boehme centuries later,

All is in Man, both Heaven and Earth, Stars and Planets; and also the number Three of the Deity. 36

The macro/microcosmic couplet as expressed by Boehme was the ‘essence of his teaching’ as Nicolson says. 37 And his trinitarianism should not be glossed over too quickly -- it is highly likely that when Boehme said that the number three of the Deity was also in human kind, his meaning was that the Number Three was actually constitutive of human beings, an hypostasis

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made flesh. This was no arbitrary resemblance for Boehme, but an unmistakable expression of the divine language of forms in Nature:

There are especially seven forms in nature, both in the eternal and external nature; for the external proceed from the eternal: The ancient philosophers have given names to the seven planets according to the seven forms of nature; but they have understood thereby another thing, not only the seven stars, but the sevenfold properties in the generation of all essences: There is not anything in the Being of all beings, but it has the seven properties in it, for they are the Wheel of the centre, the cause of Sulphur, in which Mercury makes the boiling in the anguish-source.58

Boehme stresses an important consideration in regard to the ‘seven influences’: the stars merely reflect the influence of the seven forms of nature, mysterious formative principles that account for the ‘law of seven’ (note too the appearance of the ‘Wheel of the centre’ again). Can there be anything to this ‘seven-ness’ apart from the quaint repetition of archaic cultural remnants?

Contemporary mathematician René Thom insists that there must be. For Thom there are seven elementary catastrophes which describe all forms, all phenomena in the world. I suggest that we find in Thom’s work the re-appearance of certain key aspects of the Hermetic imaginary, certain signature ‘ways of thought’ which have resurfaced on the other side of the barrier of the ‘scientific revolution’ and of scientific thought in general.

In his Structural Stability and Morphogenesis first published in the early 1970’s, Thom proposes to describe the deep mathematics that demonstrate the existence of seven geometric principles of the phenomenal world. What is immediately intriguing about this work is that it proposes not a quantitative analysis of a system, but a qualitative one. Thom’s theory of catastrophes makes no pretension to be predictive in the manner of Newtonian science. In this way it is a theory akin to Darwin’s theory of Natural Selection: it is an attempt to bring together a large number of disparate phenomena under the one explanatory umbrella -- in Thom’s case, the fundamental geometrical structures that govern all major changes in any system. And just as Darwin’s theory of evolution is not -- cannot be -- predictive, so with Thom’s theory of catastrophes.

A catastrophe is Thom’s name for a major change in a system (described topologically) that occurs following a minor change in the external variables used to describe that system. His theory of catastrophes however is much more than an exercise in applied topology. Despite his -- admittedly not very strong -- protestations to the contrary, catastrophe theory makes a very strong metaphysical claim. Everything in the phenomenal world is a type of dynamical system which can be described by one of seven ‘catastrophe sets’ (that is, the parameters
describing the system that indicate governance by one of the seven catastrophes). The geometrical shapes of the seven 'elementary catastrophes' bear an iconic relationship to their names: the 'swallowtail', the 'wave'(hyperbolic umbilic), the 'hair'(elliptic umbilic), the 'mushroom'(parabolic umbilic) and the 'butterfly' catastrophe set. Each of these is a recognisable 'shape' imaging the topological distortions that the system undergoes when one or more of its variables is 'tweaked.'

Paradigmatically, a system shifts from one relatively homeostatic (stable) state to another -- the beginning and end states are attractors, and the shift process is the topological space Thom calls a catastrophe. Morphogenesis, the creation and mutation of forms, is 'described by the disappearance of the attractors representing the initial forms, and their replacement by capture by the attractors representing the final forms.' Concerning 'attractors', Thom admits,

[L]ittle is known of the topological structure of structurally stable attractors...It seems to me, however, that this is the essential geometric phenomena intervening in a large number of morphogenetic processes, such as changes of phase in physics and the phenomenon of induction in embryology.

Thom's attractors, like the catastrophe itself, cannot be observed directly -- they are organising fields ('morphogenetic fields') occurring in a four-dimensional space. All that can be 'observed' is a succession of three-dimensional catastrophes: an evolving catastrophe set. Nonetheless Thom, through numerous examples, believes that we are forced to infer the presence of these organisational geometries:

The essential point of view advanced here is this: the stability of every living being, as of every structurally stable form, rests, in the last analysis, on a formal structure -- in fact, a geometrical object -- whose biochemical realisation is the living being.

And Thom means every form. He sees only two basic divisions between structures: static forms like stones or geological formations and metabolic forms which include, for example, a jet of water, a plume of smoke, a dancing flame and a human being. This geometrical idealisation allows him to say, in the spirit of Synesius, that 'every animal is topologically a three-dimensional ball.'

Complicated forms in the world, like a cloud or a tree, are not governed by one catastrophe, but rather are the result of the accumulation of numerous elementary catastrophes.
What is important though, is that these catastrophes can be described independently of the physical substrate that may instantiate them:

One of the basic postulates of my model is that there are coherent systems of catastrophes (chreods) organised in archetypes and that these structures exist as abstract algebraic entities independent of any substrate.\textsuperscript{66}

This allows Thom to make some surprising claims for his studies in morphogenesis. He insists that we must ‘accept the idea that a sequence of stable transformations of our space-time could be directed or programmed by an organising centre consisting of an algebraic structure outside space-time itself.’\textsuperscript{57}

Thom borrows the terminology of the theoretical biologist C. H. Waddington when he introduces the term ‘chreod.’ A chreod (creode) is Waddington’s term for what he calls the ‘canalisation of development’\textsuperscript{68} of a zygote, where its histogenesis is governed by ‘a restricted number of end states among which there are few if any intermediates.’\textsuperscript{69} A chreod then is a ‘pathway of developmental change’ involving the actions of a ‘considerable number of...systems, and these are interrelated by some feedback connection in such a way that the developing system, if diverted to a minor extent from the creode, has a tendency to return to it.’\textsuperscript{70} For Thom a chreod differs from a morphogenetic field only in the ‘privileged role allotted to time’, i.e. it is the term for a developmental description of the field.\textsuperscript{71} All creatures ‘tend along some convergent funnelled route’ -- a chreod -- and the maintenance of the creature relies on a small number of regulatory functions such as sleeping, eating, respiration, reproduction etc. Each of these functions are ‘breaking hypersurfaces in the global model’ (ie., the organism considered in its totality) and each begin with a chreod which creates first the organs which correspond to the function and then the ‘function fields’ of the nervous system. The function fields ‘create organising centres of global functional fields (archetypal chreods) in our mental organisation.’\textsuperscript{72}

Following the logic of his geometric imaginary, Thom proposes that the psychological organisation of organisms pivots around a series of ‘dualistic’ states.

In some sense the nervous system is an organ that allows an animal to be something other than itself, \textit{an organ of alienation}.\textsuperscript{73}

He describes how at some point a predator ‘becomes’ its prey, its mind dominated and hence alienated from itself by the image of that which it seeks. Suddenly the predator ‘jumps from the surface corresponding to the prey to its own surface’, this jump corresponding to the \textit{perception} catastrophe, ‘an instantaneous \textit{cogito}.’\textsuperscript{74} Here Thom proposes the geometrical equivalent of the quantum jump of sub-atomic particles, the ‘moment’ of the perception catastrophe being characterised as the ‘non-moment’ (unquantifiable ‘jump’) between the alienated mind of the predator-become-prey and the predator proper. Thus for Thom the
dichotomy between Self and Other is resolved in the collapse of one geometric state into another, a process which continually repeats itself.

The details of Thom’s theories are outside the scope of this chapter; it is sufficient to recognise the implications of the language he chooses in his explanations. The notion of an ‘archetypal chreod’ is quite clearly a topologist/geometry’s way of acknowledging and reformulating the Jungian concept of a mental ‘archetype.’ The fact that the ‘meaning’ of the chreod, as Thom says, is not inherent in its geometry, but depends on its manifestation over time, closely ties it to the empty categories of Jung’s archetypes of the Collective Unconscious which only become meaningful when ‘filled’ with content by the individual psyche.

The idea of ‘attractors’ -- since adopted by contemporary Chaos theory -- is a curious acknowledgment of the ancient progenitors of Thom’s catastrophe metaphysics. There is at once a hint of the erotic ontology of the Hermeticists and a nod to the ‘occult quality’ of Newton’s mathematics of Universal Gravitation. The fact that, as Newton said, objects are ‘attracted’ to the centre of the earth, and that the solar system itself is subject to the complex attractions of the celestial bodies occupying it is but further support for the contention that Newton himself was heir to an ancient tradition (revived and interpreted primarily by Ficino) that envisaged the relationships in the phenomenal world as instances of an ‘erotic’ lawfulness. In fact it was Newton’s insistence on the use of the term ‘attraction’ that prevented his theories from being accepted on the Continent for almost a century after the publication of his Principia. The notion that some form of erotic force was inherent in dead matter was found laughable by scientists in France.75

Thom’s insistence on making the topology of fields of force the subject matter of his all-inclusive metaphysics links him with the Stoic tradition that saw the all-pervasive pneuma as a kind of tensile, topologically deformable field of activity. As Sambursky notes, the concept of the pneuma ‘fulfilled the functions of [the contemporary notion of the] physical field by its tensequalities and by its capacity to give bodies a coherent structure with well-defined physical properties.’76 This description of the pneuma also describes, in skeletal form, Thom’s estimation of the functioning of the geometry of catastrophe sets.

In terms of the thesis of this chapter, it is important to understand the fact that Thom must ground his abstract geometry in concrete images and examples. The impossibility of picturing objects in a world of greater dimensions than three (a cognitive limitation of the human umwelt, according to Uexküll), necessitates such an exigency. This was a fact well acknowledged by the popular explicators of the concept of the fourth dimension in late 19th/early 20th century.77 A truly fourth-dimensional object would in theory be impossible
for us to recognise -- we are only allowed, as it were, approximate glimpses of what can only be for us entia rationis.

Thom's notion of the central nervous system as being an 'organ of alienation' has undeniable Gnostic resonances. The activities of the 'breaking hypersurfaces' of chreodic canalisations (part of the global organisation which defines any organism) pictures the relationship between part and whole as a continuing series of recognitions and misrecognitions, of knowledge and its absence. Furthermore this chreodic activity, this geometrical description, is the very definition of the organismic itself. In other words, Self is knowing or gnosis: substance is subject. One is strongly reminded of the legend above the portal to Plato's Academy: 'Let no man ignorant of geometry enter here.' Thom has adopted this logic quite literally, for just as Plato opposes 'ignorance' to 'geometry' (geometry being equivalent to knowledge), so too does Thom suppose that the final description of the Real resolves itself into the geometrical.

According to Thom 'coherent systems of catastrophes' (that is, chreods) constellate into structures which become 'abstract algebraic entities independent of any substrate.' He furthermore posits that the transformations of our spacetime may be directed or 'programed' by another 'algebraic structure' which is itself outside our spacetime entirely (refer to quotation above). Rather surprisingly we find contemporary topology here pressed into the service of a Gnostic mythology. While couched in his own peculiar terminology, it is quite clear that Thom is proposing that the kosmos was demiurgically created by a 'system' of which all creatures are microcosmic equivalents. As Jonas is careful to point out, the transcendence of the god of the Gnostics is stressed to the extreme. Jonas even says that 'Topologically, he is transmundane...ontologically, he is acosmic.' While ineffable and 'unknown', some Gnostic 'systems' (Jonas, like Couliano after him, is careful to use this important locution) note that one of the transmundane entity's secret names is 'Man', a term that Jonas states is significant, yet does not pursue. This again is evidence of the principle of circularity operating within Gnostic mythology, the abstract principle behind the micro/macrocosmic couplet, where 'man' becomes structurally equivalent to 'god' or creator. For Thom both humankind and the transcasmic creator are alike 'abstract algebraic entities', a formulation that reifies and recapitulates the Timaeic account of creation through the artifice of geometry. Furthermore, if 'every animal is topologically a three-dimensional ball' then so, following his own logic, is the absconditus creator.

Conclusion
In 1956 an article appeared in the Psychological Review called 'The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information', by George Miller. In this paper Miller expounded his view that there is a quantitative limitation to our cognitive abilities. Specifically he said that an individual's ability to distinguish absolutely
between a series of stimuli went through some sort of 'breakdown' when the number of items to be distinguished reached seven.

There seems to be some limitation built into us either by learning or by the design of our nervous systems, a limit that keeps our channel capacities in this general range. On the basis of the present evidence it seems safe to say that we possess a finite and rather small capacity for making such...[judgements] and that this capacity does not vary a great deal from one simple sensory attribute to another.\textsuperscript{51}

In other words, seven seems to be the 'catastrophe point' for all sensory capacities. Miller notes that this is the reason why telephone numbers, for example, were originally limited to only seven digits -- anything greater than this and most people would not be able to remember them. Telephone numbers are commonly greater than seven digits nowadays, but Miller's observations still hold. This is because Miller recognised that we are clearly able to recall information comprising elements greater than seven in many circumstances, and we do this by associating discrete sets of seven elements or less, a process called 'chunking.' Each 'chunk' cannot contain more than seven elements, but a number of chunks can be associated together so that we have a large number of elements connected together. That is why we can remember large telephone numbers -- we break them up into chunks: the area code (two digits), the new prefix for the city (add the number 9), the telephone number itself (seven or less digits.)

In considering Miller's famous paper, we meet again the 'magic number seven' which seems to have guided so much of the thought of the pre-scientific era. Miller suggests that there is no mystery to the continuing recurrence of this number as an organisational strategy, it is simply that we are 'hardwired' with this particular cognitive limitation. In this view, Thom's seven elementary catastrophes are also an expression of the limits of our cognition: there may be more 'catastrophes', it is just that we would be hard-pressed to discern them. Arrangements of seven then become a figuration (a recurring form exhibiting the same functional relationships) that itself organises elements within any imaginary: the 'magic number seven' is an attractor just like that of the circle/sphere and arborial schema.

Is this the reason for the preponderance of the number seven throughout Western culture? Afterall, even ancient peoples knew that there were not just seven planets. The Sun and Moon were part of the seven, but they certainly do not resemble the small, twinkling 'wandering stars'\textsuperscript{52} that are Venus, Mars, Jupiter, Saturn and Mercury. Did they include the Sun and Moon because somehow they felt that they needed seven stars, and that this was the only possible 'upper limit'? Why is Ursa Minor (a constellation of signal importance in Chinese and much of Middle Eastern mythology) considered to be composed of seven stars and not
elements of the other constellations that lie so close to it? Did early astronomers/astrologers look for patterns of seven because they were cognitively inclined to do so?

In attempting to answer this question we find ourselves in a position to understand the nature of the metaphysical geometries that have been the subject of this chapter. I do not think that we are limited by structural, or in contemporary parlance, 'hardwired' cognitive limitations but rather that we participate in a complex number of interrelated causal influences -- societal, historical, and cognitive factors -- all of which considered are but discontinuously observed aspects of a particular ideal object. These discontinuities would all resolve into a single object if it were possible to observe it from a 4th. dimensional perspective. There is only a 'lucky number seven' limitation intrinsic to our cognitive make-up to the extent that we, as cognising subjects, are subject to such an attractor which generates and organises ideal objects. On the surface this may seem very like Richard Dawkins' idea of the meme, a pattern of behaviour that replicates itself rather like a virus throughout a society and over a period of time, but the resemblance is only superficial. Dawkins' memes are relatively trivial patterns with a limited 'life-span'; an attractor, in its very definition, is possessed of a profound (deep) geometry that lies outside of temporal considerations.

René Thom believes that his geometrical models of dynamical processes produce the first 'rigorously monistic model of the living being, ...reduce[ing] the paradox of the soul and body to a single geometrical object.' While his system of description (geometry) is certainly a monistic model, it is clear that a vision of reality that stresses the importance of discontinuous breaks as opposed to linear, mechanical dynamics (the Newtonian paradigm) can hardly be described as 'monistic.' But there is a definite continuity of thought perceivable behind Thom's project which aligns his ideas with ideas much more ancient than those of 20th century topology. And just as the logic of Gnostic anthropology/cosmology imagines a circulatory system subtending the relationship between the human and the divine, so too does Thom's conception 'combine causality and finality into one pure topological continuum.'

In his essay, 'Is God a Mathematician?' Hans Jonas notes in regard to living organisms that,

As a physical body the organism will exhibit the same general features as do other aggregates: a void mostly, crisscrossed by the geometry of forces that emanate from the insular foci of localised elementary being. But special goings-on will be discernible, both inside and outside its so-called boundary, which will render its phenomenal unity still more problematical than that of ordinary bodies, and will efface almost entirely its material identity through time. I refer to its metabolism, its exchange of matter with its surroundings...the material parts of which the organism consists at a given instant are...only temporary, passing contents whose joint material identity
does not coincide with the identity of the whole which they enter and leave, and which sustains its own identity by the very act of foreign matter passing through its spatial system, the living form.\footnote{6}

In another essay Jonas notes that the Cartesian ‘machine metaphor’ breaks down when considering the idea of organismic metabolism, for metabolism is the ‘constant becoming of the machine itself’, a notion that is diametrically at odds to the conception of the machine as a stable collection of structures or parts. Metabolism ‘builds up’ and ‘continually replaces the very parts of the machine itself’, thus undermining and countering the classical definition of the machinic. Jonas proposes that a better analogy is that of a flame as,

the permanence of the flame is a permanence, not of substance, but of process in which at each moment the ‘body’ with its ‘structure’ of inner and outer layers is reconstituted of materials different from the previous and following ones, so the living organism exists as a constant exchange of its own constituents, and has its permanence and identity only in the continuity of this process, not in any persistence of its material parts.\footnote{7}

Jonas has (perhaps unconsciously) borrowed the same exact metaphor from Wiener:

...the individuality of the body is that of a flame rather than a stone, of a form rather than that of a bit of substance.\footnote{8}

We should recall that Thom proposes -- in a much stronger way -- that a geometrically governed homeomorphology operates between such seemingly diverse forms as a flame, a jet of water and a living organism. In simple terms, each of these is governed by, and is beholden to, a geometrically describable form/potentiality before it can become a material entity. And I think that it is clear that if we were to but substitute ‘pneumatic influences’ for ‘material exchanges’ in the above passages, we would have a fair approximation of the Hermetic conception of process in the world. If we include Thom’s geometrical description of this economy of exchanges, then we can also apprehend the proximity of his imaginary to that of the Hermetic, this imaginary itself adumbrating Norbert Wiener’s conclusion that, ‘We are not stuff that abides, but patterns that perpetuate themselves.’\footnote{9}

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1 James, William. *Some Problems of Philosophy* (NY, 1911), 4.
2 Le Doeuff, 1.
4 Ominipresence and omnipotence are ‘almost mathematical concepts’, says Spengler, vol. I, 312.
5 An identification clearly foregrounded in Newton’s controversial concept of the *Sensorium Dei*.
8 Couliano (1987), 194.
9 The very name Dominican affords us an exemplary image of how the monks themselves saw the functioning of their order. *The Domini Canes* (‘hounds of God’) were the fierce guard dogs that prowled the spiritual terrain contested by the Cathar heresy.
10 Couliano (1987), 195.
12 Durand, 3-4.
13 For an exposition of the notion of the ‘commonplace’ in literate culture before the advent of

14 Fodor, Jerry. The Language of Thought. (NY: Thomas Y. Crowell, 1975.)
15 Boyer & Merzbach, 632.
16 A brief account of the Banach and Tarski paradox and its antecedents -- from which I derive my understanding of it -- can be found in Kasner, E. and J. Newman, 181-182.
18 It must be pointed out that while they function differently upon occasion, the circle and the sphere should be regarded as equivalent when it is realised that they share only a difference in dimension. Both circle and sphere derive from the same set of geometrical considerations, and a difference of dimension becomes a negligible difference in terms of the 'fourth-dimensional' vantage-point of the vertigial hermeneutic.
19 This aspect of Bolzano's work was to have a profound influence on Wittgenstein's Tractatus Logico-Philosophicus.
20 The English word 'gas' was invented by J. B. van Helmont (father of F. M. van Helmont, cf. Chapter V), to describe the 'third' state of matter. He coined the word directly from the Greek 'chaos.'
21 These and the following considerations rely on Ananda k. Coomaraswamy's 'Kha and other Words denoting 'Zero' in Connection with the Metaphysics of Space.'
22 Coomaraswamy, 487.
23 Coomaraswamy, 488.
25 Here we observe a strong resemblance between the Buddhist conception of avidya (ignorance) and Gnostic thinking.
29 Dorese, 269.
30 Wiener, 36.
31 One of the earliest of Euclid's axioms in his Elements of Geometry: 'A point is that of which there is no part.'
32 Coomaraswamy, 489.
33 Coomaraswamy, 489.
34 Coomaraswamy, 493.
35 Coomaraswamy, 493.
36 Coomaraswamy, 493.
37 Theophrastus quoted in Sambursky, 2.
38 In Sanskrit loka -- from which we derive our word 'locus' -- means 'world' or possibly 'dimension' (in contemporary scientific parlance.)
39 In the Scholastic, rather than the Jungian sense.
40 Concerning the reception of zero in the West, Spengler says: 'This zero, which probably contains a suggestion of the Indian idea of extension -- of that spatiality of the world that is treated in the Upanishads and is entirely alien to our space-consciousness -- was of course wholly absent in the Classical [consciousness.] By way of Arabian mathematics (which completely transformed its meaning) it reached the West...with its sense...fundamentally changed, for it became the mean of +1 and -1 as a cut in a linear continuum, i.e., it was assimilated to the Western number-world in a wholly un-Indian sense of relation.' (Spengler, vol. I, 178). He is, of course, limiting himself to the mathematical concept of relation, as opposed to the (metaphysical) sense in which I have characterised the system of relations in the plenum.
41 Bhaskara quoted in Coomaraswamy, 493.
43 Fludd, Truths Golden Harrow, in Huffman, 162.
44 Koyre, 279.
45 Sendivogius, The New Chemical Light, collected in Waite, 86.
46 That 'self-contained' should imply 'spherical' is not immediately obvious to us today. Yet to one schooled in the Platonic and Neo-Platonic literature (as was Sendivogius) it would be a natural association.
47 Feldman, 255.
48 Plotinus, 358.
Plotinus, 358.

Plotinus, 358.


I am thinking particularly of Foucault's famous closing statements in Le Mots et les Choses: 'As the archaeology of our thought easily shows, man is an invention of recent date. And perhaps one reaching its end.' The Order of Things. [trans. of Le Mots et les Choses] (NY: Random House, 1973), 387.

Murdoch, 52.

Quoted in Conger, 34.

Murdoch, 38.

Nicolson, 25.

Nicholson, 25.

Boehme, 93.

Thom utilises an elaborate mythology of 'capture' and 'predation' even when describing higher level functioning (such as cognition and language) in organisms such as human beings. Although never mentioned explicitly by Thom, much of his language indicates, in my estimation, the strong influence of Rene Giraud on his thinking.

Thom, 320.

Thom, 96.

Thom, 152.

Thom, 102.

Thom, 152.

Thom, 8.

Thom, 316.

Thom, 119.

While Waddington -- unlike Thom -- early tended to keep his ideas about theoretical biology within the purview of that domain, he was not reticent in occasionally utilizing his terms in fields wholly unrelated. In his essay, 'Art between the Wars' in talking about the British 'Apocalyptic' poets, he states, '[T]his insistence on vigour and intensity...is not yet canalised by any definite line of thought.' [in The Scientific Attitude (Richmond, Vic.: Hutchinson, 1968), 38.] The use of the word 'canalised' must surely have seemed quite odd -- if not incomprehensible -- to the reader unfamiliar with Waddington's works on theoretical biology.

Waddington, 44.

Waddington, 44.

Thom, 114.

Thom, 295.

Thom, 299.

Thom, 299.

In 1730 Voltaire noted, '...if Newton had not used the word attraction, everyone in [the French] Academy would have opened his eyes to the light; but unfortunately he used in London a word to which an idea of ridicule was attached in Paris.' In Mandelbrot, 5.

Sambursky, 3.

Charles Hinton, Claude Bragdon and Edwin A. Abbot.

Jonas, 268.

Jonas, 268. I suppose he does not pursue this point for the simple fact that he assumes most readers would be familiar with his assertion that Gnosticism is akin to Heideggerian existentialism.

Thom, 152.


Our word 'planet' is derived from the Greek word for 'wanderer.'

Complex in the sense of the Medieval/Renaissance use of the word as meaning the particular mixture of humors -- themselves determined by celestial influence -- that determined physical health: one's face revealed the particular mixture or complexion of influences.

Thom, 323.

Thom, 323.

Jonas (1966), 75.


Wiener, 139.

Wiener, 130.
IV
The Gnostic Alchemy of Robert Fludd

Nature comprehends the visible and invisible Creatures of the Whole universe. What we call Nature especially, is the universal fire or Anima Mundi, filling the whole system of the Universe, and therefore is a Universal Agent, omnipresent, and endowed with an unerring instinct, and manifests itself in fire and Light. It is the First creature of Divine Omnipotence.¹

‘Golden Chain of Homer’

When surveying changes in the Hermetic imaginary one must be cognisant that these changes are more accurately characterised as developmental deformations of unitary underlying structures, structures which despite superficial differences, remain functionally unchanged. The Hermetic alchemy of the doctor/Hermetic philosopher Robert Fludd (1574-1637) represents just such a ‘developmental deformation’ in regard to the fundamental Hermetic figuration of the anima mundi. In the previous chapter considerable space was given to elucidating the function and meaning of what I have called the circle/sphere attractor. This attractor seems to be the elementary figuration underlying the Hermetic notion of the anima mundi and its virtual instantiations, psyches. As I stated Chapter III, this figuration represents or realises the relationship of Self to kosmos, or of psyche to anima mundi. The circle and its central point pictorialise the structure of this metaphysical relationship.

In Truth’s Golden Harrow, Fludd revitalises the Gnostic mythologem of the spinther, (σπινθηρ) or ‘alien spark’ by equating it with a hidden propensity within the psyche: in the work of Fludd it becomes equivalent to the subtle hypercorporeity of the Hermetic alchemist. Furthermore, he imagines the task of the alchemical operation to be the realisation of an alchemically perfected hypercorporeity. He calls this perfected hypercorporeity the ‘mental beam.’ This developmental deformation of the hypercorporeity into a ‘mental beam’ is a logical advance of the figuration of the circle/sphere attractor as anima mundi. Fludd’s alchemical work may then be seen to be predicated on the metaphysical/geometrical notion that a line drawn from the central point of a circle or sphere becomes a ray: a dynamic vector that must inevitably intersect with the sphere of the anima mundi.

This chapter is organised in two parts. In the first part I provide a vertigralist reading of Robert Fludd’s Hermetic imaginary (particularly as found in his text Truth’s Golden Harrow...
Harrow), concentrating on the central importance accorded the Gnostic mythologem of the ‘alien light’ within the Fluddian imaginary and the imaginal deformation it undergoes to become his ‘mental beam.’ In the second part, I explore the relationship of Fludd’s ideas to certain ideas that have emerged in the late 20th century.

It may not be immediately apparent that an examination of the Hermetic alchemy of Robert Fludd could contribute in any way to a revitalisation of certain discourses in the late 20th century. Yet a careful reconsideration of his particular Hermetic figurations and the meanings behind them suggests otherwise. Such a reconsideration of alchemical ideas was argued (with some urgency) in the late 1950s by Norman O. Brown in his influential Life Against Death. In the final chapter, ‘The Resurrection of the Body’, Brown proposed that Freudian psychoanalysis was the indirect (and inadequate) heir of the alchemical tradition. He further proposed that there was a strict identity between the dream of a ‘magical body’ as imagined by certain poets (Rilke, Blake and Valéry are his examples) and the subtle body of occidental tradition, the ‘diamond’, vajra (adamantine) body of the orient and the ‘polymorphously perverse body of childhood.’

By maintaining the formal equivalence of these diverse notions he asserts that each of these manifestations reflects the desire to overcome the Western division between matter and thought, body and soul. He approvingly notes Needham’s fascination with the ‘body mysticism’ of Chinese neijia Daoism and concurs with Needham that the Daoist ‘quest for a more perfect body transcends the Platonic dualism of soul and matter.’ Brown notes that the body mysticism found in Daoist alchemical literature and in the Western doctrine of the subtle body takes seriously the idea of human perfectibility, of a union or interpenetration of mind and matter, while orthodox psychoanalysis refuses to countenance such an eventuality. He says that while it is true that, ‘Psychoanalytical therapy involves a solution to the problem of repression,’

what is needed is not an organismic ideology, but to change the human body so that it can become for the first time an organism -- the resurrection of the body.

As noted in the first two chapters of this work, Ficino’s ‘Hermetic revolution’ (if one may call it that) re-introduced an erotic sensibility into the natural philosopher’s apprehension of the natural world, a sensuous awareness of the relatedness and interconnectivity between the apparently diverse phenomena presented to the senses. Brown notes that both Needham and A. N. Whitehead are similarly motivated in their respective re-evaluations of 20th century sensibilities and knowledge practices.

Whitehead and Needham are protesting against the inhuman attitude of modern science; in psycholanaalytical terms, they are calling for a science based on an erotic sense of reality, rather than an aggressive dominating
attitude toward reality. From this point of view alchemy (and Goethe’s essay on plants) might be said to be the last effort of Western man to produce a science based on an erotic sense of reality.\(^5\)

It is the task of this chapter to elucidate the importance of this aspect of the Hermetic sensibility by examining the figurations of the Hermetic alchemy of Robert Fludd and evaluating its significance for late 20th century thought.

As an introduction or pre-figuration of this fundamental figure within Fludd’s imaginary, we may recall Hegel quoting Meister Eckhart:

The eye with which God sees me is the eye with which I see him; my eye and his eye are one....If God were not, I should not be; if I were not he would not be either.\(^6\)

Here Eckhart (and Hegel) pictures the relationship of mind to nous in terms of the operations of the *axis visualis*, the ‘prince of rays’ as Alberti called it, here invoked to establish the noetic connection between God and humankind. The re-establishment of a direct relationship between the Holy Spirit (equated by Fludd with the *anima mundi*) and the alchemical philosopher is imagined by Fludd as being accomplished by this ‘mental beam,’ taking the form of a ‘straight line’ relationship that connects mankind with the intellectual.

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**PART I**

**The Radiation Economy**

The followers of Pythagoras knew their teacher as *autos*, ‘he who is himself.’ For Pythagoras’ disciples he was one of the very few people who were completely or truly ‘themselves.’ The notion that there is a true (and therefore unchanging) reality hidden deep behind appearances still attaches itself to our contemporary usage of such words as ‘author’ and ‘authority’, both of which are derived from the ancient Greek *autos*. In its ‘naturalised’ (i.e., ‘scientific’) form this authentic self has become the object of 20th century ‘ego psychology’ and the ‘individuation’ process advocated by psychologist Carl Jung.

One of the most important aspects of this notion is not the unchanging authenticity of a ‘completed self’, but rather the gnostic process by which this was attained or realised. One of the most significant aspects of both Gnosticism and Fludd’s Hermetic alchemy is the conception of *gnosis* or alchemy as a quest to uncover and realise the ‘authentic’ *autos*-self. This *autos*-self was pictured by both Gnostic thinkers and Fludd as the alien light hidden within (similar conceptions also pertain within Lurianic Kabbala). As a fragment of a greater whole, ‘authenticity’ was realised when the gnostic process reified the fact that
some part of the self was indeed part of a greater whole. This of course is the defining characteristic of Magian consciousness -- the belief that true individuality only comes in recognition of the non-separateness of the self in relation to the All. Within Magian consciousness community both precedes and participates in the actuality of individuals. Fludd’s approach to alchemy, then, is a perfect example of one of Spengler’s pivotal definitions of the Magian character:

Whereas the Faustian man is an ‘I’ that in the last resort draws its own conclusions about the Infinite; whereas Apollonian man, as one soma among many, represents only himself; the Magian man, with his spiritual kind of being, is only a part of a pneumatic ‘We’ that, descending from above, is one and the same in all believers. As body and soul he belongs to himself alone, but something else, something alien and higher, dwells in him...7

It was the aim of Fludd’s Hermetic alchemy to reveal this luminal ‘alien entity’ hidden within the human form, thus ensuring its community with the cosmic corporeity (or anima mundi). As Spengler rightly observes,

In Alchemy there is deep scientific doubt as to the plastic actuality of things -- of the ‘somata’ of Greek mathematicians, physicists and poets -- and it dissolves and destroys the soma in the hope of finding its essence. It is an iconoclastic movement just as truly as those of Islam and the Byzantine Bogomils were so. It reveals a deep disbelief in the tangible figure of phenomenal Nature, the figure of her that to the Greek was sacrosanct.8

Spengler is perhaps over-stating his case in asserting that alchemy sought to ‘destroy’ the soma in search of its essence. Alchemy may just as accurately be characterised as seeking to expand notions of that which constitutes corporeality, to propose a sur-reality of the somatic. Certainly this was the case with Robert Fludd. As a physician Fludd was undoubtedly concerned with soma or physis in all its aspects. A primary theme within Fludd’s imaginary seems to have been the conviction that the human corporeity is the urgrund from which the knowledge practices of natural philosophy should be derived. It must be borne in mind however that Fludd’s conception of corporeity was of his times -- a combination of the subtle physiology imagined as being coterminous with the venal system (following Galen’s ideas) and the newly developing ‘hydraulic’ schema perhaps first initiated by Fludd’s close friend, William Harvey.9 In any case, Fludd’s sense of corporeity was certainly quite different from the comparatively limited mechanical model that was soon to usurp it.

Fludd regarded the study of medicine as much more than the description of the diseases that could assail the body, or the explanation of its ‘material’ corporeal workings -- for him it was the science that would lead the natural philosopher to an understanding of God and His
works. This understanding was achieved through the agency of the *double exchange* which traced a vertical trajectory between microcosm and macrocosm. In his major work on the micro-macrocosmic economy, *Utriusque cosmi historia*, he pictorialises this double movement through the utilisation of images foregrounding two interpenetrating triangles, one ascending, the other descending. It is not too difficult to read the significance of this figure: the descending triangle is the vector of the Trinity, the ascending that of the tripartite (after the Platonic model) *mens* or psyche of humankind. Fludd also relies on textual images to amplify this notion of mutual psychic interpenetration. Making reference to the well known Hermetic dictum, *Deus est sphaera cuius centrum ubique, circumferentia nulli* and contemporary theories regarding the geometrical underpinnings of optical phenomena, he notes:

[The greater chorus of philosophers (among whom are named Democritus and Orpheus) concludes that GOD contains every name, since all is in him and he himself is in everything, not unlike the manner in which all straight lines drawn from the centre to the circumference are said to be in the centre...]

The rhetorical origins of Fludd’s analogy would no doubt have been clear to his contemporaries: it combines a geometrical/metaphorical reference to the deity first ‘popularised’ by Cusanus with a theory of the mechanics of His relationship to the individual. This latter is inherent in the concept of ‘lines’ in the above quotation. These refer, one suggests, to the metaphysical importance that the idea of ‘rays’ (in draughtsman’s parlance, a line with a definite direction or vector) hold in the imaginary of light itself and the central importance accorded to photic phenomena in Fludd’s Hermetic alchemy.

Fludd’s Hermetic alchemy is essentially the Gnostic quest to realise/reify the facts of cosmogony within the individual alchemist her/himself. Fludd imagined the *anima mundi*/Holy Spirit as being the intermediary in the participatory relationship of the alchemist with God (or, as we might say today, the Real), and the same processes that caused both cognition and change in the world were embedded in the nature of this quintessential template, at least as Fludd conceived of it. Following the Stoic and Epicurean/Lucretian tradition, Fludd imagined the quintessential medium that mediated this relationship as being composed of rays that moved in straight lines from a source to a receiver, and this coding was channelled both ways: from sublunary nous to divine *Nous*, and vice versa. Considered as a whole, as a vast economy of interpenetrating rays (this economy determined by the number of organisms distributed along the curvature of the Great Chain of Being), this intercommunicative matrix formed the field of potentiality behind the periodic appearance of actualities. In the work of Fludd, the ‘principal space’ of Coomaraswamy (symbolically represented by the circle and *bindu* according to
Coomaraswamy) of the Platonic Receptacle or Chora becomes Hermetically reconfigured/imagined as being composed of striations of the first principle – light.

**Imaginal Logic of an Ideal Object: Matter and Light**

Hermetic philosophers and Paracelsians in general felt that the most important textual source providing an understanding of nature was the account given in Genesis of the creation of the world. As this text also privileges an account of the creation of humankind, it seemed logical that an explication of the true nature of the relationship between the microcosm and the macrocosm should be found therein. For further explication and confirmation of the Mosaic account of Creation Fludd relied on the Hermetic Pymander (Corpus Hermeticum I), which was immediately and naturally associated with the account given in Genesis first by Ficino, his example to be followed by many succeeding natural philosophers. I propose to examine Fludd’s development of the imagery found within these two texts as a prelude to the examination of Truth’s Golden Harrow, as this imagery provides the metaphysical pretext and foundations for the process enfolded within the latter text.

In the beginning, there was Light; and from this originary Light everything proceeded. The account of the beginning in Genesis is seemingly echoed by the enquirer in the Pymander when he/she asks Poimandres (the divine being speaking in the text) to reveal the secrets of the ‘things that are’ and ‘to understand their nature’:

> I saw an endless vision in which everything became light -- clear and joyful -- and in seeing the vision I came to love it. After a while, darkness arose separately and descended -- fearful and gloomy -- coiling sinuously so that it looked to me like a {snake}. Then the darkness changed into something of a watery nature, indescribably agitated and smoking like a fire; it produced an unspeakable wailing roar...But from the light...a holy word mounted upon the {watery} nature...¹³

These early passages in the Pymander bear a clear relationship with the account in Genesis and echo for the Hermetic philosopher descriptions also found in Plato’s Timaeus and Neo-Platonic mythology generally. A connection between the ‘holy word’ (logos) of the Pymander with the ‘word’ (logos) in the gospel of St. John was first perceived by Ficino:

> Ille [Moses] potenti verbo domini cuncta creatu nunciat, hic [Mercurius/Hermes] verbum illud lucens, quod omnia illuminet... filium Dei esse asseverat...¹⁴

That the logos of St. John was the ‘Son of God’ was an accepted notion of biblical exegesis in Ficino’s time, but he was probably the first to directly connect this with the logos of the Pymander. Further development of the logos figure would became central to the imaginary of Robert Fludd’s Hermetic alchemy.

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According to Fludd, the first section of the Pymander is a description of the appearance of the Primal Matter or 'philosophical hyle' as he called it. Fludd relates that Thales was the first to consider that water was the primal matter of nature, and attesting to this were both pagan writers and Holy Scripture. Yet in what way, we may ask, is water the 'primal matter' as opposed to being but one among four of the four elements? Evidently Fludd is here referring to a long Neo-Platonic tradition in which water was symbolic of 'matter.' This tradition stems from at least the time of Porphyry (but probably originates a century before in the work of Numenius\(^\text{15}\)) where the description of Odysseus' journeys across the ocean in the Homeric text were read by Neo-Platonic hermeneutes as an allegory for the soul's tribulations while trapped in the world of matter. Fludd was one of the few thinkers in his time to insist that many biblical stories should be regarded as allegories rather than literal truths (a notion considered quite controversial, yet not quite the opinion of an apostate). This is doubtless a manner of thinking inherited from his Neo-Platonic and Hermetic forebears.\(^\text{16}\)

In Genesis the Light is 'upon (or above) the waters' (where water = the 'philosophical hyle.') For Fludd the allegorical figure of the waters is equivalent to Moses stating that the earth was 'without form and void'; the formless being the Neo-Platonic hyle. He further notes that Hermes speaks of the 'dreadful shadow, turning into a watery substance;'\(^\text{17}\) Plato to the mother, nurse, and house of things that are born\(^\text{18}\) (i.e. the Platonic Chora or Hypodoche of the Timaeus), adding that Augustine compares it to darkness and silence. By invoking this imagery Fludd is foregrounding the importance of the particular ideal object represented by the circle/sphere attractor within the imaginary of Hermeticism, an object which was given important consideration in the 20th century by A.N. Whitehead, for whom it represented the first appearance in the West of a model of universal intercommunication.

The term hyle is not originally Platonic, but rather Aristotelian. We know however that Aristotle -- as with Fludd -- identified his hyle with the 'Receptacle' (Hypodoche) or Chora of Plato's Timaeus. Plato defined the Receptacle as the 'nurse of all becoming'\(^\text{19}\) and the 'natural matrix for all things'\(^\text{20}\) stating that the Receptacle is a 'receiver' without any qualities of its own. As A. N. Whitehead interprets this figure, the Receptacle receives its forms by reason of its inclusion of actualities, and in a way not to be abstracted from those actualities. The Receptacle...is the way in which Plato conceived the many actualities of the physical world as components in each other's natures. [This] mutual immanence of actualities [is] Plato's doctrine of the medium of intercommunication.\(^\text{21}\)
Fludd's identification of the *Chora* with Moses' 'formless void' seems also to be logically aligned with Whitehead's interpretation of the Platonic Receptacle, as Whitehead concludes that while the Platonic Receptacle and the Epicurean/Lucretian Void 'differ in some details,' both conceptions are emphatic assertions of a real communication between ultimate realities...It is part of the essential nature of each physical actuality that it is itself an element qualifying the Receptacle, and that the qualifications of the Receptacle enter into its own nature.\(^{22}\)

Lucretius famously stated, 'Everything is but bodies [atoms] and the void.' According to Whitehead's interpretation -- and, as I have implied, Fludd -- the one (void) qualifies the other (atoms or bodies) and the 'principle of intercommunication' represented by the all-inclusive Receptacle cannot in its turn be abstracted from these corporeal actualities. There is an important point to note about this characterisation of the Platonic account of intercommunication. By ignoring the priority Plato evidently allows the Receptacle in regard to the manifestation of corporealities (it is aligned with Plato's famous notion that time is 'the moving image of eternity,' i.e. we see atomised moments [bodies] but not their 'eternity' or interconnection), Whitehead's reading is consequently characterised by a circularity that allows one to bring his conception within the purview of modern cybernetic theory. As outlined in the previous chapter, Wiener's 'cybernetics' grew from his initial interest in the phenomenon of 'feedback' where systems are generated and maintained by recursive or self-referential structures and processes. Recently Humberto Maturana has privileged this particular aspect of cybernetic theory, focusing on those systems he calls *autopoietic,* that is, 'self-creating' systems or machines that are organised (defined as a unity) as a network of processes of production (transformation and destruction) of components that produces the components which: (i) through their interactions and transformations continuously regenerate and realise the network of processes (relations) that produced them; and (ii) constitute it (the machine) as a concrete unity in the space in which they (the components) exist by specifying the topological domain of its realization as such a network. It follows that an autopoietic machine continuously *generates and specifies its own organisation* through its operation as a system of production of its own components...\(^{23}\) (my italics.)

One should particularly note the circularity foregrounded in Maturana's concept of a autopoietic system or machine. It then becomes clear that a metaphysical precedent for Maturana's conception may be found in Whitehead's reading of the principle of intercommunication (participation, *methexis*) as it was initially conceived within the Platonic tradition. Even if one leaves out the self-referential ('feed-back') aspect of Whitehead's interpretation, the proximity of this Platonic figuration of eternal Receptacle...
and temporary actualities with Serres' and Wiener's imagery of temporary vortices within an eternal flow of information exchange can only support the idea that we are here observing the continuing recrudescence of a single ideal object.

One hypotheses that within this Platonic figuration we observe the appearance of the most fundamental of cognitive distinctions, that which Gestalt psychologists call the figure-ground discontinuity. Importantly, this fundamental discontinuity is ineluctably 'enfolded' within a unity that comprises the relationship of figure to ground. It is this fundamental binary figuration that is the beginning of the logical entailments that form the ideal object of which the notion of the Hypodoche and its embedded actualities is but one early manifestation. Aristotle hypothesised the notion of the Receptacle (ground) into the notion of a substance (hyle) that 'remained beneath' (sub-stance) all the perceived 'qualities' in objects (figures), thus completely atomising the interconnectivity and 'medium of intercommunication' implied in Plato's original idea. As Whitehead notes, the intercommunication implied in the notion of the Receptacle is in the form of the omni in omnibus model, where all existents 'participate,' or are enfolded within an interpenetrative matrix, yet it was the Aristotelian atomisation\(^{24}\) of reality that would eventually triumph within the scientific tradition. But at the very beginnings of the scientific project Robert Fludd was instrumental in further articulating and foregrounding the notion of the (Hermetically reconfigured) ideal object of the Receptacle as the principle of intercommunication.

The original etymological meaning of hyle was 'timber', and this allows us to see how a certain imagery led to the notion of, in Fludd's terminology, the 'philosophical hyle.' For example the image of a 'massy' substance (wood) together with a formal structure (the 'plan' or 'design') combined, produced a house. By analogy, according to Aristotle, all actualities are unintelligible unless one asserts the co-presence of matter and formal pattern. From this combination would later be derived the Neo-Aristotelian notion (interpreted through Neo-Platonic eyes) of 'intelligible form' so dear to Leibniz.

This early characterisation of hyle gradually became transformed into a connective principle that assured the ultimate unity of the kosmos. When Platonist theory travelled to Arabia after the closure of the Academy, philosophers like Avicenna, al-Ghazzali and Averroës conceived of matter as being the 'common corporeity' underlying all objects. This led to some unusual corollaries: Averroës, for example, took Aristotle's idea of the 'Active Intellect' (nous poetikos) to be something incapable of division (because everywhere extended) and therefore there was only one nous poetikos in which all human beings shared -- the very definition of Magian consciousness, as Spengler defines it. Likewise the Spanish Rabbi and Kabbalist Avicebron thought that the corporeal extension of matter was
continuous throughout the universe.\textsuperscript{25} This syncretic amalgamation of Platonic and Aristotelian ideas is also one of the signal contributions of the Hermetic tradition, a product of the vertigal vector of the Alexandrian mentalité.

Most importantly in terms of the Hermetic tradition we should note the doctrine that, ...a ‘material’ principle operates at the highest and lowest level of the universe, as the immediate correlate of the unitary first principle as well as the ultimate substratum of the system of Forms in the physical realm.\textsuperscript{26} There is, in other words, a continuum, united by a ‘material’ substratum, which encompasses (in virtue of its being a continuum) the lowest forms of life -- that which we would nowadays call ‘inanimate matter’ -- and the highest forms within the Great Chain of Being.

Robert Fludd’s innovation within this imaginary was the new emphasis he placed upon the centrality of lux or light. For Fludd the significance of the extensive ‘primal matter’ or philosophical hyle recedes before the unifying activities of the first existent, lux. When the Hermetic/alchemy texts asserted that ‘All matter is One’,\textsuperscript{27} Fludd envisaged the primacy of light rather than the darkness and silence of the traditional (Aristotelian) hyle. Fludd conceived of light as,

[T]his fiery creation, made on the first day in the divine image, this first best gift given by God to perfect the remainder of his construction, Moses called light...Plato the Idea, Aristotle, the First principle ...Mercurius Trismegistus...the blessed brilliance...In short, all of them with almost complete unanimity, usually called it the first Action, Pattern, Species and Essence.\textsuperscript{28}

This passage reveals much about Fludd’s Magian conception of ‘substance’ and its place within the general metaphysics of light. Principally it demonstrates the inversion of the relationship of matter to light within Fludd’s Hermetic outlook. Like Robert Grosseteste centuries before him, Fludd imagined light as being the originary force in nature.

The Philosophical Hyle and The Metaphysics of Light

Fludd’s mention of the word ‘species’ strongly connects him with the tradition initiated by Grosseteste which considered that the common corporeity -- previously ascribed to the dull, ‘material’ hyle -- was light itself. This was because it had the ability to instantaneously expand in all directions from a single point. In a theory that would please contemporary physicists who champion the Big Bang or Inflationary Universe models, Grosseteste conceived of the universe as being created from a single point of light ‘auto-diffusing’ itself in all directions.\textsuperscript{29} Like Fludd, Grosseteste reasoned that as lux was created on the First Day, it must be the basic energising force of the universe and was
therefore the key to understanding the metaphysical and physical world.\textsuperscript{30} He thought that all objects emitted something he called \textit{species}, and that these were instrumental in producing vision. The \textit{species} ‘project in straight lines, in all directions, from every point on every object in the universe’,\textsuperscript{31} a concept, it would seem, which he drew directly from the work of the Arabic scientist Alhazen who held that light was emitted from every point on a bodies surface. As a consequence Grosseteste came to realise that mathematics and geometrical optics ‘were the foundation of physical reality.’\textsuperscript{32}

Grosseteste’s cosmogonic conception of the \textit{fiat lux}, and his figuration of emanating rays are closely aligned with the imaginary of Fludd. For both Grosseteste and Fludd the functioning of the philosophical hyle was subsumed under that of light; they both expressed a form of monism in which all actualities become an expression of the primal \textit{lux}. Light, then, becomes the primary unconditioned substance, the ‘matrix of all things.’

This must be considered a key aspect of Magian consciousness. Similar conceptions are found, for example, in the Hindu conception of \textit{akasha} or space. \textit{Akasha} derives from the root \textit{kas} which means ‘bright,’ ‘to radiate’ or ‘to shine.’\textsuperscript{33} According to one authority it more fully means ‘to shine from every side, as a presence whose shine spreads everywhere.’\textsuperscript{34} We observe here an unmistakable homology with Grosseteste’s ‘autodiffusion’ of light and the reduction of space (the common corporeity) to light rather than matter or \textit{hyle}. According to ancient Indian tradition \textit{akasha} is that by virtue of which things are manifest and it is the medium both of movement and extension or corporeality.\textsuperscript{35} In the Buddhist Abhidharma tradition \textit{akasha} is that aspect of reality (\textit{dharmas}) which is unconditioned; that is, not subject to the law of \textit{paticca samuppada} or co-dependant arising.\textsuperscript{36} One can assert, then, that the figure of \textit{akasha} is formally equivalent both to the Atomist notion of the Void and the Platonic concept of the Receptacle. By virtue of this formal equivalence, one may further suppose that the same ideal object subtends the figurations of both Robert Fludd and ancient Indian tradition.

In his \textit{Avatara} Nicholas further notes that \textit{akasha} is instrumental in the process of gnostic perfectibility as noted in the \textit{Bagavat Gita}. He does not mention a specific passage, yet perhaps he is thinking of the following lines:

\textit{Where there is gnosis, light shines forth from the orifices of the body, then be it known that ‘Being has matured.’}\textsuperscript{37}

A very similar imagery and mythology is the vertigral key to understanding Fludd’s Hermetic alchemy. As the \textit{Bagavat Gita} states, when ‘being has matured’ the unconditioned \textit{akasha}, space, or the common corporeity of light, pervades the human body. Fludd’s Hermetic alchemy is predicated on just such a configuration of imagery and its attendant metaphysical structure.
Rays and Lights: The Gnostic Alchemy of Truth's Golden Harrow

Robert Fludd's *Truth's Golden Harrow* is in the form of a reply to a work by Patrick Scot, *The Tillage of Light* (1623) in which Scot maintained that the *lapis philosophorum*, the Philosopher's Stone, was not a material substance. He held that the *lapis philosophorum* was an immaterial entity; an entirely spiritual substance partaking of no corporeity. Fludd, a medical doctor and Paracelsian iatrochemist, wanted to include the substance of the Philosopher’s stone *in rerum natura*, in the nature of things. To do this, he had to prove that its nature was somehow within the elemental realm, even if at the most attenuated extreme. The manner in which he does this reveals the close connection between an alchemy conceived of as a revivification of the Adamic/Christ ‘logos-code’ encrypted in the subtle body and the connection between Hermetic alchemy and the imaginary of early Christianity.

Fludd’s reply to Scot is evidence in support of the view that alchemy was primarily an experiment of the spirit (a conclusion widely publicised by Jung, but originally proposed by Silberer in his *Probleme der Mystik und ihrer Symbolik*, 1914), as opposed to proto-chemical research (which is the ‘standard account’ of science viewpoint). Spengler’s description of the Magian concern with the greater corporeity (the ‘pneumatic we’) as opposed to the atomistic ‘I’ is revealed in Fludd’s Hermetic approach to alchemy, as is Spengler’s characterisation of the primacy of the concept of the alien light within Magian consciousness. This latter Gnostic mythologem is clearly revealed to be the core of Fludd’s alchemy in *Truth’s Golden Harrow*, for his ‘answer’ to Scot is the remarkable assertion that the *lapis philosophorum* is neither a stone nor immaterial substance, rather it is the perfected hypercorporeity of the alchemist become one with the Holy Spirit.

Fludd leads the reader gently towards this remarkable contention however, patiently answering each of Scots points or ‘furrows’ with Fludd’s own ‘harrors,’ one after the other. Then, in the middle of his fourth ‘harrow’, Fludd says:

> Now the Elixir is the temple of wisdom, or the earthly sun of the philosophers which is as well the tabernacle of the divine emanation as the heavenly. The earth shall open and bring forth a saviour. Light is in darkness and the darkness does not comprehend it.  

Almost a *non sequitur*, the sudden evocation of the image of Christ emerging from the earth must have come as a surprise to the reader of *Truth's Golden Harrow*. Yet the sense generated by the two final sentences is produced by a compound of Neo-Platonic figurations the concatenation of which would have been a familiar rhetorical strategy to his learned contemporaries: the body, like the darkness of the earth, has a light hidden within (the saviour-Christ), and it is only ignorance of this fact that distinguishes the *hoi polloi*

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from the philosopher (by Fludd’s lights an *alchemical* philosopher). The sources for this imagery could not be more distinct -- it is clearly Gnostic in inspiration.

After an examination of several allegories in the Scriptures, Fludd says that, the spiritual rock...which is Christ risen again, [and is] composed of a divine spirit and a spiritual body, of which the true philosophers Elixir is said to be the type or pattern, we must not nor cannot justly affirm that this divine and spiritual stone can be excluded from materiality....It consists of a divine and plusquamperfect spirit and a body exalted from corporeity into a pure and spiritual existence, from mortality to immortality...\(^{39}\)

The Philosopher’s stone (‘spiritual rock’) then, is a body ‘exalted from corporeity’ such that it becomes immortal. Yet despite this, one should not be so rash as to suppose that it is thereby ‘excluded from materiality.’ Fludd next asserts that ‘this light’ (that is, the immortal body) is part of the universal emanation from the ‘fountain of light which was...present with God when he made all things’, noting that Orpheus, Pythagoras and Democritus thought that ‘all things were full of gods’ which amounts to the same thing as the (Neo)Platonists maintaining ‘a peculiar soul or beam of light to be in every particular and individual creature, but the universal soul of the world was the head and fountain to which they all referred.’ He concludes that all these ideas meet in the assertion in Holy Scriptures that *Spiritus Dei incorruptibilis est in omni re:* God’s incorruptible spirit is in everything.\(^{40}\)

Fludd utilises two principal Hermetic, Neo-Platonic images in this cosmogonic landscape: the *anima mundi* as the ‘fountain or head’ and the individuated lights which ‘refer’ -- that is, Platonically ‘participate’ or are ‘modelled’ upon -- the originary ground or medium of the *anima mundi*. How did Fludd come upon these ‘peculiar souls or beams of light’?

Firstly I propose that Fludd is actually thinking of the ‘starry vehicle’ or subtle body when speaking of ‘beams’ or ‘rays.’ He is quite clearly familiar at least with the tradition that considers the astral body a ‘vehicle’ or *okhema*. This becomes apparent if we examine key passages in another important work devoted to Fludd’s Hermetic alchemy, the *Philosophical Key*. In this text Fludd describes an alchemical experiment in which he subjects a quantity of wheat to varying degrees of heat to separate the ‘elements’, noting at different stages the philosophical significance of the observed chemical breakdown of the wheat grain. According to Fludd, the most difficult stage was the extraction of the quintessence, the element which is ‘the very life by which the four elements do act in mans body by virtue of the central or inward motive principle.’\(^{41}\) To produce this element Fludd had to ‘invent a peculiar heat’ which allowed him to recover ‘this aetherial humour & purif[y] it to its greatest brightness.’\(^{42}\) Through a lowering of the temperature it ‘congealed
into a perfect diaphan and transparent substance, like a precious stone, mingled partly with
clear crystal substance...as a crystal glass all to be seamed with sparks and streaming
stars of light..." Fludd then breaks off his description of the chemical experiment to
distinguish between soul and spirit saying,

The vital soul is a bright light from God which is carried as in a chariot in a
clear spirit on whose wings it flyeth...the spirit is a female...and the light is
the male or agent by which all things do live; and by that reason we do
[affirm] that the thin and limpid diaphan matter like white crystal is the
vehicle of the soul...

This passage is significant for the way in which Fludd succinctly unites the classical
metonymic associations of the subtle body. The ‘chariot’ of the ‘clear spirit’ is the okhema
that Proclus and others derived from Plato’s Phaedrus (246a), transforming this key figure
into the subtle bodies that the individual soul assumes in its katabasis from the realm of the
fixed stars. The actual term okhema is not used by Plato in the Phaedrus (it rather appears
in the Timaeus where, contrary to later Neo-Platonic interpretations, the sense is of the
earthly, material body as a vehicle for the soul), but the vehicle for the nous is described as
being drawn by winged horses -- and this metaphor is hereafter associated by Neo-
Platonists with the astral body. In Fludd’s time the astral or subtle body had become both
extended and refined, being regarded as the quintessence which vivified bodies. Fludd
demonstrates his awareness that the quintessence is the agent for procreation after the
Aristotelian model -- an essential contribution to the dynamo-morphology of the astral body
-- and that it is the same or a similar substance to that of the subtle vehicle.

Where did Fludd derive his knowledge of the luciformal body/matter? A key source is
perhaps Jean Fernel’s Physiologia, first published in his De Naturali Parte Medicinae in
1542. A reference and textbook for doctors for over a century after its publication, Fludd
would surely have been familiar with this text, as his medical practice was much respected.
In Book IV of the Physiologia Fernel explains the function of the ‘animal spirits’ in the
body and the means by which ‘information’ (as we might say today) was passed along the
nerves, by way of the concept of the subtle body:

The Academics were the first to suppose, when they realised that two
entirely dissimilar natures cannot be associated together without the
interposition of a suitable mean, that our soul, created by the supreme
maker of all things, before its emanation and immigration into this thick and
solid body, put on as a simple garment a certain shining, pure body like a
star, which, being immortal and eternal, could never be detached nor torn
away from the soul, and without which the soul could not become an
inhabitant of this world.
By ‘Academics’ Fernel means of course the Neo-Platonists, and he goes on to explain that there is another ‘aetherial’ body enclosing the soul as well, following the Neo-Platonic morphology. It is important to bear in mind that there was never an exact agreement on particulars in regard to the functioning of the astral body in the Neo-Platonic tradition, yet nearly all thinkers distinguished at least two subtle bodies or vehicles (except Porphyry who only admitted of one) for the soul or *nous*, as Fernal reports. The relation between the subtle body(ies) and the ‘animal spirits’ for Fernel was basically the system of their functioning as transmitted by Stoic pneumatological physiology and the explication of this through the work of Galen. In this tradition the pneumatological system of ‘animal spirits’ constituted itself the subtle body of the Neo-Platonists. As Walker notes, this description of physiological functioning was inherently dangerous in the 16th and 17th centuries as the admixture of medical with religious/philosophical notions, quite apart from leading perhaps to logical and metaphysical contradictions, signalled a distinct religious unorthodoxy.\(^{47}\) In particular there was a blurring of the distinction between the corporeal body (the medical/animal spirits were, after the Stoic conception, material, but much more refined, i.e. quintessential) and the incorporeal soul, a confusion, notes Walker, ‘likely because of the orthodox Christian meanings of the term spirit, i.e., either the superior, divine part of the soul, or the third part of the Trinity, the Holy Spirit’.\(^{48}\)

Clearly for Fludd there was no particular confusion: he identified the Holy Spirit with the quintessential part of humanity, an identification that marks his Gnostic outlook unmistakably. Yet it is also important to realise that while Fludd considered himself an orthodox Anglican, the nature of his conceptions certainly distinguished him from his more conservative peers, making him quite ‘unorthodox’, as Walker would no doubt assert. We should observe here the absorption of the conception of the *anima mundi* into the mediatory Holy Spirit of Christian mythology, an important stage in the morphology of the concept of the world-soul. We should also note the development of the idea (through Fernel, Galen and of course Descartes\(^{49}\)) that the subtle body is coextensive with known corporeal transmission systems, such as the blood stream and nervous system.

Quite apart from the likely influence of Fernel, as a Hermeticist Fludd would of course have been familiar with the passage in *Corpus Hermeticum X* where it states:

> A human soul is carried in this way: the mind is in the reason; the reason is in the soul; the soul is in the spirit; the spirit, passing through veins and arteries and blood, moves the living thing and, in a manner of speaking, bears it up.\(^{50}\)

As Daniélou notes, this passage clearly adumbrates Proclus’ later descriptions of the relationship of the astral vehicle to the body.\(^{51}\) The mind (*nous*) is carried (literally,
‘charioted’), such that the soul is the vehicle of the *logos* (‘the reason is in the soul’), the
*logos* of the *pneuma* (*M*the soul is in the spirit’), and the *pneuma* of the earthly body
moves through the veins, arteries and blood (which is exactly Fernel’s description of the
passage of the medical/animal spirits.)

It is notable that Fludd was able to combine his medical knowledge with his Paracelsian
and Hermetic studies, and that he did so utilising the subtle corporeity as the key that united
these diverse pursuits. He was able to do this because, at least where the subtle body is
concerned, each knowledge domain availed itself of the same ideal object.

**Origins of Fludd’s Radiation Economy**

In *Truth’s Golden Harrow* Fludd gives special mention to the ‘reverend Bishop Synesius’
and his conception of the functioning of the ‘mental beam.’ If the number of times that
Synesius is mentioned or acknowledged by Fludd is any indication, it is clear that Fludd
held Synesius’ views in high esteem. According to Couliano, the synthesising of Platonic,
Aristotelian and Stoic elements that comprise the theoretical basis for Renaissance magic
(and hence, all later Hermetic theory and practices) can be principally attributed to Synesius
of Cyrene, the foremost disciple of the martyred Neo-Platonist Hypatia of Alexandria.
Principally known for his Neo-Platonic conceptions, Synesius later -- most expediently,
considering his teacher’s murder at the hands of a Christian mob -- converted to
Christianity, an act which no doubt raised him in the esteem of Fludd and other Christian
thinkers.

Synesius believed that the Stoic pneumatic *hegemonikon* was responsible for both
soothsaying and magic. His *De somniis*, translated by Ficino in 1489, provided the basis,
according to Couliano, for Ficino’s own philosophical system, conceived of as an
‘initiation into the mysteries’ as Eugenio Garin tells us. Synesius held that it was because
of the activities of the pneumatic synthesiser that we ‘can communicate with the Gods,
either through sight, through conversation or by other means.’ He notes that,

> The parts of this universe that sympathise and cooperate with man must be
> joined together by some means...And perhaps magic incantations provide
> such a means, for they are not limited to conveying meaning but they also
> invoke. He who understands the relationship of the parts of the universe is
> truly wise: he can derive profit from the higher beings by capturing, by
> means of sounds [*phonas*], substances [*hylas*], and forms [*schemata*], the
> presence of those who are far away.

In the end this is all made possible because ‘the human intellect contains within itself the
forms of all things that exist.’ We know that Fludd himself was not adverse to utilising
‘incantations’ to heal his patients, and the idea that there was a pneumatic communication system (as we would say today) that could traverse great distances was a fact the efficacy of which was well attested to by both Cornelius Agrippa and his teacher Trithemius.\textsuperscript{56} The medium of this communication was the same luciform medium that traversed the veins of the human subtle corporeity.

Within the long history of the metaphysics of light, perhaps the most influential thinker was Alkindi. Of particular importance is his text \textit{De radiais stellarum}. According to Alkindi every single thing in the universe was the site for the production of, and was subject to the influences of, fiery stellar rays:

It is manifest that everything in this world, whether it be substance or accident, produces rays in its own manner like a star...Everything that has actual existence in the world of the elements emits rays in every direction, which fill the whole world.\textsuperscript{57}

These rays constitute a vast web of interconnecting emanations such that everything in the world, every object and its affects, influence and are in their turn influenced by everything else; a conception of reality that is the embryonic type, one suggests, for future 20th century accounts of the field organisation of matter. In fact it is no exaggeration to say that it is Alkindi’s ‘radiation theory’ of matter that provided the central figural conception which would much later develop into the concept of the ‘luminiferous ether’, then the ‘lines of magnetic force’ of Faraday and finally the field theory of Einstein.\textsuperscript{58}

As Couliano points out, Alkindi’s theory of universal irradiation is really an elaboration of Synesius’ system of magical ‘correspondences’ whereby the ‘signatures’ of all things were always already imprinted on the soul (through, of course, the process of the katabasis of the astral vehicle) and were able to interact/intersect with all other things.\textsuperscript{59} To invoke a more recent analogy, we may imagine the apparent manifestation of bodies within this pneumatological economy as being the result of the interference patterns produced by the holographic mechanism set up by the original Demiurge.

Fludd concatenates a series of linked images which operate almost as a hieroglyphic language in his descriptions of the mental beam. He states that there exists a ‘virtue’\textsuperscript{60}...which is able to call [people] back again to heaven’ and that,

Happy is he who, after death, after labours and bitter cares of the earth, by entering into the ways of the mental beam, sees the altitude of things shining and glittering with divine light.\textsuperscript{61}

He then invokes St. Paul’s metaphor of the grain of wheat as harbouring the ‘pattern of resurrection’ and says that the mental beam inhabits this grain or else it could not ‘rise again.’\textsuperscript{62} It should be remembered that, to his mind at least, Fludd proved this to be the

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case in his earlier mentioned *Philosophical Key* wherein he describes how he subjected a grain of wheat to chemical decomposition, finally revealing the ‘limpid, diaphan matter’ -- which he now notes is of the same substance as the mental beam.

The locution ‘entering into the ways of the mental beam’ strongly suggests that for Fludd this ‘mental beam’ was an instrumentality, an instrument that required (possibly a series of) attendant practices to activate it. Once activated from its hylic slumber, the *logos*-code of the mental beam allowed the adept to fully appreciate the ‘altitude of things’ (that is, their ‘highest’ nature). Here the Gnostic emanationist schema is clearly adopted by Fludd. That which is ‘highest’, closest to the Creator, is the divine light within.

Fludd believed that just as the ‘external beam of gold aspires to the common perfection allotted to gold’, so too the subtle material spirit within all lesser matter contains an ‘excellent formal light’ which can be worked to the ‘plusquamperfection of itself and so causes a resurrection after the passive spirit is made all one with his agent, so that this matter will be transmuted into the nature of incorruptibility and immortality.’ A little later he plainly states that this ‘spiritual vehicle, of the mental beam, or this material temple of the incorruptible spirit of wisdom’ is ‘a spiritual body made worthy by the action of Nature and the assistance of Art...And this exalted body is the true pattern of the perfect and spiritualised body of Adam.’

To disentangle the threads of this passage we must first recognise that an Alexandrian/Gnostic anthropology is accepted by Fludd. According to both anticosmic Gnostic mythology and Hermetic philosophy the soul descends to the material world in its *okhema* successively accruing influences from the planets -- such a trajectory is recounted in the *Pymander* for instance. If an individual ‘awakes’ to the fact of their divine origin, they have the chance (through *gnosis*) to survive bodily decomposition and return to the celestial spheres through the agency of this same subtle vehicle. If however an individual remains irredeemably *hylic*, the subtle body can weigh them down such that no resurrection is possible. As Walker observes,

> This conception of spirit...would account for its being peculiarly subject to astral influences, since it derives from the stars, and for the great urgency of its purification, since it does not leave the soul at death, but can drag it down, or, if light and dry enough, ascend with it.

He notes too that it would have a special affinity with the celestial spheres because of its shape (which is spherical), and its proper motion, which is circular. In describing the ‘excellent formal light’ and the striving for its ‘plusquamperfection’ Fludd also invokes a Gnostic/Hermetic syncretic utilisation of the Aristotelian notion of formal and final causes.
By ‘formal light’ Fludd clearly means a luciform pattern that gives shape to things -- it is a Neo-Platonic variation on the Aristotelian conception of substantial form. The ‘plusquamperfection’ of this formal light can be achieved after the ‘passive spirit’ is become one with its ‘agent.’ I suggest that the passive soul is the supplicatory alchemist, while the agent is the Holy Spirit conceived of as the luciform medium of the anima mundi or world-soul of which the human subtle body is akin in both substance and form. He likens the final product of this process, the ‘mental beam’ or ‘spiritual body’ (that is, the vivified subtle body) as being isomorphic to the perfect and ‘incorruptible’ body of the original creature, Adam (that is, the ‘Hermetic Adam’ of the Pymander). The idea that the alchemist pursues a process that leads to a perfected, adamantine (‘incorruptible’) spiritualised body, is very similar to conceptions within Oriental yoga, particularly the bodhisattva tradition within Vajrayana Buddhism and the Tantric siddha tradition of India. In regard to the latter, yoga historian Georg Feuerstein has noted that the Tantric masters sought to

create a transubstantiated body, which they called adamantine (vajra) or divine (daīva) -- a body not made of flesh but of immortal substance, of Light...they viewed [the body] as a dwelling-place of the Divine and as the cauldron for accomplishing spiritual perfection. For them, enlightenment was a whole-body event.\(^{67}\)

Not insignificantly Feuerstein notes that this transubstantiated body is sometimes called ativahika-deha, ‘superconductive body’, a body that ‘is really the Body of all’ and which can therefore ‘assume any form at will.’\(^{68}\) The idea that the transformed body in the Tantric siddha tradition becomes a translucent ‘superconductor’ has remarkable affinities with Fludd’s Hermetic conception of the alchemist becoming a conduit for the Holy Ghost, a kind of perfected communicative node within the intercommunicative economy represented by the figure of the anima mundi. I suggest that something similar to the yogic process is the ‘secret’ behind Fludd’s Truth’s Golden Harrow. If we remember that the word yoga is derived from the proto-Indo-European root word yug, which means to unite,\(^{59}\) then I think that this cannot be a totally illegitimate assessment of Fludd’s alchemical project.

The idea that Fluddian alchemy was a system of psycho-physical practices, or more particularly a form of askesis resembling the yogic practices of the siddhas or the Buddhist Vajrayana ‘pure light’ practices seems much less of a conceit when we consider the model of the Pythagorean and Neo-Pythagorean communities. The fifth century Neo-Platonic philosopher Hierocles, in his commentaries on the Golden Verses of Pythagoras states that the object of the purificatory rites of the Pythagoreans was to ‘restore the quintessential element to its original state.’\(^{70}\)
[T]ogether with the discipline (askesis) of virtue and the recovery of truth, he shall also be diligent in the purification of his radiant (augoeides) body, which the [Chaldean] oracles also call the subtle vehicle of the soul.71

Fludd too talks of the necessity of purifying the alchemist’s body into ‘transparent virgin earth or [a] vessel of purity’ preparatory to receiving ‘the golden beam of formal perfection.’72 Fludd’s alchemy therefore seems much more akin to a yogic process predicated on the perfection of the equivalent of the Pauline ‘resurrection body’ (vide Origen quotation below) than it does to any laboratory ‘chemical’ experiment. If we are to take both the alchemist Sendivogius (whose New Chemical Light is referred to in Truth’s Golden Harrow) and Fludd at their word when they state that the alchemist should ‘not be led astray by those who waste their time and money on herbs, animals, stones and all kinds of materials but the right ones’ (Sendivogius73) and that ‘the true operation of this mystery differs so far from the Vulcanian and torrid artifice of spurious Alchemists as white is from black or light from darkness’ (Fludd74) then we can only suppose that a definite form of spiritual/magical practice was pursued by them both.

Hypostaseis of Christ

In a significant passage, Fludd locates his discussion of the Philosopher’s stone within ongoing debates as to the nature of Christ’s incarnation:

We cannot deny but that Christ the author of salvation (whose image and pattern this our mystery is) did rise both body and soul and so of two united together in perfection made one unity...and these are only one thing by the connection and unity of one spirit which is all one with them both. What, shall we therefore imagine him not to be because [he is] not material, or shall we deem him not material because spiritual, when every form imparts a matter, be it corporal or spiritual? Admit therefore that the Elixir be of a spiritual substance, [and that] excludes [not] it[s]...materiality, when corporality and spirituality vary not but in the refining and purifying...75

The ‘mystery’ Fludd refers to is the alchemical operation itself, conceived of as an initiation (for as Fludd was doubtless aware, the word ‘mystery’ literally means ‘initiation’) or rebirth. This rebirth is ‘patterned’ after the resurrection of Christ, as well as, no doubt, the death/rebirth ritual that was the central ‘mystery’ of the ancient Eleusian rites. Fludd says that the body and soul of Christ were unified by ‘one spirit’ (the Holy Ghost, conceived of in the Magian form of a participatory ‘we’ rather than the Faustian/Cartesian ‘me’75) and indicates that both corporeity and the immaterial spirit are but modes or aspects of one another, depending on their ‘refinement’ or ‘purity.’
For Fludd there was no mind-body duality such as we find emerging after the Cartesian bifurcation. When he notes that ‘corporality and spirituality vary not but in the refining’, he is stating the essence of the panpsychic hypothesis in its alchemical form. In Fludd’s imaginary the nature of mind or psyche is light, and as everything is composed of rays of light, then everything is mind, at least to some degree. This being the case, Fludd considers it entirely the mark of precipitancy to declare the Elixir immaterial, as Scot asserted. Furthermore, the unity of Christ’s two natures -- in this case body and soul -- is achieved by a tertiary spirit. This idea signals Fludd’s rallying of the Hermetic imaginary in defense of certain ideas that were a matter of continuing debate even in his own time. This discourse took the form of the controversy concerning the hypostaseis of Christ.

Invoking Spengler again:

The controversy concerning the nature of Christ...was just those problems of substance which in the same form and with the same tendency fill the thoughts of all...Magian theologies.77

The controversies Spengler alludes to are those of the Nestorian controversy over the hypostaseis of Christ. After the conversion of Constantine, debates over the nature of Christ and the Trinity were to continue for over four hundred years. Much of this debate surrounded the rather indiscriminate use of the term hypostasis which could mean either nature, substance or person depending on context. Eventually the meaning of the word was delimited by the Council of Constantinople (381 C.E). as being equivalent to the word prosopon, ‘person’ and that the Trinity was definitely ‘one substance and three hypostasis.’ In 451 C.E. the Council of Chalcedon stated that Christ was a single entity, possessed of two natures (en dyo physeis), ‘in a single person and hypostasis’ (eis hen prosopon kai mian hypostasin.)78

In 431 C.E., The Council of Ephesus through the machinations of Cyril of Alexandria, condemned Nestorius of Constantinople for his duophysite conception of Christ. For Nestorius, God and humanity in Christ were two separate ousiai, two hypostaseis admitting no admixture, but Christ himself was only one prosopon. Cyril’s position that Christ was one physis and one hypostasis was used to explain how Christ ascended bodily to heaven -- there could not be ‘two Sons enthroned together’ next to God, but only one, the union of Logos and flesh.79 As Cyril held that Christ’s body was not heavenly, yet ascended to heaven, he has been seen as professing a form of docetism, an issue only resolved at the Council of Ephesus (449 C.E). when it was finally asserted that Christ was of two natures before his incarnation, but only one nature afterwards. But this was not the end of the debate either; suffice to say that whereas the conception of Cyril of Alexander would continue to hold a reasonably respectable status, as a result of the Council’s decision Nestorius of Constantinople would always be scorned as a heretic.
While these protracted debates might seem rather absurd today, the resolution of these problems was clearly necessary if the church was to make any sense out of the belief in the ‘resurrection of the flesh.’ The Western Quincunx clearly states: ‘All men shall rise again with their bodies...This is the catholic faith.’ The early Church Father Tertullian held to an extreme materialistic interpretation of this creed -- for him the human body in all its fleshy corporeity would rise again. Origen, on the other hand, while rejecting the extreme docetism of which he accused the Gnostics (rather ungenerously, for his views overlap with theirs at many points), seems to have proposed something akin to a subtle body as the vehicle of resurrection:

Another body, a spiritual and aetherial one, is promised us -- a body that is not subject to physical touch, nor seen by physical eyes, nor burdened with weight...In that spiritual body the whole of us will see, the whole hear, the whole serve as hands, the whole as feet.

Quoting St. Paul, Origen says that this body will be a whole new schema or plan. He uses the metaphor of the seed of a tree wherein the ratio or logos for the future tree is embedded. The principle in the seed he calls spintherimos, a neologism that literally means ‘emission of sparks’ or ‘sparking.’ (In Truth’s Golden Harrow Fludd describes the long struggle of the alchemist for the Elixir, the quantity of which might well resemble the ‘weight of a grain of mustard seed’, clearly a reference to the image of the mustard seed in the New Testament (Matthew 13.31-32; Luke 13.18-19 and Mark 4.30-32.).

Baptismal Irradiation

Origen’s opponent Methodius of Olympus criticised Origen for saying that after death the soul ‘has another vehicle (okhema), analogous in form to the sensible vehicle. This is to declare that the soul is incorporeal, in the Platonist manner.’ No doubt Origen did derive his knowledge of the astral body from Middle Platonism, but other Christian writers less disposed to Neo-Platonic ideas (and especially that of an astral body) were wont to use the term okhema in ways that indicate a surprising connection between the idea of a starry vehicle and the rite of baptism.

The linking of the pneumatic vehicle both with an imagery of rays and the rite of baptism is clearly stated by Gregory of Nazianzen:
It was light which carried off Elias in the fiery chariot (αρματος), carried him off without consuming him...light is the baptismal irradiation which contains the great and wondrous mystery of our salvation.86 (my italics)

This remarkable statement is a further link in the vertigral configuration which suggests that Fludd, in conceiving the of world as constituted by interpenetrating rays, thought of his alchemical endeavours as taking advantage of this so as to institute some sort of ancillary, esoteric baptism.

In his commentary on the above quotation by Gregory of Nazianzen, Daniélou notes,

Again light is a symbol of the power of the Holy Spirit. It is the fieriness of Elias’ chariot that is considered here, rather than its being a vehicle to Heaven. But it is still the same context, in which baptismal grace is signified in its aspect of power of the Holy Spirit which carries one away into the life of Heaven.87

Just as importantly, Daniélou demonstrates that early Christian art subsumed Hellenistic representations of Helios and his chariot into the mythology of the luciform vehicle of God, and even represented Christ himself as the ‘Sun of Justice’.88 Baptised Christians were imagined as ascending to Heaven in this solar chariot of God, baptism often being referred to as okhema pro ouranos, by which was meant the instrumentality of the Holy Spirit in raising the soul to the heavens.

The idea of a sun-like vehicle that escorted souls to heaven is also found in the Chaldean Oracles, a series of fragments that were to have an enduring affect on European thought, especially after their re-examination by Ficino. The apotheosis of the initiate in the Chaldean mystery rites was referred to as ‘elevation’, where the soul of the initiate becomes one with a ray sent towards him/her from the sun.89 Importantly, the entire process of cognition is related to the apperception of the Supreme Intellect which ‘flashes with noetic divisions’ (that is, the Platonic Ideas), the organ of apperception being the Platonic ‘eye of the soul’ rather than the terrestrial organs of vision. Lewy notes that the Chaldean Oracles seem to be strongly influenced by Philonic interpretations of Plato, as they describe the activity of spiritual cognition in equivalent metaphors: the initiate, after purifying his senses through various ascetic practices, ‘stretches out’ the ‘eye of the soul’ towards the light of the Ideas. As he/she stretches out the rays of the ‘flower of the intellect’90 (as the Oracles have it), they are reciprocally met by rays sent from the divine Intellect. This conception of both Philo and the Chaldeans is ultimately drawn from Plato’s Republic where the ‘eye’ of the human soul, after being ‘cleansed’ of impurities is able to ‘incline its own beam upwards’ to gaze on the primordial light which presents itself ‘last of all, and is seen only with an effort.’91
The importance of these conceptions is that they had, either directly or indirectly, a determining influence on Robert Fludd. In fact one can say that the figure of the reciprocal interpenetration of rays is the symbol ne plus ultra of Fludd’s alchemical and philosophical system. The basis of Fludd’s system of Hermetic alchemy can now be clearly delineated: the creation of the lapis philosophorum was accomplished by some sort of ascetic regimen (Fludd mentions the necessity of the purity of the practitioner many times in Truth’s Golden Harrow) that emulated similar regimens followed by Neo-Platonists (Plotinus is a perfect example), the followers of Pythagoras and the Chaldean initiates; the alchemist, through purity of heart, or perhaps merely the alignment of the rational intellect (mens) with the divine Nous, awakens the Gnostic ‘mental divine beam’ within him/herself, projecting it towards the reciprocal influx of the Holy Spirit, itself conceived of as a beam or ray of fiery light. Again invoking a contemporary figuration, one may say that the interference pattern produced by these intersecting irradiations is the perfected adamantine body of the alchemist, the entire process forming a baptismal irradiation or rebirth.

This entire process is predicated on the central Gnostic mythologem of the alien light within, a mythologem which Fludd extends to include a vectorial component. This is an important extension of the morphology of this particular ideal object. Rather than a static spark hidden within, the alien light is imagined as having a spiritual and temporal direction or alignment -- it is no longer a trapped scintilla, but rather a ray or beam that is literally projected towards the reciprocating influx of the Holy Spirit from which it originated.

By interpolating the figure of the subtle body between the extreme poles of mind and matter Fludd was able to assert that the lapis philosophorum was indeed within the ‘material realm’, as the difference between mind and matter was one of degree or subtlety rather than of kind. In this way Fludd proposed an alchemical solution to the mind-body dualism that plagued Christian re-interpretations of the Platonic division between the physical and intellectual worlds. The division between subject and object as hypostasised by modern(ist) science is sometimes said to be a continuation of the relationship between the spirit and the flesh as envisioned by Christianity. Physicist and philosopher Carl F. Freiherr von Weizsäcker unequivocally states:

I believe that the distance which in the modern mind exists between subject and object is a direct legacy of the Christian distance from the world.\(^{53}\)

Robert Fludd’s conception of the quintessential ‘mental beam’ and its functioning within the Hermetic pneumatic economy is a solution which bridges this distance by insisting on the coextensive corporeality of things, yet it is a conception which (as one would have supposed considering his Anglican background) is shorn of the more obvious erotic sensibilities such as are evidenced in the works of Ficino. Nonetheless one may assume
that such a sensibility operates in the background, as it were, of Fludd’s work, as the figuration of a ‘perfected body’ would surely indicate.

In closing this first section of Chapter IV, I will recall Joseph Needham’s characterisation of the essentially *scientific* endeavours of the Daoist alchemists in their search for the elixier of immortality:

The philosophy of Taoism,...though containing the elements of political collectivism, religious mysticism and the training of the individual for a material immortality, developed many of the most important features of the scientific attitude.\(^{94}\)

The essential suppositions within this scientific (that is, *experimental*) attitude are very significant when seen in relationship to Fludd’s own Hermetic alchemy. As Maspero notes,

The Graeco-Roman world early adopted the habit of setting Spirit and Matter in opposition to one another, and the religious form of this was the conception of a spiritual soul attached to a material body. But the Chinese never separated Spirit and Matter, and for them the world was a continuum passing from the void at one end to the grossest matter at the other; hence ‘soul’ never took up the antithetical character in relation to matter.\(^{95}\)

A similar notion supported the alchemical vision of Robert Fludd, and for whatever reason, one suggests that similar ‘yogic’ practices to those of the Chinese alchemists underpinned his own alchemical practices. If only for this reason alone, the Hermetic/alchemical ideas of Fludd are in need of re-evaluation if we are to develop a postmodern perspective on the mind-body duality still sanctioned by modernist science.

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**Part II**

**Neo-Mikrokosmos**

The idea of the presence of a *logos*-code within matter was interpreted by Robert Fludd as the reflection of the divine structure of the universe within all things. This Fluddian ‘pattern of resurrection’ is but one facet of an ideal object adumbrated by the notion of the subtle corporeity. Furthermore the *logos*-code figure has resonances that have exerted their ‘alchemical’ fascination over the centuries. Even a cursory examination of such a homeomorphology would reveal such varied expressions as Leibniz’s entelechies, Mary Shelley’s ‘modern Prometheus’ and the possibility of patenting the DNA code of living tissue. One might say that each of these -- and perhaps especially the latter -- are the modern equivalents of Fludd’s hylarchic quest, especially if one avails oneself of the vertigral perspective.
Robert Fludd’s pursuit of the logos-code has reverberations within our own era. It is possible, for example, to establish a connection between the Hermetic notion of a communicative economy of interpenetrating rays and the ideas of embryologist J. Z. Young and mathematician René Thom that reveals the deployment of similar figurations and similar attendant ideas.

Young has developed the notion that each species of animal exhibits the functioning of its own ‘cosmology.’ A cosmology is a system of representations within the brain: representations of the particular environment in which the organism exists. Like Uexküll at the turn of this century, Young sees different species as being constitutionally limited by a combination of their sensory apparatus and the ‘mental models’ that are the direct consequence of a history of sensory input. Noting the highly influential 1959 essay by Lettvin et al., ‘What the frog’s eye tells the frog’s brain’, Young states that the point of this paper is that, ‘the frog does not witness the fine scene we see, with the willows waving in the breeze. He sees only those things that are necessary for him’,96 such as the movements of a bug, or the larger movements of a predator. This is a consequence of the fact that the maintenance of life depends on correct response to the environment. We should notice here a hierarchy of organisms, an order of increasing complexity determined by their responses to the increasingly complex ‘worlds’ in which they exist, a ‘naturalised’ (that is, scientific) version of the Great Chain of Being.

Young’s idea of an internal cosmology is mirrored in the work of Thom, who acknowledges the similarities of Young’s conceptions to his own.97 Thom states,

I have reached the conviction that there are simulating structures of all natural external forces at the very heart of the genetic endowment of our species, at the unassailable depth of the Heraclitean logos of our soul, and these structures are ready to go into action whenever necessary. The old idea of Man, the microcosm, mirroring World, the macrocosm, retains all its force: who knows man, knows the Universe.98

Thom believes that not only are there ‘local charts associated with the organism that describe all the metrical structure of Euclidean space’99 as well as models of all relevant aspects of the organism’s environment represented within the mind, but also models of the activities and mental contents of all predators as well. In other words, the minds/mental models of other animals are modelled within the mind/mental models of any particular organism, taking the form of (presumably), I know that you know that I know... etc. This is the force behind his assertion that ‘who knows man knows the Universe’, an idea distinctly reminiscent of Synesius’ conviction that ‘the human intellect contains within itself the forms of all things that exist.’ This idea that a mind contains models of all other minds
is also found in Leibniz's concept of the monad, as will be seen in the following chapter. We may further say that Synesius' 'signatures', so important to Paracelsus, Fludd and Agrippa, are at least thematically equivalent to Thom's geometric, chreodic structures. They serve the same function within a universal economy imagined as being composed of intersecting geometrical figures (Fludd's interpenetrating twin triangles for example) and rays.

But Thom goes further than this when he maintains that all particular individuals are 'derived by specialisation (as is said in algebraic geometry) from a universal model' and that the 'big evolutionary advances of history will be described by global deformations of this universal model.' Thom is not particularly forthcoming in regard to a detailed description of this universal model; he relies instead on a suggestive metaphor. Where, in the final analysis, does life come from, 'but from the continuous flux of energy from the sun'? The flux of solar photons is intercepted the moment they reach the surface of the ocean or earth, their energy converted to heat, and this conversion takes the form of a 'shock wave.' Life, according to Thom, takes the form of the 'smoothing out' of this shock-waveform through the action of the 'subterranean circulation' of energy in the form of chemical energy. This circulation echoes 'the inverted pyramid of the ecology of living beings', each species being 'a structurally stable singularity, a chreod of this energy.'

This highly abstract portrait of the 'universal model' is not particularly helpful from a 'hard science' point of view, but on the level of a qualitative, even poetic description of the global model from which all terrestrial forms are derived it certainly displays strong resonances with the Hermetic model of the anima mundi and the idea that all individuated organisms 'refer' (as Fludd would say) to this universal 'font.' One also needs to remember that Thom considers rocks, human beings and a jet of water as all being formally equivalent, structurally stable chreods or attractors. In other words, at a certain level of description -- the most fundamental, according to Thom -- everything becomes a function of certain geometrical relationships. According to Thom's argument, all these diverse forms or functions are but simple deformations of the one, universal model: an anima mundi. Quite plainly this imagery also recalls Spengler's Magian, pneumatic 'We' that supervenes over and above the egoistic, Faustian 'I' that characterises the modern(ist) period.

We observe in Thom's work, perhaps to a greater extreme than that of Young, the notion that highly abstract structures (chreods) are the medium by which the delimited, mutually exclusive categories of organism and environment are dissolved. In fact Thom regards his geometrical, chreodic descriptions as being the only viable monistic solution to the mind-body duality, 'reducing the paradox of the soul and body to a single geometrical object.' Both thinkers place great stress on the fact that the 'environment' and the nisus of
homeostasis are the determining factors in the formation of 'cosmologies' (Young) and 'archetypal chreods' (Thom) which ultimately delineate the 'singularities' (Thom) which are organisms. This manner of talking, I suggest, is but of its times, a fact that fails to mask the Hermetic notions they plainly revive. The ascendency of biologic descriptions of organisms and their environment in late 20th century discourse, and of molecular biology as the research area where the 'secret of life' may be found, reflect contemporary interest in 'complex' and negentropic structures (such as the phenomenon of life). On a formal level, I propose, discussion of chreods or cosmologies reflects Hermetic and Neo-Platonic conceptions of the relation of the sub-lunar mens to nous. By ascribing the instantiation of geometrical chreods or cosmologies to brains rather than minds, these thinkers have substituted a biologic for a mentalistic vocabulary. But this simple act of substitution merely postpones rather than provides convincing answers to all the problems associated with mental representations and the apprehension of meaning.

The point, surely, is this: that both the Hermetic/Neo-Platonic and the (monistic) materialist descriptions of an organism's place in the world are formally equivalent. The biologic 'material' description, like the mentalistic 'immaterial' description, rely on the notion that there is a covariance between the very structure and organisation of the animal and the demands of the environment. Animal structure might thus in a sense reflect the nature of the world itself,' as Young states. From the 'mentalistic', Neo-Platonic point of view, the 'survival' of mind relies on the 'structure and organisation' of thought reflecting the rational organisation of the world. To invert Young's biologic model, the nous structure must reflect the essential nature of the world. Following the logic of both Synesius and Thom therefore, all and everything must always already be modelled within the human mind: omni in omnibus.

The ideas of both Thom and Young are striking examples of late 20th century natural scientific ideas that bear a clear homeomorphic relationship with the intercommunicative radiation economy first articulated by Synesius and subsequently advanced by Robert Fludd. Particularly in Thom's case we observe the notion of primary reality as being composed of sets of geometric patterns, the ultimate result, as they must be, of the interpenetration of rays. This homologous relationship demonstrates the necessary periodic re-appearance (or insistence) of an imaginary constellated around certain ideal objects. There exist therefore certain objects structured by an inferential economy of entailment relations whose changing morphology cannot mask the re-appearance of the same functional relationships within a given imaginary. Young and Thom's substitution of a late 20th century biologic/materialistic vocabulary is an example of a changing jargon, but not of a new set of functions or relationships.
The geometric imaginary of a communicative economy predicated on pneumatic rays was Robert Fludd’s manner of articulating the fundamental description of reality. Geometry is primarily a set of invariant relationships between rays, points and curvatures. It was Fludd’s conviction, just as it has become for a 20th century thinker like René Thom, that this set of relationships, reified within the fundamental pneumatic realm, both proved and provided the rational undergirding of phenomena.

Rays and Vibrations
Fludd pictured the panpsychic doctrine in terms of an economy composed of communicative radiation. This radiation paradigm continued in various guises (‘magnetic lines’, ‘luminiferous aether’) up until its fundamental transfiguration after the advent of non-Euclidean geometry in the mid-19th century. When Riemann and Lobachevsky demonstrated the contingent nature of Euclid’s fifth postulate (and that, in fact, parallel lines could and do meet on a geodesic), a worldview in which the figuration of rectilinear rays was fundamental was beginning to become unravelled. The telling blow was delivered at the turn of this century when Eddington, in the company of a select few other scientists, observationally confirmed Einstein’s prediction that light rays produced by a star would be ‘bent’ when coming within the vicinity of planetary gravitation, itself the product of the curvature of spacetime. This experimental confirmation came as no surprise to Einstein, but rang a note of finality to one particular aspect of the Hermetic imaginary. The ‘monstrous,’ ‘imaginary’ geometry of Lobachevsky and Riemann, so influential on the development of Einstein’s ideas, became the basis for a new paradigm of curvatures, unfoldings of spacetime and continuous fields.

As a consequence of the Einsteinian conception, so paradigmatically at variance with the Hermetic imaginary, it might be thought that we have lost the force of the Hermetic worldview and that its imaginary has finally become abandoned. But this is far from the case. While non-Euclidean geometry significantly modified the nature of rays (ie., they could be curved or bent rather than universally rectilinear), Einstein’s universe would ultimately reject them for a more comprehensive account that dispensed with the idea of rays altogether. By this I mean that with the introduction of the idea of the curvature of spacetime, and the conviction that ‘spacetime grips mass, telling it how to move’ while ‘mass grips spacetime, telling it how to curve’ as physicist John Wheeler puts it, we observe the return of an imaginary resonant with such Hermetic conceptions as the spherical body of the anima mundi of Plato’s Timaeus (for Einstein the shape of spacetime is that of a hypersphere), the spherical soul of Plotinus and Ficino, and the spherical hypercorporeity of the okhema or sidereal vehicle. Rather than an economy of ‘rays’ and spheres, of a God who is like a circle ‘in which all straight lines drawn from the centre to
the circumference are said to be in the centre’ (Fludd), Einstein/Minkowski spacetime enfolds all communicative ‘emissions’ (causal forces) into the one all encompassing description of the meshing of curvatures.

Nor was this particularly an innovation on Einstein’s or Minkowski’s part. It had been ‘in the air’ since the popular interest in the idea of the fourth dimension in the late 1800s. In 1876 William Clifford, the translator of Riemann’s work into English, developed a theory of matter and its activity based on the notion of the curvature of space. Matter thus became the localisation of curvatures of space, taking the form of ‘little hills’ in the continuum.

[T]his property of being curved or distorted is continuously being passed on from one portion of space to another after the manner of a wave, such that, this variation of the curvature of space is what really happens in that phenomenon which we call the motion of matter.\textsuperscript{107}

Clifford further postulated that electricity and magnetism were the result of the bending of higher dimensional space, antedating Einsteinian theories that unite the (Newtonian) notion of force with the geometry of space by about fifty years.\textsuperscript{108} Fourth dimensional theorist Charles Hinton believed that the phenomenon of light itself was a ‘vibration’ of the unperceived fourth dimension. It its essentials, this is the conclusion of contemporary physics as well.\textsuperscript{109}

Within the Fluddian imaginary we also observe a similar concern with the communicative and constitutive nature of vibration. Some of Fludd’s most well-known images are of the Pythagorean monochord upon which are inscribed the various attributions of notes, harmonics, celestial and sub-lunar beings. This instrument in its entirety (that is, the full gamut of its intercommunicative ‘correspondances’) is operated by God in his aspect of Tetragrammaton (four-fold name), which Fludd described as ‘the infinite dimension in and between all things.’\textsuperscript{110} Vibration was imagined by Fludd as that which communicates ‘in and between’ all actualities, a figuration which, as we have seen, is still with us today. Interestingly, Fludd’s conviction that the Tetragrammaton or deity was the infinite dimension within and between all things is an early precursor of late 19th century conceptions (such as those of William Clifford) which saw the fourth dimension as precipitating phenomena such as the appearance of matter. In the imaginary of Robert Fludd, light was the fundamental reality behind all appearances, all matter: it was found within the interstices of reality, between the atoms, if you like, and certainly not in some far off realm. In this way Fludd imagined that the Holy Spirit was infused within all matter.

In contemporary times the equivalent of the unitary ‘element’ behind the hylomorphic world is that of electro-magnetic radiation, even if this radiation is no longer imagined as
travelling in straight lines. Light, radio-waves, x-rays, in fact all phenomena, all appearances, are but various amplitudes of one underlying ‘stuff’: radiation. Everyone knows that it was the Curie family who first recognised the energetic properties within a naturally occurring element, but why did they call it radium? The present examination of Robert Fludd’s imaginary would propose that they were merely following a logical line of development in the Hermetic imaginary of interpenetrative rays. There was no ‘scientific’ reason to expect that the properties of radium manifested themselves as straight lines (and none nowadays) — but there certainly is an imaginal logic that would precipitate such a conclusion. Contemporary science is able to place all phenomena along a continuum of radiation — a Great Chain of Radiation. If one were to hand such a description to Robert Fludd, we can only suppose that he would be happy to see the continuing influence of the Hermetic imaginary down through the centuries.

It is no exaggeration to say that all phenomena are considered by contemporary science to be examples of amplitude positions within a radiation continuum. One of the most interesting aspects of late 20th century science is the re-appearance of the Pythagorean doctrine of the vibratory harmony of matter, that all things are the result of harmonic ratios. ‘Superstring’ theory proposes that all fundamental particles (electrons, quarks, leptons, muons etc.) are but differing vibratory frequencies of a single filamentous string. According to this latest development in theoretical physics the entities that are the ultimate constituents of atoms are but differing vibratory levels of a single substratum imagined as a string or line. Matter, then, actualises the form of an image observed in an oscilloscope: a single line forms on the screen (its lowest vibratory state), which, when ‘energised’ begins to change shape into a wave (an electron perhaps) which eventually becomes a chaotic, spaghetti-like image observed at its highest vibratory level. In Superstring theory each level of vibration, from undisturbed filament to violent spaghetti-chaos (and all states in between), represents some fundamental particle.

The idea of vibration as being the fundamental characteristic behind phenomena (and sub-atomic theory is considered to be the most fundamental aspect of description in 20th century physics) was first proposed by the Pythagorean school. Yet, following the logic of vertigrality, we would be mistaken in thinking that the reappearance of this idea is sporadic or unusual. Isaac Newton in his Optics recognised that colour was merely the result of ‘colourless’ vibrations entering the sensorium, ‘as sound in a bell or musical string, or other sounding body, is nothing but a trembling motion.’ Leibniz held to the same view, extending this vibratory character to sensuous phenomena in general. Behind the charm of music was the ‘harmony of numbers’ an ‘account which we do not notice, but which the soul none the less takes, of the beating or vibration of sounding bodies, which meet each other at certain intervals,’ and the pleasures ‘caused by the other senses amount to much the
same thing, although we may not be able to explain it so distinctly. We observe in Leibniz furthermore a hierarchy of the senses with the ‘beauty of proportion’ apprehended by sight and the harmonies of music afforded by hearing accorded the highest value. The impressions recorded by the other senses were less distinct, and therefore less ‘close’ to the rational faculty.

Conclusion
It is a truism within the standard account of science to maintain that the force of Newton’s depiction of Universal Gravitation was the final straw that broke the still lingering Aristotelian division between the celestial and sub-lunar realms; realms with their own, not necessarily reconcilable, laws. Newton finally demonstrated that the movements of the quintessential stars and the falling of an apple were governed by a single universal ‘law.’

Yet this famous truism is rather inaccurate. The Hermetic worldview, influential for centuries before the close of the 17th century, held to the notion of the interconnectedness of all phenomena in the universe. Indeed, Aristotle himself saw the universe in organismic terms, with its various parts working in harmony like the physiology of some gigantic beast. The Hermeticist saw the universe in terms of correspondances and ‘signatures’, powers and intelligences (the panpsychic hypothesis) all co-operating within a vectorial continuum. Jacob Bronowski characterised Kepler’s astronomical studies in this manner:

Kepler wanted to relate the speeds of the planets to musical intervals. He tried to fit the five regular solids into their orbits. None of these likenesses worked, and they have been forgotten; yet they have been and they remain the stepping stones of every creative mind. Kepler felt for his laws by way of metaphors, he searched mystically for likenesses with what he knew in every strange corner of nature. And when among these guesses he hit upon his laws, he did not think of their numbers as the balancing of a cosmic bank account, but as a revelation of the unity in all nature. For Kepler and Robert Fludd, science was a revelation of the logos-code of the world. Both were informed by the same ideas, but only one has entered into the general discourse about early science. This is primarily because of Kepler’s chance discovery of his third law of planetary motion, a discovery that was instrumental in the subsequent development of Newton’s ideas. The difference between the Hermetic and Newtonian views hangs on the notion of the ‘law’ of gravitation. Newtonian laws are deterministic, irreversible and mechanistic (in fact all of these qualifications amount to saying the same thing), whereas the laws of the Hermetic world were determined by a transcismic Legislator and were perhaps as periodically mutable as was his will.
This *logos*-code was the structure that united the Unconditioned with the conditioned, the Receptacle with the individual. John Muirhead’s summation of the fundamental orientation of the Platonic tradition is just as apposite a characterisation of the Hermetic view:

**[There is nothing more vital to the Platonic tradition, or that distinguishes it more sharply from its Democritan rival, bent on explaining the whole in terms of the parts into which ‘victorious analysis’ resolves it, than that, in the Order of reality, the whole precedes the parts.**]114

Most importantly in relationship to the Hermetic alchemy of Fludd, from the previous statement it follows that to know the reality or essence of things we have to look at them not in their feeble beginnings, but in the light of what they are when most fully developed, when the parts or phases which they exhibited are most completely permeated with the form or idea of their function in the whole...115

This might well serve to characterise Fludd’s hylarchic alchemy, a quest to discover the ‘perfection’ of the hypercorporeity or ‘mental beam.’

J. Z. Young believes that the workings of the cerebral ‘cosmologies’ of humankind in the late 20th century are undergoing a subtle shift; a shift that, like Fludd’s figure of the ‘mental beam,’ signals a transcendant awareness of the operation of the rational (*logos*-code) in the world:

*Humankind* is limited by [their] very brain structure to [gather information] in certain ways. [They seek] for patterns of order similar to those personal and social ones that maintain [their] own homeostasis. But [they] are beginning to transcend these limitations in seeing something of the whole ordered pattern of life on earth and at least in looking for it in the Cosmos.116

Comparing Young’s statement to Bronowski’s assessment of Kepler’s work, we observe that Young is thinking along lines already understood by Kepler centuries ago. The notion that the ‘whole ordered pattern [ie. *logos*]’ of life on earth may be found throughout the *kosmos*, that a cognitive and cognisable order (the ‘cosmology’ of human ‘brain structure’) obtains throughout, is demonstration that an imaginary predicated on the micro-macrocosmic couplet may yet again be reasserting its vertigial influence.

Fludd’s Hermetic alchemy brings to the fore the notion of the ineluctible interpenetration of mind within nature and that the experiential scientist (experimental alchemist) is pursuing a metaphysical quest in his explorations of the world of ‘matter.’ Transformation of matter therefore becomes transformation of self. The idea that consciousness has something ‘real’ to contribute within a material, experimental process was perhaps first re-announced by
Heisenberg and Schrödinger in the early decades of this century with, respectively, their ‘Uncertainty Principle’ and ‘Schrödinger’s Cat’ thought experiment. What both these announcements amount to, in the context of the examinations of this chapter, is that the intuition of Robert Fludd and the Hermeticists — that mind permeates all ‘matter’ — is in need of reassessment (and re-configuration) in recognition of its vertigral status within the history of knowledge practices.

1 The influential alchemical text *Golden Chain of Homer*, written by Anton Josef Kirchweger, was first published simultaneously in Frankfurt and Leipzig in 1723.
2 Brown, 274.
3 Brown, 272.
4 Brown, 277.
5 Brown, 276.
9 Harvey’s famous study of the heart and arterial stream, *On the Motion of the Heart and Blood in Animals*, was instrumental in initiating the post-Galenic medical image of the system of the blood and heart as being simply a case of hydraulic action.
10 That is, nous (rational mind), *thaumos* (affective soul) and the appetitive function.
11 See Chapter III for a full exposition of the importance of this dictum.
12 Fludd, 59.
14 Ficino quoted in Yates, 26.
16 See Lamberton in regard to the importance of allegorical interpretation in Neo-Platonic thought.
17 In the *Pymander*, quoted previously.
18 Fludd, *Utriusque cosmi...Historia*, in Huffman, 62.
20 Quoted in Whitehead (1948), 160.
21 Whitehead (1948), 160.
22 Whitehead (1948), 160.
23 Maturana & Varela, 79.
24 I am using this term figuratively, as Aristotle himself was a keen critic of the philosophy of the Atomists.
25 Crombie, 50.
27 First articulated by Parmenides and Heraclitus, it was also the opening argument of the Asclepius. This Hermetic truism was thus an aspect of intellectual debate from at least Augustine’s time onwards in the West.
28 Fludd, 64.
29 This idea was undoubtedly derived from the emanationist account of the origin of the cosmos argued by Plotinus.
30 Edgerton, 75.
31 Edgerton, 72.
32 Crombie, 51.
34 Nicholas, 281.
35 Govinda, 137.
37 Trans. by Coomaraswamy, 154.
38 Fludd, 151.
39 Fludd, 154.
40 Fludd, 154.
41 Fludd, *A Philosophical Key*, 117.
42 Fludd, *A Philosophical Key*, 117.
43 Fludd, *A Philosophical Key*, 118.
44 Fludd, *A Philosophical Key*, 118.
45 Walker, D. P., 119.
46 Fernel quoted in Walker, 119.
47 Walker, 120.
48 Walker, 121.
49 Descartes held that the function of the nervous system was to transmit the 'animal spirits', i.e. the pneumatic current.
51 Danielou, 75.
52 Couliano (1987), 113.
56 Agrrippa claimed to be in communication with Trithemius by ‘thought transference.’
57 Al-Kindi quoted in Lindberg, 19.
58 An idea pursued at length in the final chapter of this work.
59 Couliano (1987), 123.
60 By which he means a ‘power’ or ‘force’ (*virtus*, *vim* etc.)
61 Fludd, 155.
62 Fludd, 156.
63 Fludd, 159.
64 Fludd, 159.
66 An imagery accepted by both Proclus and Plotinus where the spherical soul and heavenly bodies are both described as moving circularly.
68 Feuerstein, 279.
69 Still extant in English when one speaks of *yoking* a cart to a horse for example.
70 Mead, 64.
71 Hierocles quoted in Mead, 65.
72 Fludd, 162.
74 Fludd, 164.
75 Fludd, 153.
76 I think, therefore I am.
77 Spengler, vol. II, 255.
78 Couliano (1992), 9.
80 Quoted in Mead, 84.
81 Quoted in Mead, 85.
82 Mead, 85.
83 Fludd, 148.
84 Also Luke 8.11: *The seed is the logos of God.*
85 Methodius quoted in Danielou, 74.
86 Quoted in Danielou, 81.
87 Danielou, 81.
88 Danielou, 86.
89 Lewy, 60.
90 An equivalent image, it may be noted in passing, to that of the lotus flower in Buddhist iconography.
91 Lewy’s translations, 372.
92 And, as I have suggested in this chapter, not only Western initiatic traditions. In the Buddhist *Lalita Vistara* we find a description of the Buddha attaining *sumadhita* where, ‘a Ray, called the ‘Ornament of the Light of Gnosis’, proceeding from the opening in the cranial protuberance, plays above his head.’ [in Coomaraswamy, *Selected Papers: Metaphysics*. Ed. by Roger Lipsey. (NJ: Princeton Univ. Press, 1977), 154.] These ‘rays’ are found throughout Buddhist iconography, and are always considered signs that a bodhisattva had ‘matured’ through enlightenment or *gnosis*. For reasons unknown, Robert Fludd utilises precisely the same imagery and ideas.
94 Needham, 161.
95 Maspero (referred to by Needham as ‘indispensable and brilliant’ in the study of Chinese thought) quoted
in Needham, 153.
96 Young, 8.
97 Thom, 329.
98 Thom, 324/5.
99 Thom, 313.
100 Thom, 294.
101 Thom, 295.
102 Thom, 296.
103 Thom, 323.
104 Young, 8.
105 Of course it was not really planetary gravitation as much as *siderial* gravitation, for the observations were of a solar eclipse.
107 Clifford cited in Kern, 153.
108 Kaku, 338.
109 Kaku, 75.
114 Muirhead, 418.
115 Muirhead, 418.
116 Young, 16.
117 Rene Thom translates Heraclitus’ *logos* as ‘pattern.’

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V

The Gnostic Leibniz,
or What is it Like to be an Atom?

A. N. Whitehead maintained that all modern cosmologies are but detailed variations of the ontological schemes of Plato, Aristotle, Epicurus, Lucretius, Newton and Leibniz. This 'morphological' view of ontological models displays some similarities with the notion of ideal objects outlined in this dissertation, but it is doubtful that Whitehead would have fully endorsed the implications of the ideal object. Yet he certainly was not averse to positing a delimited number of 'variations on a theme' when examining key ideas in the history of Western thought. Whitehead maintains that all talk of 'atoms and the void', Receptacles and (Newtonian) sensoriums,

revolve around the diverse notions of Law, the diverse notions of the communication between real individuals, [and] the diverse notions of the mediating basis in virtue of which such communication is attained.¹

The 'notion of Law' in Whitehead's examinations, I would say, bears a homologous relationship to that of the logos--code in the work of Fludd, Thom and others: the idea that there is a 'patterning' to the phenomenal world. Whitehead further suggests that another important question, derived from the above considerations, is the 'status of the spirit of man in the scheme of things.'²

Both Robert Fludd and W. G. Leibniz, each in their own way, gave priority to this question. They proposed that the recognition of the operations of human perception and cognition were fundamental and preparatory to any description of the physical world. Both of these thinkers held that the subjective positioning of the 'seeker of knowledge' led to certain inescapable conclusions regarding the relationship between the seeker and the phenomenal world.

The problem for Leibniz then was the problem of the 'knower and the known.' For him it was acutely obvious that when we describe the characteristics of the world, we do so from the position of a cognising subject. One may say that for Leibniz, as for scientists Bohr, Heisenberg and Schrödinger several centuries later, the central epistemological problem was how to include the observing subject and its observations within the continuum of the phenomenal. It was in answer to this central problem that Leibniz proposed his philosophy of the monads, examined in terms of its fundamentally Hermetic figuration in this chapter.

Without an acknowledgment of the strong Magian aspects within the intellectual achievements of certain thinkers of the 17th century, scholars erroneously attribute to thinkers of the period
a way of looking at ideas that is in fact a rather late 20th century manner of conceptualisation. This is an outcome of the ‘rewriting’ of intellectual history so that it may fit into the Anglo-American philosophical tradition (as discussed in Chapter III). Consequently Leibniz is most often portrayed as one of the earliest champions of the computational basis of mind. His famous remark that in the future two disputants will not sit down to argue a point but will rather say, ‘Let us calculate’, is routinely held up as evidence for his commitment to what we would now call the computational view of human cognition. Here we notice a spurious assumption that equates Leibniz’s conception of ‘computation’ with modern versions of the computational theory of mind (such as that of Martin Davies and the mechanical thesis inherent within it). While there may be some limited truth to this assertion, it can only be sustained by the active suppression of the fact that Leibniz had a deep and enduring interest in esoteric traditions of thought. Without an acknowledgement of the influence of Hermetic thought and figuration on the development of Leibniz’s thinking we are at a loss to explain the peculiar tenor of his monadic philosophy. As already suggested in Chapter I, if we ‘factor in’ the continuing influence of Hermeticism (through the continuing guidance of the fundamental figurations of its imaginary), then we are able to see that esoteric thinking has always been deeply intertwined with the modernist scientific project, taking the form of an inevitable ‘return of the repressed.’

One may say that the prefacing of the objective description of the physical world by a theory of the interpenetrative subjectivity of all beings and all matter was the *ne plus ultra* of Hermetic physics. It was also, one suggests, the very *Urgrund* from which the investigations of both Leibniz and Fludd were generated. It was Descartes who, at the beginning of the modern(ist) scientific tradition, first divided the world into cognising subjects and lifeless, mechanical objects, with both sides of this dyad beholden to, and providing the ideological support for, the Baconian command-obedience couplet. That which makes Leibniz’s work unique is, as A. N. Whitehead sees it, his exploration of one side of this Cartesian divide.

The notion that the cognising Self was fundamental to the explication of any ontology or epistemology, ‘the greatest philosophical discovery since the age of Plato and Aristotle’ as Whitehead rather hyperbolically characterises it, is the distinguishing mark of Leibniz’s philosophy. Whitehead proceeds to contrast Leibniz’s work with that of Newton and Lucretius, both of whom attempted to excise the thinking subject from an objective description of the world, thus ‘explicitly asking the question, What does the world of atoms look like to an intellect surveying it?’ Leibniz was concerned however to answer a completely different question: ‘What is it like to *be* an atom?’
Leibniz and his Times

Leibniz was born in the final years of the Thirty Years War. He grew up in a Europe still suffering from the fragmentation, divisiveness and enmity of political intrigues and the machinations of leaders who must have seemed little more than war-mongers. One historian estimates that the population in the countryside of Germany alone fell 40% to what it was before the war, and up to 33% in the cities. It is in this era, in this political landscape, that we can discern the formative background to Leibniz’s work.

As Stephen Toulmin has pointed out, standard interpretations of the rise of 17th century science have almost exclusively represented the era in which it arose as being one of increasing prosperity in which improvements in social, economic and political institutions allowed greater ‘thinking time’ within which the great innovators of science could flourish. A more careful scrutiny of the social and political conditions of the 17th century provides a quite different picture, such that the first fifty years of the century, rather than being years of increasing comfort and stability are now recognised as some of the ‘most uncomfortable, even frantic, years in all European history.’ Consequently, rather than the fruits of increasing leisure, modern science and philosophy should be seen as ‘responses to contemporary crisis.’ Toulmin sums up the situation succinctly:

In early 17th century Europe, life was so far from being comfortable that, over much of the continent from 1615 to 1650, people had a fair chance of having their throats cut and their houses burned down by strangers who merely disliked their religion. Far from this being a time of prosperity and reasonableness, it now looks like a scene from Lebanon in the 1980s. As many historians put it, from 1620 on the state of Europe was one of general crisis. And it is against this backdrop of general crisis that we should examine Leibniz’s response, for it is as a response to a *generalised catastrophe* that we should regard the development of his monadological metaphysics.

This generalised catastrophe could not have been more acute. In Leibniz’s Europe outbreaks of the plague were common. The population of France was decimated in 1630-32 and again in 1647-49; England’s Great Plague of 1665 was but the last in a series of continuing outbreaks. In the first half of the century food production was severely affected by continual bad harvests, and as the greater part of the European population (80 to 90%) relied on agricultural production, there was widespread misery and starvation. International trade all but disappeared — Spain lost its imperial command of the South Atlantic and the steady inflow of capital in the form of silver disappeared. Unemployment was rife in the cities, owing to the great influx of starving peasantry whose farms were being decimated. All this produced a
willing army of mercenaries for the Thirty Years War. It is not surprising then that in the 1640s expectations grew as to the immanent End of the World, the Apocalypse being predicted to occur in the year 1657.

Historian Eugenio Battisti has called the late 16th century Council of Trent an *antirinascimento,* a 'counter-Renaissance', in similar terms to the iconoclasm of the Reformation/Counter-Reformation as described in Chapter III. It was this particular expression of the counter-Renaissance that was one of the factors that directly culminated in the Thirty Years War, the other, in Toulmin's analysis, being the assassination of Henry of Navarre in 1610. The perceived failure of Henry's attempt at bringing together Catholics and Protestant 'Huguenots', signalled by the ineffectuality of the Edict of Nantes (1598), and of course, Henry's eventual murder by a supporter of the Catholic League would intensify into outright war in 1618, mirroring on an impossibly grand scale the bloody 'Massacre of Saint Bartholomew' that had attended Henry's wedding to Marguerite de Valois thirty eight years earlier.

In 1664, when Leibniz was eighteen years old and the secession of hostilities of the Thirty Years War sixteen years in the past, he dreamed of one day creating a universal language of thought. This language would be 'very difficult to construct but very easy to learn', and more importantly,

> It will be quickly accepted by everybody on account of its great utility and its surprising facility, and it will serve wonderfully in communication among various peoples, which will help get it accepted.

It is not too difficult to see why the young Leibniz would feel such a pressing need for an international language of communication. All around him was palpable evidence of the effects of non-communication or communication gone awry: the material affects of war, the fragmentation of society and the bitter rhetorical battles still being waged by the Church. Even thirteen years later, in his *Towards a General Science*, Leibniz would defend his idea of a 'language of thought' in terms of a sure method that would withstand future assaults of barbarous unreason:

> For a school which followed such a method in philosophy would naturally attract from among its tyros the same leadership in the kingdom of reason as geometry has, and would not totter or collapse if as a result of invasion, in a new barbaric era, the sciences themselves went under with mankind.

Only a year previous Leibniz had entered the employ of the Duke of Brunswick in Hanover as the Duke's librarian. This post would provide him with stability and comfort from this time until his death in 1716, yet despite his new found security we can clearly discern his apprehension at the thought of some impending invasion of barbarism, of a return to the apocalyptic unreason surrounding his childhood.
Leibniz’s response to his times, to his fear of an impending rule of unreason, was unique. He proposed a metaphysical system that explained all phenomena in terms of spiritual fragments. As an analogy we might recall the aesthetic response of the Dada artists to the Great War of our own century. We see a fascination with the fragment, the broken message, the torn and re-arranged surface. Each of these modes became techniques in their production of poetry, images and performance. In a similar manner we can observe in Leibniz a response to the shrapnel torn bodies of the Thirty Years War, the pock-marked landscape of his youth. But for Leibniz there was no question of embracing chaos. His shards and fragments became necessary unities -- monads, all of which bore a secret pattern of association which no amount of barbarian firepower could tear asunder. In this way his response resembles the Surrealist answer to the despondancy and nihilism invoked by the Dada artists. The Surrealist thinkers, like Leibniz, rejected the metaphysical and artistic celebration of division, fragments and despair and attempted to create a new sytematic philosophy that would unite rather than divide. It is no wonder that the Surrealist theoreticians listed Leibniz as one of the few philosophers they approved of -- just as their thought was an attempt at repairing the despair and nihilism foregrounded in Dada by way of a syncretic approach to the ‘marvellous’, so too Leibniz’s project can be recognised as one of a radical and quite literal sur-reality.

Leibniz and Alchemy

In answer to the question ‘what is matter?’ Leibniz replied that it is spiritus coagulans -- spirit made dense. Presently we will see what he meant by this, but first we must ask why he choose this particular phrase. I suggest that he used the term coagulans because he was deliberately acknowledging his debt to alchemical thought.

The question as to whether Leibniz had any real connection with alchemy is one that is not often asked. George Macdonald Ross’s ‘Leibniz and Alchemy’ is one of the very few papers that address the issue. At the outset Ross states that the possible influence of alchemical thinking on Leibniz’s philosophical thought is not the subject matter of his paper. Instead he proposes to examine the ‘more straightforwardly factual question of what he believed about it.’ He immediately acknowledges that this is a pity as ‘facts about Leibniz’s alchemical beliefs acquire significance only through their relation to more important aspects of his intellectual development’, but in the absence of any systematic assembling of this evidence, its significance cannot be evaluated. This assumes of course that there is some ultimate form of evaluation, a juridical court of intellectual achievements which can pass judgement on the value of intellectual ‘influences’ on any given thinker. Contra Ross, the theory of vertigrality suggests we can carry through an investigation despite the paucity of extensive textual evidence.
Ross limits himself to the question as to whether Leibniz believed it possible to make gold. While this is a worthy question to attempt to answer -- Ross finds that Leibniz invested considerable time and money into the activities of several individuals trying to make gold -- it has little bearing on the soteriological aspects of alchemy. Of more interest is Ross's statement that 'Leibniz always believed in the theoretical possibility of creating gold, apparently on the metaphysical grounds that matter is one.' As we have seen, the idea that 'matter is one' was one of the basic tenets of Hermetic thought and therefore of alchemical practice.

Towards the end of his life Leibniz seems to have experienced a turn-around in his attitude to the challenge of making gold. Originally open to the possibility, he finally came to reject it, along with the existence of the Philosopher's stone. This was mainly due to the fact that several alchemists to whom he periodically provided money and perhaps assistance never produced anything like a lapis philosophorum. The failure of these experiments probably came as no surprise to Leibniz, yet it is significant that he was for a long period open to the possibility of the transmogrification of 'base matter' into gold. As Ross notes, the fact that Leibniz finally rejected the idea of the philosophers stone does not entitle us to assume that Leibniz therefore rejected all ideas that a contemporary scientist would consider irrational or mystical. While Leibniz was very careful to draw a distinction between rational and irrational ideas in scientific thinking 'he drew the line differently from us' as Ross says. He considered reliance on biblical revelation as a guide to natural philosophy quite unsupportable, characterising Fludd's Mosaic philosophy as 'fanatical.'

Leibniz, like other thinkers of his time, was influenced by contemporary research into iatrochemistry, and Ross perceives a direct connection between this and Leibniz's later monadic philosophy. He notes that as early as 1671 Leibniz was formulating a theory of 'kernels' explicitly using chemical/ alchemical terminology, this concept being 'nothing other than a primitive and materialist version of the monads of his mature philosophy.' The idea that metals sprang from 'seeds' and grew in the earth like plants was widespread from the earliest of times, so it is not unusual that Leibniz should have utilised this concept in his work. What is unusual for the times is the degree to which it was systematically developed.

The fact that Leibniz used the term spiritus coagulans in reference to matter is by no means a sure indicator in itself that he was influenced by the process and worldview of alchemy. Yet it is an unusual locution that points to a possible connection with the well-known alchemical motto: solve et coagula. If we add to this the essential alchemical concept of the perfectibility of matter, that matter contains the 'seed' of its future transformation and is in certain respects 'alive', then we can appreciate that the development of his monadic philosophy owes more to
alchemy than would be immediately apparent. Taking into consideration the fact that alchemy was the practice of which Hermeticism provided the theory, we are impelled to look closely at certain motifs in Leibniz’s philosophical development in terms of Hermetic figuration and thought.

**Monads and the Alien Light**

Considerable scholarly endeavour was once invested in trying to discover the origins of Leibniz’s use of the word ‘monad.’¹¹ Most scholars considered that he derived it from F. M. van Helmont, others suggested that he got it directly from Lady Anne Conway.¹² Even if Leibniz first heard the word from Conway, scholars claim, her ultimate source was van Helmont, and this is undoubtedly true. The most reasonable assumption however is that Leibniz, like any other scholar familiar with Neo-Platonic philosophy, would have first encountered the word either in reference to Pythagoras’ concept of the One (monas) or in Plotinus’ formulation, monos pros monon, ‘from the one to the One.’¹³ As ‘monad’, van Helmont’s usage would only have reminded Leibniz of the richness of classical ideas associated with this term.

And it is Leibniz’s early conception of the ‘kernel’ that reveals much of the richness attending his mature use of the word monad. A kernel, of course, is a seed, and we find throughout Leibniz’s writings numerous references to such an image. The mythology that most clearly antedates Leibniz’s use of the ‘seed’ concept is Gnostic. The idea that hidden within all human beings languishes a trapped scintilla, a ‘seed of light’ or spark (spinther) hidden not only in the ‘prison’ of the body, but also in the phenomenal world, a world characterised by suffering and evil, is an essential element in Gnostic mythology. Following the determinations of the ‘Conference on the Origins of Gnosticism’ in Messina in 1966, one can in fact confirm that it is the central, defining mythologem of Gnosticism. As Kurt Rudolph explains, the notion of the divine fragment is an essential element of the macro/microcosm couplet as expressed in Gnosticism:

This idea...is ontologically based on the conception of a downward development of the divine whose periphery (often called Sophia or Ennoia) has fatally fallen victim to a crisis and must -- even if only indirectly -- produce this world, in which it then cannot be disinterested, in that it must once again recover the divine spark (often designated as pneuma, ‘spirit.’)²¹

This spark is the sign of an inextirpable seed of alienation of humankind from the world of matter (hyle): just as the intelligent world is at a far remove from perceived reality, so has humankind an essential ‘otherworldly’ essence to it. Human beings literally partake of the divine through the scintilla hidden within, a fragment that is the dormant virus of future
development -- a seed which, if properly nurtured, will eventually develop into a perfected being, ready to again become one with the deity.

In his *New Essays* (1704) Leibniz notes the various terms associated with the notion of innate ideas (his monadological philosophy, in its systematicity, embraces the nativistic principle), particularly mentioning Julius Scaliger’s *semina aeternitatis* or *zopyra*, meaning to say living fires, flashes of light, hidden within us, but caused to appear by the contact of the senses, like the sparks which the shock of the flint strikes from the steel. And it is not an unreasonable belief that these flashes are a sign of something divine and eternal, which makes its appearance above all in necessary truths.\(^2^3\)

There is a direct acknowledgment of a particular aspect of the Platonic tradition in the last sentence of this passage. Leibniz invokes what may be called the ‘*logos* tradition’ which holds that there must be certain *a priori* objects (‘necessary truths’) which are immutable. His argument is almost tautological when he says that it is not ‘unreasonable’ to accept the existence of a rational faculty at least in part constituted by ‘necessary truths.’ Here he directly alludes to the tradition within the metaphysics of light which links the highest rationality (*ratio* or *logos*) with ‘illumination’, a tradition of photic imagery spanning from at least the time of the Plotinian texts and finding perhaps its greatest concentration in the work of St. Augustine where it is used to support his conception of cognition as ‘illumination.’ Already we can see that Leibniz is evoking the morphology of a particular ideal object. This object is that which observes the Stoic notion of the *logos spermatikos* become subject to logical deformations that allow the production of Plotinus’ *logoi* contained within the first emanation and Augustine’s *rationes seminales* and *rationes aeternae* (the latter closely corresponding with Leibniz’s ‘necessary truths.’)

But there is much more besides the recognition of an ‘orthodox’ tradition operating here. The Gnostic similes are unmistakable.\(^2^4\) In his *New System* (1695-6), Leibniz attempts to differentiate the ‘higher’ monads from the lower:

...we ought not to mix without distinction or to confuse with other forms or souls, *minds* or rational souls, which are of a superior order and have incomparably more perfection than those forms embedded in matter which...are found everywhere, since in comparison with these others, minds or rational souls are little gods, made in the image of God, and having in them some glimmering of Divine light.\(^2^5\)

For Leibniz minds are rational souls (*nous*) in virtue of the fact that they not only resemble the deity (are ‘little gods’) but participate in the divine through the presence of the ‘glimmering light’ -- a kind of hyper-celestial transistor -- within. An equivalent contemporary figuration might well be that human beings have within them a luciform communication device that
allows instantaneous translation between the language of the divine nous and the terrestrial 
*nous/mens*. My description of this device as being ‘luciform’ is not just metaphorical -- 
Leibniz himself invokes the notion of the ‘astral [ie. luciform] body’ in his *New Essays*, 
noting that it is a pity that such a notion has been so uncritically rejected by his 
contemporaries, as this has contributed to ‘the neglect of the natural way of explaining the 
conservation of the soul’.26

It would be a mistake to consider the above contemporary figuration as just a conceit. If the 
figure of the Gnostic scintilla is in fact a significant mythologem, part of a greater ideal object, 
then we should expect to find similarly functioning figures in contemporary times. And 
indeed we find such a similarly functioning figure within the burgeoning mythology 
associated with the phenomena of UFO and ‘alien abduction’ reports. Not only do we 
encounter a profound light-imagery, but we also consistently find the idea of the ‘alien 
implant’-- a communication device-- inserted within the abductee’s bodies. And just as with 
the Gnostic spark, this communication device is both the sign and agent of some future 
trajectory or growth toward the light (UFO) that implanted it, as the very word ‘implant’ 
would certainly seem to suggest.

One suggests that Leibniz’s view of this alien implant is much more akin to the original 
Gnostic view than that propounded by Robert Fludd for example. As noted in the previous 
chapter, Fludd expanded upon the figure of the alien light to incorporate the human 
hypercorporeity. He furthermore predicated his Hermetic alchemy on the possibility of the 
eventual perfection of this principle so that it would one day re-attain its perfection as a direct 
‘link-up’ with the *anima mundi* or Holy Ghost. This notion of the dormant perfectibility of 
the divinely implanted scintilla is not necessarily inherent in Gnostic descriptions. Although 
Leibniz’s idea of the perfectibility of monads will be discussed shortly, it is not at all clear that 
he imagined the scintilla as being capable of transformation (‘perfectibility’) in time. This 
would seem to suggest that the *absconditus* creator had not indeed instantiated the ‘best of all 
possible worlds’ as Leibniz so famously described the world of phenomena.

Leibniz’s idea that human souls and the Divine ‘mirror’ one another is of course inescapably 
Hermetic.27 And like his Gnostic forebears, Leibniz believed implicitly in the perfectibility of 
all living things, that all ‘matter’ (i.e. coagulated spirit) was drawn by an Aristotelian ‘final 
cause’ up the ‘Great Chain of Being’:

The *animals*, of which some are raised by means of conception to the rank of 
the larger animals, may be called *spermatic*; but those among them which 
remain in their own kind (and they are the greater number) are born, multiply 
and are destroyed like the large animals; and there is only a small number of 
elect ones who pass into the greater theatre.28

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Leibniz's use of the phrase 'elect ones' and his description (previous quotation) of rational souls as partaking of 'incomparably more perfection' is strongly reminiscent of the Valentinian division of souls. His use of the term *spermatic* in regard to the 'larger animals' -- i.e. those with souls, not necessarily fully rational, but 'seeded' with the divine spark nonetheless -- is an almost unmistakable indicator of the refulgence of the Gnostic *Weltanschauung*.

Leibniz notes that an 'elect' few monads (souls) can rise above their kind to a 'greater theatre', but the greater number do not. Leibniz, in choosing the word 'monad' for his necessary minimum, a minimum which is simultaneously a plenum, assumes a qualitative rather than a quantitative difference in kind, an interior difference described as a difference in perspective:

> When we penetrate deeply into things, we observe more reason than would be believed in most sects of philosophers. The lack of reality in the things of sense, according to the Sceptics; the Pythagorean and Platonist reduction of everything to harmonies, numbers, ideas, and perceptions; the 'One' and even the One Whole of Parmenides and Plotinus...the vital philosophy of the Cabbalists and Hermetics, who attribute feeling to everything....These are all combined together as in a centre of perspective, viewed from which the object (confused from every other point of view) reveals its regularity and harmony of parts.\(^{29}\)

The sense of monas/monad as being the perspective of a single individual still inheres in its modern derivatives: monk, monastery. The proto-Indo-European root holds the sense of 'solitary': in the Buddhist text the *Suttanipata* (3.11.40) we find the words, *ekattam monam akkhataam*, 'solitude is called wisdom.'\(^{30}\) The Magian metaphysics of light behind the Renaissance rediscovery of linear perspective has a curious 'double' property, perhaps here first directly alluded to by Leibniz. As all objects emit rays corresponding to every point on their surface, and as these rays all converge on the *axis visualis* of the viewer, then one is entitled to note that -- quite literally -- *everything* is in the eye of the beholder. The monad contains the phenomenal world.

Leibniz himself held to a hierarchy of souls. More than that, he held to the Gnostic/Hermetic belief that some occupy an immanently higher place on the ladder of Being, having a greater degree of perfection. In a letter to Princess Sophie (1706), we find him stating,

> It is to be believed that there are rational souls more perfect in the scale of being than we are, which may be called *genii*...and it is quite possible that some day we shall be of their number. The order of the universe seems to require it.\(^{31}\)
As noted earlier, it is almost certain that Leibniz did not believe in the perfectibility of certain monads or individuals within their lifetime, as this would have upset the systematic, hierarchical structure of his monadological universe. When he states that it is possible that someday ‘we shall be of their number’ he refers, no doubt, to the afterlife.

The use of the term *genii* is unusual in its unmistakably Magian resonance. Nor is it an isolated occurrence (it appears in his *Monadology* as well). Why does he not use the more intelligible term (that is, for his times), angel? It certainly has the same meaning, i.e., an intermediary intelligence occupying the hyperlunary spheres between human kind and the divinity. It may be counteracted that Leibniz’s use of the term can be explained by the fact that Descartes used *malin genie* for the evil demon of his *Meditations*, and this would explain its currency within philosophical discourse. Yet Leibniz’s *genii* are clearly not evil demons, rather they are ‘more perfect’ beings. The answer, I think, is that Leibniz is clearly signalling his indebtedness to the ‘oriental’ ideas that vertigrally contribute to his monadic philosophy.

Leibniz held that that which separates human beings (higher monads) from animals (lower monads) is humankind’s intellective faculties. It is knowledge, rational (‘Platonic’) knowledge that is the determining factor in the potential ascension of rational monads to the intelligent status of the *genii*. In both Gnostic and Buddhist systems salvation is seen as being effected by *gnosis* (Gnostic) or *jnana* (Buddhist). According to the Valentinians, the process of *gnosis* reveals the knowledge of ‘who we were, what we have become; where we were, whereto we have been thrown; whither we hasten, whence we are redeemed; what is birth and rebirth.’ In light of this, Conze notes that the Buddha’s enlightenment was directly preceded by the ‘cognition of conditioned co-production’ (*paticca samuppada*, the notion of the co-dependent arising of all beings and objects in the world), which has the same effect, in each particular, of the Valentinian conception of gnostic enlightenment. He further notes,

> In both cases the mere insight into the origination and nature of the world liberates us from it, and effects some kind of re-union with the transcendental One, which is identical with our true Self."33

Conze also notes the existence of the negative corollary to the above, namely the Buddhist/Hindu notion of *avidya* or ignorance (*vidya* means ‘knowledge’, yet it is a particular type of knowledge -- the kind of knowledge produced by ‘enlightenment’). *Avidya* is the origin of the chain of causation, it is ignorance of the true nature of reality, a self-deception which ‘misdirect[s] our attention towards a manufactured world of our own making, conceal[ing] the true reality to which wisdom, the highest form of gnosis, alone can penetrate.’ Similarly, the Gnostics held that human beings are trapped in a demiurgic world, suffering an ignorance perpetuated by malevolent powers (*archons*) and the mis-interpretation
of New Testament and Mosiacal texts by the early Church Fathers. The world as it appeared was a false, illusory world.

In a similar spirit Leibniz was clearly unconcerned with ‘saving the appearances’; he wanted to know what was necessarily true of reality, how things really are beneath the flux of phaenomena. To this end his monadic philosophy represents his solution to an ontology that was absolutely committed to a realist description of the world: for Leibniz the Real had to be that way (i.e., composed of monads) because it would be irrational to admit otherwise. In this way his philosophy resembles the position of the Kabbalistic text Sefer Yetzirah and the Pythagorean philosophy which the Sefer Yetzirah closely parallels: the ‘oriental’ approach to scientia that is pre-eminently dismissive of the play of maya and which privileges the Magian geometrical approach to reality.

The idea that the phenomenal world is but a world of ‘appearances’ is of course inherent in the very world phaenomena (phaenomena), yet it is this sense of the word which is most absent in contemporary usage. In Aristotle’s time phaenomena were not the equivalents of the ‘objects’ and ‘events’ by which we today translate the term. The ‘middle voice of the Greek verb suggests neither wholly ‘what is perceived, from within themselves, by men’ nor wholly ‘what, from without, forces itself on man’s senses’, but something between the two’, as Barfield notes.35 For ancient philosophy ‘that which appears’ is a space of liminal figuration, neither inside the Self, nor outside in ‘the world.’

Without doubt the sense of phaenomena entertained by most philosophers of science today is that which focuses on the implication of ‘that which forces itself on consciousness from without’: a model inherent in Haraway’s call for the retaining of the notion of a ‘commonsense real world’ in scientific work. We should compare this assessment with that of Neils Bohr and his celebrated ‘Copenhagen Interpretation’ of quantum mechanics. For Bohr experimental science had no need nor justification for the metaphysical presumption of the existence of a ‘real world.’ He summed up his assessment in a famous, terse sentence from his Como lecture of 1927:

An independent reality in the ordinary [that is, classical] physical sense can...neither be ascribed to the phenomena nor to the agencies of observation.36

The key to understanding this anti-ontological/epistemological stance, according to his biographer Pais, is Bohr’s reconceptualisation of the notion of phenomena. Bohr conceived of phenomena as including both the observed and the ‘mode of observation.’37 To accord with ‘elementary epistemological principles’ Bohr felt that we should reserve the word ‘phenomenon’ for the comprehension of the effects observed under given experimental conditions.38
Ten years later he qualified this further by holding that the word phenomena should ‘refer exclusively to observations obtained under specified circumstances, including an account of the whole experiment.’ In other words, a phenomenon was that which ‘appeared’ in a given (quantum mechanical) experiment coupled with the entirety of the experimental conditions which gave rise to it, including, most importantly, the ‘mode of observation’ itself. Now this ‘mode’ was intended by Bohr to mean the consciousness of the observing scientist as well as her ‘sensory extensions’ such as photographic plates, particle accelerators etc. Bohr’s one-time student and biographer, physicist Abraham Pais, hails Bohr’s conceptualisation of phenomena as ‘his most important contribution to philosophy’, a ‘dramatic’ change that has been largely ignored by professional philosophers. Quite obviously both Bohr and Pais are ignorant of the fact that this dramatically ‘new’ definition of a phenomenon is actually a reinstatement of the ancient conception of phaenomena as elucidated by Barfield. A phenomenon is that which lies within the cusp between observing subject and the Real, with the consequence that scientific and other ‘facts’ become figural constructions obeying the particular observational set-up (that is, the ‘psychological state’) of the observer.

Leibniz was committed to just such an approach in his development of the notion of the monad.

**Kabbalistic Monads**

In his *Monadology* Leibniz re-invents the notion of the Pythagorean/Plotinian *Monas* as the source of all subsequent monads:

Thus God alone is the primary Unity, or original simple substance, from which all monads, created and derived, are produced, and are born, so to speak, by continual fulgurations of the Divinity from moment to moment... The use of the word ‘fulgurations’ is very significant, just as is his mention of Scaliger’s *zopyra*,

meaning to say living fires, flashes of light, hidden within us, but caused to appear by the contact of the senses, like the sparks which the shock of the flint strikes from the steel.

Both terms point unequivocally to a significant source for his mature philosophy -- the Kabbalah, and particularly the *Sefer Zohar*. Scaliger’s *zopyra* is clearly a rendering of *sephirot*, a central concept in the Kabbalah, and the word fulguration means flash, or lighting strike. The name *Zohar* has most often been translated as ‘splendour’ or ‘brightness’, but it is perhaps most accurately translated as ‘flashes.’ Leibniz’s image of fulguration, of fitful periodic descent (the reversed image of *anabasis* in the Chaldean mysteries with its vision of ascent on a sunbeam) is his attempt to find a ‘middle path’ between his determination of monads as absolute individuals (which would therefore be forever severed and separated from the deity after Creation) and the idea of emanation which would make them part of
Creation, but violate his postulation of the Identity of Indiscernables. This latter Leibniz used in his rejection of the concept of atoms as 'perfect simples' (for then every atom would be identical, with the consequence that there would be no difference in the world), but it also forces upon him the conclusion that human beings, through the process of emanation, share an identity with the deity. As Leibniz refused to consider any sort of direct similarity between God and his Creation, he needed a way to express his conviction that the deity was immanent in matter, but not identical with it (which, for example, he took Newton's concept of the universe as the sensorium of God to imply.)

I suggest that Leibniz's fulgurations are an equivalent figuration to standing-wave pulses that maintain the coherence of a subject so described. In this way his fulgurations are the precursor of what contemporary physicists describe as the vibratory characteristics of matter (as described in the previous chapter), a consequence of the tensional nature of field phenomena. Just as an oscilloscope can be tuned to produce a continuous standing wave pulse, so Leibniz's monads are maintained in time by a formal, continual pulse or 'fulguration.' A good analogy is that of a digital watch. The time that a digital watch keeps is maintained by the regular pulses emitted by an artificially created crystal. A tiny battery provides the energy, but it is the crystal, or more precisely, the regular internal structure of the crystal, that provides the 'pulse of time.' It has been suggested that the ticking of an analog clock and the (normally imperceptible) crystal pulse of a digital watch engender the idea of time passing because they mimic the beating of the human heart. It is highly likely that a largely unconscious play of similar figurations lay behind Leibniz's invoking of the image of the deity's life-sustaining 'flashes.'

One of Leibniz's earliest influences was the mathematics professor Erhard Weigel of the University of Jena whom he studied under in 1663. Weigel was particularly noted for his expositions of Pythagorean mathematics, and was famous in his time for writing a book that professed to be an account of the mathematical basis of morality, solely derived from the Pythagorean formulation of the tetraktis.\textsuperscript{45} In his \textit{Theodicy}, Leibniz acknowledges the influence of Weigel on his development of the concept of fulguration:

\begin{quote}
M. Weigel communicated...a special demonstration of the existence of God [and] his continual creation...He said that the basis of the demonstration was the Pythagorean Table: one is multiplied by one. These successively repeated unities, were thus the moments in the existence of things. Each of the unities of life depended upon God, who gave life momentarily...And as these unities flagged in their life from moment to moment, he always created others to revive them...\textsuperscript{46}
\end{quote}
It is more than likely that Leibniz derived his fulguration imagery directly from his reading of the Zohar. Compare the following passage from the Zohar with Leibniz’s previously quoted image of sparks struck from a flint:

For just as the one hammer-blow causes sparks to fly off in all directions, so God brought into being simultaneously manifold species and hosts, each different from the other, without number...Now when God was about to create the world, He produced a secret spark from which there issued and radiated all the lights which are disclosed.47

‘All the lights that are disclosed’ is the manifest world, recalling precisely Scotus Erigena’s famous conclusion, ‘All things that are, are lights.’ In the Zoharic scheme of course, all the manifold ‘lights’ of the world partake in their ultimate nature of the first ‘secret spark.’ Leibniz’s God, just as for Erigena, was the absconditus of Pseudo-Dionysius (with whose Mystical Theology and Divine Names Leibniz was familiar), but for Leibniz there was no Plotinian henosis, or return to the source. Invoking the Hermetic/Cusan figuration discussed in Chapter III, he notes,

It has been very well said that [God] is like a centre which is everywhere; but his circumference is nowhere, since everything is present to him immediately, without being removed from his centre.48

Concurring with St. Augustine’s explanation that God is omniscient because he is ‘outside’ time (time coming into being only at the moment of Creation), Leibniz draws a distinction between the ‘time-bound’ rationality of lesser monads and their creator. Yet his conception of monads as each being little universes, so to speak, allows him to recognise that the present is big with the future, what is to come could be read in the past, what is distant is expressed in what is near. The beauty of the universe could be learnt in each soul, could one unravel all its folds which develop perceptibly only with time.49

So in the end lesser monads are bound to a ‘different beat’ of pulsation: time-bound, unwinding -- but God ever maintains life through the ‘successively repeated unities’ fulgurating timelessly within the one secret spark.

Knorr Von Rosenroth

The principal texts of the Zohar were introduced into gentile Europe principally through the efforts of one man, Christian Freiherr Knorr von Rosenroth (1636 -- 1689). Described by Scholem as a Protestant Theosopist,50 Knorr was reputed in his lifetime to be the most profound of Christian scholars of Kabbalah. Yet for one whose major contribution to Kabbalistic studies was to a great extent to determine the image of the Kabbalah for historians of philosophy until the end of the nineteenth century,51 surprisingly little is known about him.
The son of a Silesian Protestant minister, Knorr travelled widely throughout Western Europe in his youth, finally settling in Sulzbach in Northern Bavaria, where at the age of thirty six he became an official in the court of Prince Christian August, and eventually the prince’s close adviser. Both the prince and Knorr were strongly influenced by the writings of Jacob Boehme, and Knorr become known as an ‘inspired poet’, his work now regarded as being among some of the finest in German religious literature. It was not his poetry however that was to ensure his fame, but rather his anthology of Kabbalistic texts, *Kabbalah Denudata: The Kabbalah Uncovered, or, The Transcendental, Metaphysical, and Theosophical Teachings of the Jews* (first volume published in Sulzbach in 1677, the second in 1688) which would have such a profound influence not only on radical and separatist Pietist circles in Germany, but an unprecedented influence on Leibniz and his circle of friends in particular.

Perhaps under the influence of Boehme, Knorr developed an interest in the Kabbalah during his early travels and, when he reached Holland, he began studies with several rabbis including Meir Stern of Amsterdam. He was able thereby to study source material in the original, acquiring manuscript copies of the works of Isaac Luria (compilations of Luria’s teachings by his foremost disciple Vital), and providing him access to an Italian work on Kabbalah and alchemy, the *Esh ha-Mezaref*, the original of which is now lost, surviving only in the Latin translation of extracts in Knorr’s *Kabbalah Denudata*.

Scholem’s overall evaluation of Knorr’s scholarly efforts in the composition of the *Kabbalah Denudata* is salutary, and he defends him against detractors of the time:

> Although the book contains many errors and mistranslations, particularly of difficult Zoharic passages, there is no justification for the contemporary Jewish claims that the author misrepresented the Kabbalah.

Leibniz spent ten days with Knorr in Sulzbach late in 1687 where he discussed particularly the metaphysical doctrine of emanation and the nature of the hierarchical system as outlined in the *Kabbalah Denudata*.

Before proceeding further, I would like to address a question that is not often asked, a question that has direct bearing on the profound influence of the Kabbalah on Leibniz’s mature philosophy. The question is satisfyingly simple:

**What Shape is a Monad?**

Few scholars have thought to consider the question as to the possible determining influence of Hermetic or Kabbalistic imagery on Leibniz’s thought. Politella, for example, notes that before 1700 Leibniz knew only one of Giordano Bruno’s Lullian works and perhaps his ‘mathematical circles’ (Kabbalah-influenced ‘circuit-diagrams’: the first extant examples of a
combinatorial approach to the *characteristica universalis*), maintaining that these works 'could have provided no material for his Monadology.\textsuperscript{56}

Politella's conclusion serves to perpetuate the well established conviction that philosophy -- and particularly the thought of philosophical luminaries like Leibniz -- avoids all figuration and recourse to, or influence from, images. *Contra* Politella, I would maintain that Leibniz was not only influenced by Bruno's (and Lull's for that matter) circle diagrams, but was strongly influenced in the formation of his concept of the monad by circle and sphere images. In other words, he was availing himself of one of the most influential and consistent of attractors within the geometrical imaginary. This would not be inconsistent with the overall influence of the Hermetic imaginary on Leibniz's thought, for the circle/sphere attractor, as discussed in Chapter III, exerts a primary vertigral influence here as well.

In re-introducing the Aristotelian doctrine of substantial forms, Leibniz says it was 'necessary to form a conception of them resembling our ordinary notion of souls.'\textsuperscript{57} He shortly notes that his conception should not be confused with other notions of 'souls, minds or rational souls, which are of a superior order and have incomparably more perfection than those forms embedded in matter...'.\textsuperscript{58} We know that Leibniz was quite familiar with the idea, held by both Proclus and Plotinus, that the human soul is in the shape of a sphere (the better to facilitate celestial travel: *like knows like*), and he was certainly aware that it was a truism in the 17th century to consider atoms as being spherical,\textsuperscript{59} so it would not be surprising to find Leibniz describing the monad as a sphere. Of course, he does no such thing -- in fact he expressly states that monads cannot have shapes, otherwise they would have parts. And consequently a monad, in itself, and at a given moment, cannot be distinguished from another except by its internal qualities and actions which cannot be otherwise than its perceptions...and its appetitions...which are the principles of change....It is as a centre or a point where, simple though it is, an infinity of angles are found made by the lines that come together there.\textsuperscript{60}

Monads, then, have no shape whatsoever -- they are 'metaphysical' points, without dimension; akin to, but not identical with, mathematical points (the latter being the 'points of view for expressing the universe'\textsuperscript{61} of metaphysical monads). But this does not in itself rule out the possibility that when imagining monads, he saw spheres. In his *Discourse on the Natural Theology of the Chinese* Leibniz notes:

The Chinese also call their *Li* a globe or circle. I believe that this agrees with our way of speaking, since we speak of God as being a sphere or a circle whose centre is everywhere and whose circumference is nowhere.\textsuperscript{62}

The Neo-Confucian concept of *Li* was an important influence on the development of Leibniz's philosophy. Leibniz, like many of his contemporaries, was fascinated with China.
He was in correspondence with several scholars of Chinese culture, the most important of whom were Claudio Grimaldi (1638-1712) and Joachim Bouvet (1656-1730). Bouvet was the tutor to the Emperor Zhang Xi’s children in Peking, and was a renowned philologist whose *Historical Portrait of the Emperor of China* Leibniz had published in the second edition of the *Novissima Sinica*. Both Grimaldi and Bouvet were Jesuit missionaries who had either spent many years in China, or in the case of Bouvet, actually corresponded with Leibniz from China.

Leibniz devoted considerable time to studying Neo-Confucian conceptions of ‘substance and form.’ In the cosmological philosophy of Chang Tsai (1020-77), the primary undifferentiated stuff out of which all things are made is Ch’i (qi). When the historian of Chinese philosophy Fung Yu-lan states that, ‘Chang Tsai explained the appearance and disappearance of concrete particulars in terms of the condensation and dispersion of the Ch’i,’ we appreciate the proximity of this idea to that of Leibniz’s characterisation of matter as *spiritus coagulans*. Yet in espousing this idea of the condensation and dispersion of a material substrate Chang Tsai was at a loss to explain the differing *types* of things in the world. Chang Tsai’s philosophy of Ch’i was subsequently modified by the Neo-Confucians Ch’eng Yi and Chu Hsi to include the concept of *Li*. This latter represented the particular ‘law’ or ‘pattern’ by which any actuality is formed. According to Joseph Needham, *Li* is not a mechanical order or ‘a pattern thought of as something dead...it is dynamic pattern as embodied in living things, and in human relationships and in the highest human values.’ This idea is closely aligned with the notion of *logos* or ‘pattern’ in the West, yet it derives from ideas found in the appendices of the ancient divinatory text, the *Yi Jing* or ‘Book of Changes.’

Needham notes that ‘Chu Hsi and other thinkers of his group [ie. the Neo-Confucians] made a great effort to bring all of Nature and Man into one philosophical system,’ utilising the concepts of *Li* and *Chi*. The Neo-Confucian project, then, exactly parallels Leibniz’s own philosophical project of including the ‘subjectivity’ of *psyches* within the overall pattern of Nature. Consequently it should come as no surprise to find that he considered the Chinese concepts of *Li* and *Chi* to be further confirmation that he was ‘on the right track’ in forming his monadological system.

In fact Leibniz came to believe that there was a direct connection between Chinese thought and that of the Hermetic tradition. In the early 1700s Leibniz and Bouvet thought they had made some startling discoveries. It was Bouvet’s belief that the divinatory system of the *Yi Jing* represented a notation system for all of Chinese science. Not only that, but Bouvet believed that the legendary creator of the symbols of the *Yi Jing*, the mythical emperor Fu Xi, was in actuality the person otherwise known as Hermes Trismegistus. In support of his contention he believed that he could demonstrate that the ancient form of the Chinese script
and language displayed similarities both with ancient Hebrew and Egyptian hieroglyphs. Unfortunately the correspondence with Bouvet abruptly ceased at this point, and Leibniz never received confirmation of Bouvet’s theories. Leibniz did however believe in the possibility that Fu Xi was actually Hermes Trismegistus, or at least that the knowledge of the ‘patriarchs’ (i.e. the *prisca theologi*) as transmitted through Hermes had reached China at some very early date.  

Needham strongly suggests that ‘Neo-Confucian philosophy was in fact a scheme of thought striving to be a philosophy of organism.’ In an essay in his monumental *Science and Civilisation in China* Needham traces the origins of a non-mechanistic ‘philosophy of organism’ in the West directly to Leibniz. He further suggests that, through his research into Chinese philopsophy, Leibniz was the conduit, as it were, for the actual Chinese origins of the philosophy of organism as expressed in the work of Chu Hsi and others. Elsewhere Needham briefly examines the influence of the Kabbalah on the development of Western science, yet he does not make the obvious connection between the Kabbalistic tradition and Chinese thought as exemplified in the monadological system of Leibniz.

In regard to the above quotation wherein Leibniz describes *Li* as being a ‘sphere or circle’, he is no doubt referring to a particular type of diagram found within commentaries on the *Yi Jing*. These diagrams are circular in form, and represent the changing states of the universe. These states are lawful, following the metaphysical structuring of what are known in the West as the ‘hexagrams’ of the ‘Book of Changes.’ These diagrams were given fulsome treatment by the Neo-Confucian scholar Shao Yung, and led to the greater development of the concept of *Li*. Fung Yu-lan notes that,

> Shao Yung’s diagrams...helped to suggest the idea of *Li*. According to Shao what the diagram represents is the law that governs the transformations of things. This law is not only antecedent to the diagrams, but also to the existence of individual things. Shao maintained that before the trigrams were first drawn by their discoverer, the *Book of Changes* already ideally existed. The Chinese idea of a pre-established harmony operating throughout the universe would also have naturally appealed to Leibniz, as this was one of the key conceptions underlying his monadological universe. The idea of a pre-established harmony operating within the universe is inherent in a cosmological principle central to much Daoist and Neo-Confucian thought, that of the *Taiji*. In his *Discourse on the Natural Theology of the Chinese* Leibniz discusses at length the Chinese concept of the *Taiji*. This principle is most often represented in Chinese texts as a circle or sphere. Nowadays most people in the West know this symbol as the ‘Yin/Yang circle’ (‘double fish’) diagram. It is probable that Leibniz was thinking of both circular images of the *Taiji* and Shao Yung’s diagrams of the cycle of lawful changes when he aligns these figurations with that of the Hermetic dictum regarding god and the sphere.

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The sort of ‘organic’ order that Needham associates with the concept of \textit{Li} (and Leibniz’s understanding of this concept) is close to our contemporary notion of deterministic chaos. Dilating upon Needham’s description of \textit{Li} as natural order, Alan Watts says:

\textit{Li} is the asymmetrical, nonrepetitive, and unregimented order which we find in the pattern of moving water, the forms of trees and clouds, of frost crystals on the window, or the scattering of pebbles on beach sand.\textsuperscript{73}

The ideogram \textit{Li} originally referred to the crazed pattern often found in jade, or on ancient pieces of porcelain. It was clearly a pattern, but one which would be well nigh impossible to associate with mechanical order, at least in terms of the relatively simple (and mathematically tractable) interactions proposed by Newtonian physics. Yet the idea that there exists an order behind the seemingly diverse phenomena of the turbulent flow of water and clouds, of the striations in the bark of a tree as well as the fluctuations in the stock-market is that which in the late 20th century is called ‘deterministic chaos.’ Leibniz no doubt apprehended in the Chinese concept of \textit{Li} a principle which could stand for the sort of complex pre-established harmony he saw as systematically ordering his universe of monads. That this natural order is so complex that it mirrors the complexities of organisms rather than machines, is an idea that Needham apprehends as being the \textit{leitmotif} of the ‘philosophy of organism’ as first promoted by Leibniz.

Given the textual evidence, it may be countered that Leibniz possibly conceived of the deity as ‘spherical’, but this does not entitle one to say that all monads are spherical. I can only say that this does not fit with his professed belief in the ultimate harmony of the world, a harmony not only best represented by a sphere, but which was almost universally represented utilising just such a figuration in Neo-Platonic and Hermetic literature. I suggest that both Shao Yung’s diagrams and diagrams of the \textit{Taiji} served to further orient Leibniz within an imaginary which would naturally suggest the figural ‘shape’ of monads to be that of spheres, and that the influence of these Chinese concepts supported the notions he was already deriving from his study of the Kabbalah. Not only that, but the very influence of the text of Knorr’s \textit{Kabbalah Denudata} on Leibniz strongly supports the sphere/circle imagistic connection.

Attending the text of the \textit{Kabbalah Denudata} are a number of diagrams and tables especially prepared by Knorr for his edition. He was encouraged in this by Henry More who advised:

Your two Cabbalisticall Tables with the Names and Attributes congested under each Sephirah (which will not be much unlike in nature and use Johannes Meursius his Denarius Pythagoricus) will also be very fitt for this first volume you intend. And if your Systema Theologiae Judaicæ were in this volume too,
all these would tend to the Sharpening mens appetitts for the reading and understanding of the Soar [ie. Zohar.]^{74}

More considered the information that Knorr had assembled in his tables and diagrams the ‘most authentick Treasure of their [ie. the Jewish mystic’s] Cabbala’, and the *Kabbalah Denudata* was published with what may be the first in a long line of tables of anagogic ‘correspondences’.^{75} The diagrams consist of images of hierarchically placed circles, or a series of nested circles (circles within circles) or a combination of both (*vide* figures 1 & 2). These images are representations of the manifestations and relationships between the *sephiroth* of the Kabbalistic ‘Tree of Life’, *Etz Chaim*.

This figure was first expounded in an eponymous text by Isaac Luria’s foremost disciple, Vital. The figure of the ‘Tree of Life’ represents the series of emanations, the *sephiroth* or ‘spheres’, which depended from the ‘Ein Sof or ‘Infinite’ (the *absconditus*). The idea of the *sephiroth* is very much like the series of emanations enumerated in the Gnostic Valentinian account of Creation, and Scholem suggests a direct connection between Kabbalistic and Gnostic conceptions. This is particularly evident in the work of Isaac Luria, the 16th century kabbalist of Safed, whose doctrine of the fragmentation of the divine essence (the *shevirat hakelim*, or ‘breaking of the vessels’) and the consequent imprisonment of the holy sparks in the lower world, closely corresponds with the most significant of Gnostic mythologems.

Knorr von Rosenroth’s *Kabbalah Denudata*, apart from its substantial translations of the *Zohar*, is mainly given over to an exposition of Luria’s doctrines. When speaking of the *sephiroth* Knorr almost always says *sphaera* -- *Sphaera prima* (the *sephira* Kether or ‘Crown’); *Sphaera motus diurni* (the *sephira* Chochmah or ‘Wisdom.’)^{76} That the emanations should be imaged as spheres is of course an almost foregone conclusion considering the strong Neo-Platonic influence on Kabbalistic thinkers generally and Luria and Knorr in particular. What is most interesting, from my point of view, is that Knorr’s diagrams, and particularly the most famous representation of the *sephiroth* and ‘Tree of Life’ mirror almost exactly contemporary diagrammatics for ‘connectionist’ or ‘parallel distributed system’ computer simulations. The reason for this is not difficult to see: like a connectionist computer system, the ‘Tree of Life’ represents an initial message (input/divine spark) which enters a node ‘gate’ (*sephira*) and is then ‘split’ into paths which attend other nodes, the entire image/process representing the *attractor* or *chreod* (‘output’ answer/universe) that results from such initial input. In connectionist diagrams the input nodes are always represented by a circle. At this point, I think, it is unnecessary to ask why this should be.

Given all the above, I think it is quite likely that images of a universe composed of an infinite series of interconnected spheres -- the Kabbalistic Molecular Model -- would have had a determining affect on the development of Leibniz’s monadic philosophy. Still, Leibniz’s
monads are ‘dimensionless’ metaphysical points -- how can this be reconciled with the sphere of a sphere? If we remember that the sphere is a circle in three dimensions, and that a circle derives essentially from a point -- what amounts to the intellectual equivalent of tracing a Euclidean circle with a compass -- then we are entitled to say that a monad is the intelligent equivalent of a sphere. With this addendum however: Leibniz’s monads are, strictly speaking, hyperspheres. We know this because, as Leibniz repeatedly reiterated, everything is contained in each individual monad -- just like an infinite series of nested circles or spheres. A sphere is only a sphere if constrained to three dimensions; if it were able to be ‘unfolded’ within a 4th. dimensional space (an operation implicit in Leibniz’s figural description), then perhaps ‘the beauty of the universe could be learnt in each soul’, as Leibniz says.

There is a further important consequence of the hyperspherical nature of monads. The Monadology (65) notes that the deity is fond of a ‘divine and infinitely marvellous artifice’:

[E]ach portion of matter is not only infinitely divisible, as the ancients recognised, but is also actually subdivided without limit, each part into further parts, of which each one has some motion of its own; otherwise it would be impossible for each portion of matter to express the whole universe.77

He follows this passage with a now famous figure:

Each portion of matter may be conceived of as a garden full of plants, and as a pond full of fish. But every branch of each plant, every member of each animal, and every drop of their liquid parts is itself likewise a similar garden or pond.78

We thus note -- and we have Mandelbrot’s own acknowledgment of Leibniz’s intuitions concerning fractals to support the claim79 -- that, as a consequence of the infinitely mirroring, systemic iterability of monadic substance, monads are fractalic. In what may imaginatively be described as an act of marvellous prescience, Leibniz foresees not only the application of fractal algorithms to produce (simulate) the subtle bifurcations observed in the leaves and branches of plants, but also the more recent theories of cosmologist Andrei Linde who proposes that we live in a ‘multiverse’ of embedded fractal universes.80 While in his own times Leibniz’s monadological philosophy was regarded as rather odd, his fractalic conception of the monad -- where each monad is a fragment that contains the whole -- is not at all difficult to assimilate in today’s scientific culture. We are now quite familiar with the ‘holographic’ idea that a part may contain the whole (as indeed a holographic image physically demonstrates). The notion of recursion lies at the heart of Mandelbrot’s fractal algorithms, just as it does in Maturana’s idea of autopoiesis and the cybernetic notions of Bateson and Hoffmeyer. The circularity inherent in Leibniz’s conception of the monad -- where, looking ‘inwards’ one finds the ‘outside’ world mirrored -- is the very epitome of the notion of the ‘causeless cause’ of autopoietic systems. In fact one recent writer attributes the
discovery of the significance of ‘feedback’ to Leibniz himself. Unlike the thinkers mentioned of course, Leibniz did hold to the idea of an ultimate cause, but this does not affect the homologous relationship obtaining between his fractalic conception of substance and more recent formulations.

While Leibniz himself may not have been a mystic, his rhetorical model for the Monadology is certainly modelled on a mystical source: Pseudo-Dionysius’ Divine Names, a work which itself is beholden to Proclus’ Elements of Theology. Rather than a mystical philosophy then, Leibniz’s monadology is ultimately beholden to what I shall call the ‘esoteric model.’ While mystics are primarily concerned with the ineffable, esotericists on the other hand have a positive predilection for complicated and involved structures and metaphors, as well as a predilection for a tranhistorical perspective concerning the utility of certain knowledge structures. And Leibniz’s syncretic system, an intricate and finely wrought attempt at a systematic metaphysics, is similarly an attempt at a synthesis of ancient ideas and the ideas of his own times. In this way he resembles Philo of Alexandria who, while certainly not a mystic, sought to construct a systematic interpretation of the world derived from mystical sources as well as a realist (Platonic) approach to epistemological/ontological questions. Leibniz’s commitment to extreme realism is reflected in his conviction that only that which is a self-contained, completely independent individual is ‘real’ — in other words, a monad.

While Leibniz’s monadological system is the result of a lifetime’s work of research into various esoteric systems of thought and a magnificent attempt at the synthesis of these systems, I propose that it is the influence of certain key figurations that constitute its ‘centre.’ Without the organising influence of these figurations we would have no modern ‘philosophy of organism’ as Needham characterises it, for we would have no Leibnizian monadology to have generated such a philosophy. As Mandelbrot admits, the simple algorithms which produce his fractalic ‘Mandelbrot sets’ are just the mathematical formalisation of ideas which he himself first attributes to Leibniz. As this chapter endeavours to demonstrate, we can go even further than this and suggest that if it were not for the substantial influence of Hermetic and Kabbalistic figuration on the development of Leibniz’s monadological system there would be today perhaps no such thing as fractal geometry.

Kabbalistic Canalisation
In the Monadology (71) we read:

[B]odies are in a perpetual flux like rivers, and parts are passing in and out of them continually.

Given Leibniz’s belief in the fractal organisation of nature, and the vertiginous sensibility that this implies, it is not surprising that he thought that bodies, including the human body, to be open sites of interactivity, temporary nodes for organising influxes, rather than ‘closed
worlds.’ This is a way of looking at the universe is central to the ‘philosophy of organism’ that Needham attributes to Leibniz: the world is more like an organism than a machine. Leibniz’s conception of bodies in flux certainly adumbrate that of Hans Jonas (as discussed in Chapter III), when Jonas upholds the idea of metabolism (wherein we find a continual exchange of ‘matter’ or ‘information’ between an organism and its environment) as the principal ‘pattern which perpetuates itself.’

The Zohar is similarly unambiguous in describing the complexity of interconnections between human beings and the divine. And it is the activities and actions of individuals that will ultimately ‘complete’ the creation of the divinity:

...the smoke of the sacrifice rises and creates harmony above, so that all unite, and in this way there is completion in the supernal realm. The impulse comes from below and from this all is perfected. If the Community of Israel did not give the first impulse, the One above would not move to meet her, and by the yearning from below completion is effected above.\(^{83}\)

The erotic figuration, only suggested in this passage but quite forceful throughout many books of the Zohar (and a source of considerable embarrassment for many orthodox Jewish scholars), recalls the Yab-Yum imagery of Tantric Buddhist iconography, and serves essentially the same purpose: the hypostatization of an imagery of tensility, suspension, outpouring and release that is associated with mystical ecstasy.

Kurt Rudolph notes that one finds a definite equivocation in certain Gnostic texts concerning figurations of corporeality:

It is sometimes difficult -- for example in Mandaean texts -- to distinguish between individual and general statements about material and bodily existence: the body is described as a world (and therefore negatively) and the converse. The whole destiny of the world can be demonstrated in the figure of Adam, but so also can that of redemption.\(^{84}\)

We have already noted the import of the ‘Hermetic Adam’ of the Poinndres in the work of Ficino and Fludd. Leibniz himself held to the demiurgic capacities of human beings: ‘The mind not only has a perception of the works of God, but is even capable of producing something like them, though on a small scale.’\(^{85}\) A similar notion to that of the Hermetic Adam reappears in the mythology of the Kabbalah:

The form of man contains all that is in heaven above and upon earth below, the superior as well as the inferior beings; it is for that reason that the Ancient of the Ancients has chosen it for His own. No form, no world could subsist before the human form, for it contains all things, and all that is, subsists only by virtue of it: without it there would be no world...\(^{86}\)
This is the Adam Kadmon which literally means ‘previous man’, or metaphysical ‘archetypal man.’ Adam Kadmon is also referred to as Adam Eelo-o, the ‘high’ or ‘celestial’ man. Frank characterises the Celestial man, the first divine manifestation, as ‘the absolute form of all that exists’, and directly associates it with the ‘Logos, or the Word.’ Although Frank does not acknowledge it, Knorr von Rosenroth was probably the first to hold that the figure of Adam Kadmon was equivalent to the Logos. Now if Logos means ‘pattern’ -- which is the meaning René Thom asserts Heraclitus assigned it -- then it is not difficult to see that the Zohar ascribes to the figure of Adam Kadmon, and consequently the form of humankind, the Protagorean conclusion that, ‘Man is the measure of all things.’

Similarly Gnostic texts see the macro/micro couplet in terms of a gigantic anthropos. The Valentinian Tripartite Tractate describes the ‘aeon of Truth’ as being ‘a unity and a multiplicity’ which is

by way of analogy, like a spring which is what it is, yet flows into rivers and lakes and canals and branches, or like a root which extends into trees with branches and fruit, or like a human body, which is partitioned in an indivisible way into members of members, primary members and secondary, great and small.

This image of a spring from which flows a river and its tributaries, or of the root from which grows a tree and its branches are essentially equivalents. They are all examples of the ‘emanation schema’ which is, I would suggest, a fractal mnemonic. What is interesting in this example is the connection with the human body, a body seen as a system of bifurcations. This bifurcation set is also expounded in the Zohar:

From this we may reckon it so: One, is the source of the sea. A current comes from it making a revolution which is yod. The source is one, and the current makes two. Then is formed the vast basin known as the sea, which is like a channel dug into the earth and it is filled by the waters issuing from the source; and this sea is the third thing. This vast basin is divided up into seven channels, resembling that number of long tubes, and the waters go from the sea into the seven channels. Together the source, the current, the sea, and the seven channels make the number ten.

As the word ‘emanation’ itself etymologically intends, the sephirot of the Kabbalah (in the above passage the ‘source’, ‘current’, ‘sea’ and ‘seven channels’ are symbolic of the ten sephirot) ‘flow out’ from the ‘Ein Sof, each an ‘intrinsic dimension of [God’s] being’, the entire process eventually (in point of fact the ‘process’ is outside of time and space) crystallising into ten sephirot, each being functions of the deity’s continuing manifestation of His/Herself in the ‘Upper World.’
We discover the same imagery, indeed, almost the same examples, utilised in recent discussions of fractal mathematics. In a review of the work of Benoit Mandelbrot, Freeman Dyson notes that many phenomena in the world are best described by what is called their ‘fractal dimension’, a geometric dimension that obtains independent of scale:

Important examples from human anatomy are our vascular system (veins and arteries) and the bronchiolostructure of our lungs. In the vegetable world we have trees, in the world of geography we have river networks and archipelagoes, in astronomy we have the hierarchical clustering of stars and galaxies.Each of these differing phenomena exhibit fractal structure. This similarity of fractal structure leading from the interior to the exterior of the body, and from the smallest plant to the greatest star clusters is an unusually audacious notion for contemporary science, indeed one may say that it is comparable in its audacity to Newton’s uncovering of the ‘universal’ law of gravity which also encompasses everything from the atom to the farthest spiral galaxies. Mandelbrot himself states that fractals are but ‘mathematical and scientific implementations’ of ideas expressed by Aristotle and Leibniz which ‘permeate our culture, and affect even those who think they are not subject to philosophical influences.’ Specifically Mandelbrot mentions Leibniz’s belief in the ‘principle of continuity’ that guaranteed the existence of a monadic ‘plenum.’ Mandelbrot states that it was the idea of the plenum ‘that sat at the very core of this thought’ and which explains ‘Leibniz’s haste to talk about fractional differentials.’

That which is contemporaneously called the fractal dimension is the bifurcation set observed to be associated with certain natural phenomena. It is associated with what I have called the ‘emanationist schema,’ and is explicitly found at the centre of Leibniz’s monadological worldview. It lies too behind the structure of the Kabbalistic and Zoharic figuration of the ‘Tree of Life.’ I suggest that Leibniz discovered in the imagery of the Zoharic Kabbalah and in particular the figuration of the ‘Tree of Life’ described and imaged in Knorr von Rosenroth’s Kabbalah Denudata, confirmation of his theory of a universal structure composed of hierarchically ordered monadic substances.

I further suggest that one should think of this particular imagery of branching bifurcations in terms recommended by Guenther in his examination of Tantric imagery discussed in Chapter II, where ‘channels’, ‘drops’ and ‘motility’ refer to the intelligential equivalents of pneumatic, somatic processes. All these figurations may be considered as relational terms within a communicative economy where soma deliquesces into thought itself -- or rather into the great, participatory Thought (logos) that is imagined as the Hermetic kosmos. If we recall Fludd’s Hermetic alchemy in terms of the Zoharic quotation regarding the initial ‘yearning for completion’ that is necessary for the supernal One to initiate this completion or ‘harmony’, we observe the appearance of the figuration of the mutual interpenetration of rays once again: an
‘impulse’ comes from below (Fludd's Hermetic alchemist initiating her/his ‘mental beam’) which is met by the One (in Fludd’s case, the Holy Ghost or anima mundi) moving to ‘meet’ it.

In Lurianic Kabbalah particularly the pneumatic mechanism of ecstasy served the purpose of a direct ‘link-up’ with the continual process underpinning reality. As Fine notes\(^5\) the idea that terrestrial acts of religious observance and piety would have an affect on the deity thoroughly changes the idea of the deity’s autonomous, ‘alien’ status. God is no longer the overseer of history, but is rather ineluctably caught up in the process, His/Her own being dependant on the good works of human beings. Yet the situation is more complicated than Fine admits: for the actions of human beings can only affect the sephirotic aspects of the ‘Ein Sof, such that the situation resembles -- again -- that of a mirror: the actions, good or bad, of human beings are like the now healthy, now ill organs in a divine anthropos, the body of this anthropos consisting of the sephirot (the organs) and their numerous connections (blood vessels? nerves?) Furthermore, just as the soul of a human being is that part which is not amenable to observation, that does not partake of ‘extension’, so the ‘Ein Sof is the Unknowable, Unnamable\(^6\) aspect of God (the name ‘Ein Sof which has the literal meaning of ‘infinite’ or ‘without end’, unambiguously observes a continuously escaping attempt at denotation; the ‘endless’ will always elude the bounds of human language). Here again we should note the mystical equivalence of the divine and terrestrial nous/mens.

Unlike the philosophy of the medieval via negativa however, wherein we also find the alien, unknowable deity, the Kabbalists had a means of participation in the nature of the Godhead. Through the union of ecstatic contemplation and the translative medium provided by the sephirot, or divine emanations (the ‘fulgurations’ of Leibniz), these thinkers were allowed occasional glimpses of the integrated structure -- Logos, Adam Kadmon, Hermetic Adam, monadic plenum -- that undergirds the kosmos.

The Kabbalistic imaginary of Adam Kadmon, of the various sephirotic nodes that constitute a kosmic corporeity, of the interconnections between them, of the canals and fonts that sustain this pneumatic system -- all this was greatly contributory to both the Hermetic imaginary and Leibniz’s development of his monadological universe. The fact that similar figurations and the relationships they serve to articulate are found within the Kabbalistic, Gnostic and Hermetic imaginaries would only have confirmed in Leibniz’s mind that he was ‘on the right track’ in delineating a rational reconstruction of the phenomenal world that was undergirded by figurations derived from a metaphysical imaginary.
Pneumatic Fields

Leibniz, like many of his contemporaries, shared with Aristotle the refusal to believe in the existence of a void or vacuum. In his letter to Wagner (1710) we see that Leibniz associated the idea of a physical void with what he called the 'metaphysical void' that would follow from the denial that God worked towards creating a universe comprised of 'perfections or forms.' In place of a physical void, Leibniz saw a continuum of matter that proceeded from the smallest 'animacule' up to the genii, with human-kind placed somewhere in the middle. This led to certain epistemological conclusions such as 'all things in nature are analogous, and the subtle may be understood from the course, since both are constituted in the same way.' The doctrine of the Book of Nature is thus re-invoked, but in terms of the scientific debate of his times.

Leibniz was well aware of the experiments of Guericke with his 'Magdeburg spheres' and of Torricelli's earlier efforts to experimentally prove the existence of a vacuum. In answer to this experimental evidence, Leibniz sided with the Cartesians and die-hard Aristotelians in asserting that -- in the case of Torricelli's glass tube filled with mercury -- the space at the top of the tube is actually filled with 'rays of light, magnetic rays, and other very fine sorts of matter' which are able to pass through the 'fines pores' in the glass. Today we would find it difficult to associate imagery such as magnetic and solar rays with the concept of 'fine matter', but for Leibniz these were but modes of the one underlying substratum. Like the Cartesians, Leibniz postulated the existence of a plenum as opposed to a void, and when Torricelli demonstrated that light was transmitted through an artificially created vacuum, Leibniz and others countered that the rays were transmitted by virtue of this plenum. For these thinkers the notion that movement could be conserved without some sort of transmitting medium was inconceivable. By the 19th century the difficulties of reconciling the 'action at a distance' implied by Newton's theory of Universal Gravitation with a science that sought to rid itself of 'occult qualities' led to the almost axiomatic acceptance of the concept of the 'luminiferous aether.'

The origin of the idea of the aether is often traced to William Gilbert's De Magnete (1600). In his 'Causes and Forces in Sixteenth-Century Physics' William Wallace places Gilbert within a tradition 'decidedly under Platonic influences' that includes such luminaries as Bernadino Telesio, Johannes Kepler and William Gilbert. Wallace calls this tradition the 'anima mundi tradition.'

Gilbert ascribed the influence of the magnet or lodestone to 'effluvia', a term that recalls both the Atomist's conception of eidola and the Hermetic conviction (explicitly described by Alkitab and Synesius) that all objects irradiate a field of causal interactivity. In Book V, part
12 of De Magnete Gilbert titles the chapter, 'The magnetic force is animate, or imitates a soul; in many respects it surpasses the human soul while that is united to an organic body.' In support of his view that the loadstone was animate, Gilbert recalls the Classical belief that the agent behind motive force was the soul:

For they deemed that not without a divine and animate nature could movements so diverse be produced, such vast bodies revolve in fixed times, or potencies so wonderful be infused into other bodies; whereby the whole world blooms with most beautiful diversity through this primary form of the globes themselves.¹⁰¹

He notes that philosophers from Thales to the Neo-Platonists 'seek in the world a certain universal soul, and declare the whole world to be endowed with a soul.' He is aware that Aristotle allows that the 'spheres and heavenly orbs' have souls 'for the reason that they are capable of circular motion and action.'¹⁰² Though Gilbert may not have been aware of it, this idea was expanded upon by both Proclus and Plotinus to include the notion that the shape of the human soul itself was spherical,¹⁰³ an idea that would no doubt have delighted him as he called his lodestones Terrella ('little earths'), believing that they similarly embodied the magnetic activities of the Earth and other celestial bodies. He recalls that,

Hermes, Zoroaster, Orpheus, recognise a universal soul. As for us, we deem the whole world animate, and all globes, all stars and this glorious earth too, we hold to be from the beginning by their own destinate souls governed...¹⁰⁴

Clearly Gilbert equated magnetic forces with the anima mundi. His effluvia also recalls both Arabic, Kabbalistic and Hermetic conceptions of the presence of a vast network of pneumatic rays enveloping the earth. This radiation is described in a significant passage in the Zohar:

Now there are stars in the heavens which have emerged from that firmament to which all the stars are attached. In that firmament there are one hundred latticed windows...At each window there is one star. And when the sun passes by these windows and lattices in the firmament he sends out flashing rays, and the stars catch up these rays...The stars which shine by night mingle with those that proceed from that firmament and they sparkle and shine, ruling over the elements in this world.¹⁰⁵

The 'latticed windows' each with their own star, recall contemporary figurations of 'fields of force': a lattice composed of (Faraday's) 'lines of force', or tensional points: at each window there is one star. It is also a clear description of some manner of celestial 'grid.' Elsewhere in the Zohar we find a text describing the 'three souls belonging to the celestial grades', one of which is a certain 'soul of all souls, inscrutable and unknowable':

Everything is dependent upon it, and it is veiled in a covering of exceeding brightness. It drops pearls which are linked together like the joints of the body, and it enters into them and displays through them its energy. It and they are one and there is no separation between them.¹⁰⁶
The ‘soul of souls’ (a figuration equivalent to the anima mundi) is the supervenient principle from which the individuated ‘pearls’ (ie., scintillating spheres) depend, their interconnection represented by the harmony observed in the constitution of a body. This passage recalls Averroës conception of Aristotle’s nous poetikos as a single continuous corporeity and is strikingly similar to Leibniz’s monadic conception of the Real. It should also be noted that Simone Luzzatto, a 19th century commentator on the Kabbalah, in his Discorso circo il stato de l’Hebrei, thought that this intermediary ‘soul of souls’ was the equivalent of the Neo-Platonic ‘astral body.’\(^{107}\) We should note again the equivalence figured between an all-encompassing anima mundi and its localisations in the form of monadic subtle corporeities.

According to my vertigral reading therefore, while Gilbert certainly was the first to introduce into the scientific parlance of the 17th century an idea that would eventually reappear as Faraday’s magnetic ‘lines of force’, the figuration was already inherent in Hermetic physics. And judging by his familiarity with the anima mundi we can be assured, I think, that Gilbert was also cognisant of its ‘extended’, causal nature.

The figuration of the anima mundi is arguably first encountered in Plato’s Timaeus. We are told that the Demiurge created the universe and

in the centre he put a soul, which he diffused throughout the body, making it also the exterior environment of it; and he made the universe a circle moving in a circle, one and solitary, yet by reason of its excellence able to converse with itself, and needing no other friendship or acquaintance. Having these purposes in view he created the world a blessed god.\(^{108}\)

An alternative translation of this section of the text has it that the demiurge ‘set soul in the midst [of the body of the universe] and spread her through all its body and even wrapped the body round with her from without.’\(^{109}\) Also this soul was ‘woven in everywhere and encompassed it round from without, and having her movement in herself she began a divine beginning of endless and reasonable life for ever.’\(^{110}\) This latter rendering of the passage more clearly delineates the resemblance of the figuration of the anima mundi to that of contemporary ideas of a physical field: it is ‘woven’ into the fabric of the universe, the warp and weft of the pneumatic threads producing the image of the grid of a force field. We should notice too the image of a spherical universe (inherent in both the contemporary ‘Big Bang’ cosmological theory and Einstein’s idea of the universe as the hypersurface of a hypersphere), and its relationship to an ultimately spherical (because it is ‘soul matter’) anima mundi. The idea that the anima mundi has her movement ‘within herself’ is particularly important when we come to consider the resonance of these ideas with the thought of Leibniz.
In his extended correspondence with the Newtonian scientist and natural theologian Samuel Clarke, Leibniz, among many other points of dispute, particularly objects to Newton’s famous description in his *General Scholium* of space as the *sensorium* of God. Leibniz considers Newton’s concept of space as a kind of *hegemonikon* of sensory information to be equivalent to the ancient concept of the *anima mundi*:

If ‘tis by means of a sensorium that God perceives what passes in the world; it seems that things act upon him; and that therefore he is what we mean by a soul of the world.\(^{111}\)

This idea of a *anima mundi* is for Leibniz tantamount to making God in man’s image, for God then acts

by a kind of perception, such as that by which men fancy our soul perceives what passes in the body. This is a degrading of God’s knowledge very much.\(^{112}\)

Leibniz rejects the idea that the universe is like the body of the deity -- a concept, it should be noted, that is equivalent to the functioning of the Kabbalistic figure of *Adam Kadmon* -- on the grounds that this imposes inconceivable/unconscionable limits on the Being of God. This is not because the notion that the universe is an astronomically extended sensory system implies some sort of time-boundedness to the ‘accessing of information’ on God’s part (similar to the worldly lot of human beings), but because it necessarily implies that God created an imperfect world that has to be supervised and occasionally ‘fixed up.’ Leibniz’s God is not a ‘tinkerer’, but a Being whose work is always already accomplished: the ‘best of all possible worlds,’ as he so famously noted. Leibniz’s universe is a world of ‘perfections and forms’ as he states, for the idea that God would have created a world that is in any way less than he could have seems monstrous to him.

Leibniz ultimately rejected the concept of the *anima mundi* (at least in its new incarnation as the *sensorium*) as it implied for him the idea of the perpetuity of the presence of God in his creation. As the ‘supreme monad’ the deity was of a qualitatively different order to that of lesser monads, and as a *monad* he was removed from all others, a *deus absconditus* rather than an ever-present *tremendum*. For this reason Leibniz rejected any idea that saw lesser monads finally reunited with the source of creation. In his *New Essays* he states his position as being against the

Averroists and certain perrnicious Quietists, who picture an absorption and reunion of the soul with the ocean of Divinity, a notion whose impossibility is perhaps shown up by my system alone.\(^{113}\)

It is his system of monadic substances that, he believes, rationally precludes any actual contact with the deity. For Leibniz there could be no one universal *anima mundi*, but rather an infinity of hierarchically ordered individual *anima* (monads). But while Leibniz held that the
deity was not actually present in the universe, he was certainly *immanent* in the monadic system.

Many contemporary thinkers attribute to Leibniz the earliest inklings of what physicists today call a ‘field’.\(^{114}\) It should be clear by now that I am suggesting that the imagery of the field was already inherent in both the figuration of an *anima mundi* and its more ‘secular’ equivalent, the aether. While the similarity of the aether to that of (Maxwell’s) field of force is probably not too controversial, the ‘back-dating’ of the connection with Hermetic and Kabbalistic figurations certainly may be seen to be. Specifically I want to suggest that the Hermetic doctrine of a field of causal influence is the intellectual and figural forebear of contemporary physical notions, and with but a little reduction in poetic phraseology we find striking descriptions of something that any contemporary physicist would recognise.

Without doubt the Hermetic conception of the anima-field has close associations with the Stoic *pneuma*. As physicist and historian of science S. Sambursky states outright, the *pneuma* was the forerunner of the modern concept of a field of force.\(^{115}\) It has tensional properties akin to the modern conception, and Neo-Platonic interpretations strongly associated the *pneuma* with the Platonic conception of the relational nature of physical space. The 4th. century Syrianus wrote of space:

> It is an interval with its own specific distinctions derived from the various orders of the soul and the illumination of the creative forms. It appropriates the various bodies and, with respect to one element, makes itself the proper place of fire...and, with respect to another, the proper place of earth.\(^{116}\)

We see here the hieratic view of space as systemic relationship rather than a void in which bodies juggle for position. Motion and rest (later, ‘force’ and ‘inertia’ in Newtonian mechanical corpuscularianism) were not the proprietary functions of bodies in themselves, but the effects of the geometry of relationships within the space-field at any given moment. Syrianus and others easily combined the activities of the harmonising world-soul of the *Timaeus* with this -- surprisingly modern -- natural physics. Broadly characterised, Leibniz conceived of force as the product of ‘soul-energy’, a curiously pre-Galilean conception.\(^{117}\) Leibniz’s *spermatic* characterisation of monads, along with his more explicit statements concerning the *vis viva*, indicate that he saw an immanent *scintilla* of the deity in all matter.\(^{118}\)

Einstein’s biographer Abraham Pais points out, ‘As Einstein saw it, Maxwell’s introduction of the field concept was a revolutionary advance which, however, did not go far enough.’\(^{119}\) He believed further that all references to the Newtonian world picture ‘should be eradicated.’

In 1931 Einstein wrote:

> Since Maxwell’s time, physical reality has been thought of as [being] represented by continuous fields, governed by partial differential equations,
and not capable of any mechanical interpretation... It must be confessed that the complete realisation of the program contained in this idea has so far by no means been attained. The successful physical systems that have been set up since then represent rather a compromise between these two programs [Newton's and Maxwell's], and it is precisely this character of compromise that stamps them as temporary and logically incomplete... 120

Of course the other program which Einstein insisted was necessarily 'temporary and incomplete' was the field/corpuscle discontinuity, the trigger for Bohr's 'complementarity' thesis. It seems clear that for Einstein the mathematical equivalent of spacetime was the concept of the field. Mathematically spacetime is imagined as the system of co-ordinate geometry that allows one to map an event. As a consequence of the grid of co-ordinates representing time and space, an 'event' becomes extended into a 'time-line' occupying four rather than three spatial dimensions. Any point in this four-dimensional 'search-space' becomes the 'point mass' of contemporary physics, a geometrised matter. This is the logical development of Newton's concept of mass in the formula, force = mass × acceleration. Newton's mass recalls the geometrised matter of Plato's Timaeus rather than the 'Aristotelian' mass of Galileo for example. This latter is much closer to the 'naive'121 sense of mass (weight) that is derived from its etymological root, the Greek massein, to knead, i.e. an unformed mass, like bread waiting to be shaped.

The ultimate status of the 'field' in contemporary physics is still undecided. Most scientists will say that it is none of their business to enquire as to its ontological status -- all that matters for the moment is that utilisation of (the mathematical description of) the field continues to yield results. Faraday thought that his 'lines of force' were invisible strings of matter surrounding objects; Lorentz held that the properties of a field were actually a particular state of the aether, a non-mechanical (non-Newtonian) substance. Einstein rejected the idea of the aether entirely, considering the concept of the field to be an irreducible element of physical description, a geometrised property of spacetime.

With Einstein the ontological status of 'geometry' achieved a renewed emphasis. The mere fact that the curvature of spacetime accounted for the effects of the gravitational field was enough to encourage him to consider a 'unified field theory' in which the forces of gravity and electromagnetism would be reconciled under a single theory. The significance of this is that Einstein hoped that one day physical science would provide a single description for all phenomena: all forces would be reduced to one force, and all bodies would become mere vortices in the ether/field. It is clear too, based on the evidence of his previous theories, that Einstein thought that this single description would be a geometrical description.
We should remember too that Einstein’s Special and General theories of Relativity were not, in the final analysis, about events in spacetime, but about relationships. This way of thinking about the world is reminiscent of the Hermetic worldview in which, at the most fundamental level of description, a vast set of interconnected relationships characterised the pneumatic economy. This emphasis on relationships is the result of looking at the phenomenal in terms of geometry. As I have previously stated, it is possible to think of geometry as being fundamentally about relationships between immaterial elements, and not about any particular figure that may be instantiated by pen and paper. That is, geometry somehow encapsulates the logos patterns in nature, and is not just an historically (and humanly) constructed set of axioms and postulates, images and diagrams. It is his emphasis on the relational that closely links Einstein’s thought with that of Leibniz, and through this latter, with the hieratic conception of space articulated within the Hermetic imaginary.

René Thom more recently proposed a further modification of the concept of the field organisation of matter. In a manner which I propose is not that far removed from Einstein’s project of finding a unified field theory, Thom considers that,

...we might look upon all living phenomena as manifestations of a geometric object, the life field (champ vital), similar to the gravitational or electromagnetic field; living beings would then be particles or structurally stable singularities of this field...\textsuperscript{122} Singularity in a field -- this figuration appears remarkably often in the literature describing the longlived history of ‘atoms and the void.’ The late 19th century scientist Lasswitz described the fundamental status of the atom as being ‘a mobile portion of space whose geometrical parts are at rest in relation to each other.’\textsuperscript{123} As Meyerson notes, matter thereby becomes

nothing by [sic] hypostatised space, since...it has no other property than spatial magnitude.\textsuperscript{124}
This is not far at all from Leibniz’s picture of space as completely filled with a ‘homogenous matter, fluid and incompressible...capable of whirling motions [to which] are due all the phenomena of the sensible world.’\textsuperscript{125} Meyerson goes on to point out the unmistakable analogy between Leibniz’s conceptions and the ‘vortex atoms’ of Helmholtz and Thompson. It is this relationship, this way of picturing the operations of the field in terms of an omnipresent medium and its localisations, that is structurally equivalent to that operating between the anima mundi and living beings in the Hermetic conception of things. There is an unmistakable figural and conceptual continuity that spans the historical gap between the Platonic Receptacle and Lucretian Void and the ‘vortex atoms’ of Leibniz, Helmholtz and Thompson. This structural continuity is even more evident in the remarkable similarity between Thom’s figural description of the relationship between the champ vital and its singularities and the Hermetic conception of the anima mundi and its psyche localisations.
According to my vertigral reading of this continuity, we are observing the morphological adaptations of a single ideal object that operates similarly over apparently divergent discourses. This ideal object is figured in the circle and its bindu, the sphere and its centre: deus est sphaera cuius centrum ubique, circumferentia nullibi.

Writing before Rutherford’s modification of Thompson’s conception of the atom,126 Meyerson would no doubt be further convinced that the proposition of the existence of the atom is a product of the insistence of a metaphysical imaginary rather than an empirical fact, if he could have encountered a very recent scientific idea. Recently physicist David Bohm has asserted that ‘atoms’ are but temporary vortices in a field he calls the ‘implicate order.’ Bohm’s conception is essentially a modification (some would say a hyperbolic modification) of Einstein’s idea that a field is spread continuously throughout space. A ‘particle’ (electron, photon etc). in this field, according to Bohm, is like the formation of a vortex in a fluid.

Within this fluid there is a recurrent, stable pattern. You may abstract it in your mind as a vortex, though there is no vortex. There is nothing but a flowing pattern of water. But a vortex is a convenient word to describe that pattern.127

If two vortices come close together, they will interfere with each other, creating a different pattern, and if they come too close they will eventually become a single vortex. From this Bohm concludes that,

there is an inherent interaction of these patterns, but the basic reality is unbroken wholeness in flowing movement. Separate entities such as vortices, are relatively constant and independently behaving forms abstracted by the mind from the whole in perception and thought.128

For Bohm this abstraction of stabilities from the unbroken flow is not an unavoidable propensity of the human mind, rather it is a way of looking forced upon it by history. The fact that science utilises a Newtonian representative system of mathematics and proceeds by an analysis of quantities rather than qualities, is entirely contingent upon historical factors. Science does not have to proceed in this manner. For Bohm the concept of a ‘deep’ field (which he calls the ‘implicate order’) and its recurrent singularities is the first step in beginning to reconceptualise the aims and merit of the scientific project.

Bohm’s talk of deep flow and recurrent patterns, his Lucretian locutions and Heraclitean figurations (process as a flow or river) are strongly reminiscent of the imagery of René Thom. In regard to his concept of the ‘life field’ Thom says that the question of the ‘ultimate nature of this field’ is ‘ultimately a metaphysical one.’129 I suggest that this applies to all conceptions of the field as utilised in contemporary science, for all are morphological variations of the one ideal object -- the anima mundi.
Interestingly, Meyerson himself seems to have come to a very similar conclusion in regard to the (19th century) conception of the aether and atoms. He finds it remarkable that scientists such as Tait, Thompson and Helmholtz should have erected such a monumental edifice on such paltry experimental evidence:

[I]t is surprising that these theories have had such considerable success, and,
still more astonishing, that their authors have been able to be deceived about
their value; this fact alone would make us suspect the presence of some secret
propensity of the human mind. [my italics.] \(^\text{130}\)

A little later, following a thorough analysis of the concepts of the luminiferous ether, matter and space he concludes that,

These conceptions are so contradictory that they could only have arisen, just
like that of the corpuscular atom, at the command of an \textit{a priori} tendency. \(^\text{131}\)

Meyerson does not hypothesise about the cause of this ‘secret propensity of the mind’, this \textit{a priori} tendency that seems to force its figurations on the minds of contemporary scientists, but he strongly advocates the metaphysical origins of physical notions and demonstrates them to be influenced by figurations that can have no possible experimental verification. My reading of the history of the field concept comes to similar conclusions regarding the organising influence, and continuity of, the Hermetic imaginary upon these scientific figurations and notions. Whatever the particular historical explanation of the field concept, and whatever ontological status (or lack of it) it is accorded, one thing is certain: while Leibniz may have been the first to have an inkling of its future importance, the idea of a luciform intermediary is both more \textit{ancient} and more \textit{vertigral} than an orthodox reading of the history of scientific imagination is prepared to admit.

\textbf{Conclusion}

In place of the Lucretian/Newtonian attempt to picture the world from an objective position, Leibniz pursued his description in terms of differing ‘modes’ or perspectives. On one level a monad (an infinite unity) is a metaphysical conception, on another level it is the abstract description of ‘force’ and on yet another it is that behind the phenomenal perception of bodies, which are merely aggregates of monads. This is a rational (for Leibniz this is equivalent to the Hermetic conception of rationality) reconstruction of the Real, and the varying levels of description are linked together in the perspectival field of one monad or soul: that of Leibniz himself. This was Leibniz’s contribution to the panpsychic hypothesis. All activity, all processes in the world were the result of what he called ‘perception’.

The passing condition, which involves and represents a multiplicity in the unit
or in the simple substance, is nothing but what is called Perception. \(^\text{132}\)

Thus all ‘forces’ and all activity are the result of the perceptions of monads, and everything, according to this description, is alive to the degree of the keenness of its perceptions.
Therefore a stone (for example) appears non-sentient to us merely because the perceptions of its aggregate monads are primitive and 'unconscious' compared to those of higher monadic aggregates. Stones have a differing consciousness to our own.

For Leibniz there was no 'real' relationship between monads -- no relationship of proximity or exchange of influence. Each saw the world from its own perspective, 'mirrored' the world as he so famously asserted. The relationship between monads is therefore of an 'ideal' nature, and this relationship is what we call the world.

Just as two paintings could be of a precisely similar object but in a different perspective, without this being necessarily a matter of their actually being of any same thing or of any actual thing at all (without, that is, their painters having been depicting the same actually encountered things, or even any such things at all), so two monads are related as being of the same world, without there being any world they are of, except as quite specific represented object.\textsuperscript{133}

While this inarguably metaphysical conception of individuals and the world they inhabit may seem preposterous to the 20th century scientific mind, such a resolutely 'subjectivist' starting point for a complete description of the physical world is certainly one solution to re-imagining the status of the epistemic project in our century. And, rather surprisingly, it is not without its parallels in contemporary science.

David Bohm uses the analogy of the perspective of two differently positioned video cameras to describe the observation of the interactions of sub-atomic particles. The purpose of his analogy is to explain certain peculiarities of quantum phenomena. Bohm states that a study of the implications of quantum theory reveals that the analysis of an experimental system into a 'set of independently existent but interacting particles breaks down in a radically new way' and that consequently 'the particles have to be taken as literally projections of a higher-dimensional reality which cannot be accounted for in terms of any force of interaction between them.'\textsuperscript{134} In other words, classical notions of locality and causality have to be thrown out the window.

Bohm's analogy imagines two video cameras set up at different angles to observe a fish tank. The two cameras feed their images into two separate monitors in another room. If one observed the monitors one would notice certain types of phenomena. Firstly one would apprehend that there exists a relationship between the images. If we look at a fish (or a number of them) on the monitors we will see that even though the fish on the two screens look different, when one fish moves in one monitor there will be a corresponding movement on the other screen, but perhaps in another direction. There appears to be, therefore, a correlation between the different elements on both screens. Bohm suggests that this is
precisely what happens in regard to the famous EPR paradox of quantum mechanics. I do not want to go into the details of this paradox, as it will suffice to know that it maintains a non-causal, non-local relationship operating between sub-atomic particles. As in his analogy, the reason that apparently different particles, separated in space and with no possible proximate influence, can seem nonetheless to be causally related is because they are in reality the same object ‘projected’ by a higher-dimensional space.

Unlike Sprigge’s analogy of the two paintings with regard to Leibniz’s perspectival monads, Bohm’s analogy does not make a distinction between ‘ideal’ and ‘real’ relations, but rather inserts them within a more inclusive higher-dimensional continuum. This solution is, I would maintain, strikingly similar to Leibniz’s own conception of the ‘ideal’ interaction of monads. Inherent in Leibniz’s conception of the monad is the ‘blindness’ (a result of the relative degree of their ‘perceptions’) of some monads in regard to some actual but unperceived aspects of the world. Human beings cannot conceive of the world in the manner of the genii for example. The genii are higher on the Great Chain, and this means that they are possessed of keener perceptions than those below. We observe here a variant on Plato’s fable of the Cave, and particularly Hinton’s explication in terms of fourth dimensional realities.

And what, in the end, is to be gained by excluding from the outset the notion that all matter can in some way be considered ‘alive’, that all existents have perceptions and are interrelated by virtue of these very apperceptions? Poincaré conceived of Thompson’s electron as a ‘singular point in the ether’, a geometric abstraction from a greater luminiferous continuity. How far is this from Bohm’s conception of sub-atomic particles being projections of a higher-dimensional ‘wholeness’? Leibniz was certainly an adherent of the atomistic view of material interaction, yet he did not thereby exclude the idea that atoms/monads were alive. For Leibniz each monad was the source of its own motive force or power, it was not a ‘dead’, passive object in the Laplacian ‘billiard-ball’ description of reality. As Charles Hartshorne succinctly notes,

[T]he Leibnizian distinction between active singulars and seemingly inactive composites whose active singulars escape our sensory detection, taken in conjunction with modern physics and biology, is showing ever more clearly that the concept of mere insentient matter plays no role in explaining the world.

We can abstract from whatever sentence may be there, but the denial that it is there adds nothing to the explanatory power of our science.136

On the experimental evidence provided by the observation of quantum phenomena one suggests that a truly open theoretical physics cannot afford to reduce the world wholly to the interactions stipulated by the materialist/mechanical thesis. Quite plainly there is a level of explanation missing. My vertigral examination of the influence of the Hermetic imaginary suggests that while contemporary science has availed itself of certain persistent figurations
provided by this imaginary, it has so far refused to accept the logical import of the worldview. Hermeticism proposes. In this regard, Antoine Faivre has recognised that the Gnostics and Hermeticists asked perhaps the most fundamental of all scientific questions: what is the relationship between mind and Nature? He adds,

When microphysicists and astrophysicists pose this same question, they seem to take up and rediscover, in a different language, the hypotheses or ideas that previously belonged to some religious traditions.137

Here Faivre is clearly (and imaginatively) alluding to the intellectually symmetrical relationship between the micro/macrocospic relation and the two extremes of 20th century physical exploration. As stated in the opening section of this final chapter, no description of the phenomenal world can possibly be considered complete without a theory of the interpenetrative subjectivity of all matter (as held by both Fludd and Leibniz in their own way), a notion that was at the very heart of Hermetic physics. I think that it is perhaps time to both recognise the continuing guiding influence of the Hermetic imaginary and to re-invent Hermetically influenced conceptualisations which may similarly help us in the development of a future natural philosophy.

1 Whitehead (1948), 160.
2 Whitehead (1948), 161.
3 Whitehead, Process and Reality, quoted in Muirhead, 420.
4 Whitehead (1948), 157.
5 Toulmin, 16.
6 Toulmin, 16.
7 Toulmin, 17.
8 Toulmin, 24.
9 Leibniz, Towards a Universal Characteristic (1677), 19-20; and Preface to a General Science, 17. In Weiner (ed.)
10 Leibniz, Preface to the General Science, 16.
11 Leibniz, Preface to the General Science, 22.
12 Ross, 166.
13 Ross, 166.
14 Ross, 172.
15 Vide Michael Sendivogius's statement from his New Chemical Light, quoted in Chapter III.
16 New Essays on Human Understanding, in Parkinson, 171.
17 Ross, 177.
18 As far as contemporary scholarship can tell, Leibniz first used the word monad in a letter to the Marquis de Hospital in July 1695, the year of publication of New System.
20 Or, as is perhaps more appropriate for this section, 'from the alone to the Alone,' (as it has often been translated.)
21 Rudolph, 57.
22 'Eternal seeds.'
23 Leibniz, New Essays, 150.
24 And not only Gnostic similes. Compare Leibniz's passage with the Mundaka Upanishad, Part 2, Chapter 1: 'This is the truth: As from a fire aflame thousands of sparks come forth, even so from the Creator an infinity of beings have life and to him return again.' In Mascaró, 77.
26 Leibniz, New Essays, 161.
27 Leibniz was fond of the medieval image of the mens as 'mirror of nature': 'Thus one may say that not only is the soul (the mirror of an indestructible universe) itself indestructible, but so also is the animal itself...'. Monadology, 77, 191.
28 Monadology, 75, 191.
Letter to Basnage (1698), in Politella, 4.


Quoted in Politella, 35.

Conze, [b] Buddhism and Gnosis, 16.

Conze [b], 17.

Conze [b], 17.

Barfield, Saving the Appearances (London: Faber and Faber, 1972), 48.


Pais (1991), 432.

Bohr in Pais (1991), 432.


Pais (1991), 432.

One should recall Ernst Mach’s conviction that all scientific theories are really only extensions of the psychology of the observing scientist.


Leibniz, New Essays, 150.


The full title of this work is Arithmetische Beschreibung der Moralweisheit von Personen und Sachen, woraus das gemeine Wesen besteht, nach der pythagorischen Kreuzzahl in lautet tetraktische Glieder eingetheilt, published in Jena in 1674. [Politella, 8.]

Leibniz, Theodicy, Part III, quoted in Politella, 28.

Zohar, Book Vayyeze, 156a, 101.

Leibniz, Principles of Nature and Grace, Parkinson, 201.

Leibniz, Principles of Nature and Grace, Parkinson, 201.

In the more accurate sense of one who seeks knowledge of God, rather than a follower of Madame Blavatsky, creator of the Theosophical Society in the late 19th century.


Scholem, ‘Knorr von Rosenroth’, III.8; Politella, footnote 29.

Politella, 6.

Leibniz, New System, 117.

Leibniz, New System, 117.

‘...for seventeenth century corpuscularians generally, it was above all speed and direction of motion that did the explanatory work. As often as not, atoms were thought of as invariant in shape, as spheres.’ [Gaukroger, S. Descartes: An Intellectual Biography (Oxford: Clarendon Press, 1995), 71. See also Meyerson, 71.


Leibniz, New System, 121.

Leibniz, Discourse on the Natural Theology of the Chinese, 66.

Fung, Yu-lan, 278.

Fung, Yu-lan, 284.

Needham, 558.

Needham, 558.

Leibniz, Discourse on the Natural Theology of the Chinese, 14-15.

Leibniz, Discourse on the Natural Theology of the Chinese, 16.

Needham, 558.

Needham, 505.

Needham, 90; 297.

Fung, Yu-lan, 285.


A relatively modern example of this is the English occultist Aleister Crowley’s Book 777, a text which presents itself as nothing less than a hyperbolic reworking of Knorr’s original tables and diagrams.

Knorr, Kabbalah Denudata, 251. In Major Trends in Jewish Mysticism, Scholem states that ‘sphere’ is the most likely original meaning of sephira.

Leibniz, Monadology, 190.

Leibniz, Monadology, 190.

Mandelbrot, 405.


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81 Bearing in mind that 'self-contained' means 'spherical.'
82 Leibniz, Monadology, 190.
83 Zohar, I. 32a, 131.
84 Rudolph, 67.
86 Quoted in Frank, 152.
87 Frank, 138.
88 Knorr, Kabbalah Denutata, vol. I, 185 et seq.
89 The Tripartate Tractate, in Robinson, The Nag Hammadi Library, 67.
90 Scholem, The Zohar, 79.
91 Fine, 6.
93 Mandelbrot, 405.
94 Mandelbrot, 406. He refers, of course, to Leibniz's creation of the differential calculus.
95 Fine, 8.
96 So unknowable is this God that many Kabbalists held that He/She was not even mentioned in the Old Testament texts.
100 Wallace, 441.
101 Gilbert, 104.
102 Gilbert, 104.
103 Both Proclus and Plotinus no doubt drew their conclusion from Plato's Timaeus (34): '...the movement suited to his spherical form was assigned to him, being of all the seven that which is most appropriate to mind and intelligence; and he was made to move in the same manner and on the same spot, within his own limits moving in a circle' -- that is, a sphere revolving in place.
104 Gilbert, 104.
105 Zohar, Book Terumah, (172a), vol. IV, 95.
107 Idel, 5.
108 Plato, Timaeus (34), 449.
110 More, 302.
111 Leibniz, Fifth Letter to Clarke, in Parkinson (ed.), 82.
112 Leibniz, Fifth Letter to Clarke, in Parkinson (ed.), 83.
115 Sambursky, xii.
116 Syrianus quoted in Sambursky, 5.
117 In regard to the pre-Galilean view, note Leonardo da Vinci on the concept of force: 'Force is spiritual essence which by accidental violence is united to weighty bodies...'; 'Force I define as an incorporeal agency, an invisible power, which by means of unforeseen external pressure is caused by the movement stored up and diffused within bodies...'; 'Force is a spiritual energy, an invisible power which is created and imparted...' -- respectively pages 60, 61, 62, in The Notebooks of Leonardo da Vinci, ed. I. Richter, (Oxford: Oxford Uni. Press, 1980.)
118 It was Kepler who first suggested that the word vis be substituted for anima, intending thereby a quantifiable term rather than one which by definition was 'ungeometrical.' Cf. R. Collingwood, The Idea of Nature (NY: Oxford Uni. Press, 1968), 101-2.
119 Pais, Subtle is the Lord..., 289.
120 Einstein quoted in Pais, Subtle is the Lord..., 289.
121 The world naive is within inverted commas because it is clear that the attribution of a 'naive sense' is naive in itself. Our sense of mass as being something 'real' and graspable that sustains everyday objects is but a recollection of medieval Aristotelian conceptions of substance, of which the entire course of modern (post-Newtonian) science has sought to eliminate.
122 Thom, 152.
123 Lasswitz quoted in Meyerson, 246.
124 Meyerson, 247.
125 Quoted in Meyerson, 248.
126 Meyerson's Identity and Reality originally appeared in 1908. Rutherford 'discovered' the atomic nucleus in the early 1920s.
129 Thom, 152.
130 Meyerson, 249.
131 Meyerson, 249.
135 Meyerson, 249.
137 Faivre, 1994 (b), 280.
Bibliography of works cited.

(Note: works referred to only once in the text are given full citation in the notes to the respective chapter.)


Hermes Recidivus:  
A Postmodern Reading of the 
Recrudescence of the Hermetic Imaginary. 

PhD. dissertation 

School of Humanities 
University of Western Sydney 
March, 1998
PLEASE NOTE

The greatest amount of care has been taken while scanning this thesis,

and the best possible result has been obtained.
The research contained within this dissertation is wholly my own work. This dissertation has not been submitted for any other degree at any other institution.

[Signature]

Leon Marvell
Dedication

To Buster and Lucy,
21st. century boy, 21st. century girl

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Abstract

It is proposed that there exist unmistakable resonances of the Hermetic world-view in much of the science of the modern period. Hermes Recidivus examines key figurations operating within both the imaginaries of Hermeticism and modern(ist) science with a view to developing a postmodern critical position in regard to the discourse of the modernist scientific project. It is proposed that a re-examination of the notions surrounding these key figurations may provide new hermeneutical tools, and that the imaginary of Hermeticism represents a potentially rich resource from which to develop alternative modes of critical enquiry.

It is furthermore proposed that the mechanism by which these Hermetic resonances are perpetuated within the discourse of modernist science takes the form of a logic of the imaginary associated with key figurations within Hermeticism. Certain figural elements associated with the Hermetic imaginary seem to possess a constancy that travels across temporal and disciplinary barriers, encouraging the assumption that these figures are central organising principles within both Hermeticism and modernist science. Specifically these figurations are those of the anima mundi and the Gnostic ‘alien light’ or spintheros. It is proposed that these figurations take the form of ‘ideal objects’ within both the discourses of Hermeticism and modernist science.

The individual chapters respectively examine the relevance of the Hermetic imaginary to Artificial Intelligence research and cybernetic theory; occidental and oriental traditions of the ‘subtle body’ and their relevance to developing a postmodern perspective on the question of mind-body dualism; the ‘metaphysical geometry’ of key figures within the Hermetic and Kabbalistic traditions and their resonances within mathematical ‘catastrophe theory’ as developed by René Thom; the Hermetic alchemy of Robert Fludd as revealed in his text Truth’s Golden Harrow, and its relevance in regard to the subject-object split of modern(ist) scientific consciousness and, finally, the influence of Kabbalistic and Hermetic figuration on the development of Leibniz’s monadological philosophy and on the notion of the ‘field’ in contemporary physical theory.
Hermes Recidivus:

Introduction

The Thesis
The central thesis of this dissertation is that the standard account of the development of science is mistaken in considering that Hermetic ideas were expunged from the modern(ist) worldview during and subsequent to the 'scientific revolution' of the 17th century. As a consequence of this, certain ideas within the Hermetic tradition represent a potentially rich resource which, when oriented in a critical relationship with contemporary scientific/cultural ideas, may well contribute to the development of a postmodern perspective in regard to these ideas.

Much contemporary discourse surrounding new scientific research areas such as 'chaos theory' and complexity, Artificial Intelligence research and Cognitive Science treat the emergence of the ideas central to these disciplines as being *sui generis*, as new conceptions too young to possess a history. Contrary to this perception I propose that many aspects of these so-called 'new' ideas actually have a very ancient history, a history furthermore which can be discerned in a somewhat unexpected intellectual milieu. Specifically this milieu is that which I will call Hermetic.

My primary approach to revealing this history is an examination of the changing imaginaries of natural philosophy. I take as my starting point the assumption of Ioan P. Couliano that,

Magic and science, in the last analysis, represent needs of the imagination,

and the transition from a society dominated by magic to a predominantly scientific society is explicable primarily by a *change in the imaginary*. ¹

Yet it is not the 'moment' of change that I am interested in. The transition from pre-scientific to what has been broadly characterised as Newtonian science in the late 17th century is quite an academically well-worn path by now. In fact that which I will call the 'standard account' of the history of science model fully embraces the notion that a sort of disciplining and refinement of the imagination either enabled or, at the very least, accompanied the transition from pre-scientific to modern science. In short, a disciplined imagination leads one to a more accurate picture of reality, and an unfettered imagination inevitably leads one astray. Inherent in this thesis is the modernist idea of a progressive refinement of consciousness (having as its vectorial determination the province of the Real) going hand-in-hand with the technological advancement of humankind. It is this linear, determinist model of rational progress that has come into question in recent years, and this dissertation quite explicitly questions such a 'standard account.'
Our term ‘scientist’ (and the consequent development of the idea of ‘science’ as an autonomous discipline) was first coined in the early 18th century; previous to this time individuals engaged in the study of the natural world were regarded as ‘natural philosophers.’ While modern(ist) science is often dated from the 17th century (the ‘scientific revolution’), thinkers of the time never saw themselves in this light. Rather they regarded their work as the pursuit of principles that had been the subject of continuous inquiry since at least the time of Parmenides. ‘We are as dwarfs mounted on the shoulders of giants,’ Newton proposed, himself quoting the 12th century natural philosopher and theologian Bernard of Chartres.²

In a similar spirit of speculative anachrony, I propose that key critical tools useful to an examination of contemporary scientific ideas can be discerned in figures associated with the pre-modernist natural philosophy of Hermeticism. I propose, therefore, that no such thing as ‘modern(ist) science’ emerged purified of pre-scientific contaminations, and that as a consequence of this a postmodern science may as well acknowledge the still influential ‘esoteric’ aspects inhering within certain of its ideas. Furthermore this dissertation proposes a manner of approach that on the surface appears quite paradoxical. Inverting the logic of a previous statement, I hold that key critical tools useful to an examination of the pre-modernist natural philosophy of Hermeticism can be also discerned in figures associated with contemporary scientific idealisations. I thus propose that certain key figures are perpetually embedded within the discourse of natural philosophy, and these figures possess an ahistorical, non-linear insistence within the ideas of both Hermeticism and contemporary science.

It would be relatively uncontroversial to note that the greater part of discussion concerning the conditions or possibilities of postmodern thought has revolved around the ‘social’ and the (broadly speaking, psychoanalytical) characterisation of the individual as social construction. Some of the most powerful critiques of modern science have come from the ‘sociology of science’ tradition of critical scholarship, in which the scientistic episteme of an ahistorical, unalloyed rationality is rejected for one recognising the formative function of historical/social contingency in the construction of knowledge practices. While I certainly do not reject this tradition of critique, this dissertation cannot be located within that tradition.
If one were to propose a triadic model as an initial heuristic for humanistic analysis, it might, I propose, look like this:

![Cosmic Model Diagram]

While much of contemporary discourse in the humanities focuses on the binary opposition of individual/social, this dissertation primarily focuses on the individual/cosmic dyad, or, more precisely, it directly concerns itself with the constitutive tertiary factor of the ‘cosmic’. My understanding of this latter term is predicated on its initial Pythagorean meaning as an universal ordering principle, and its subsequent development within Neo-Platonic/Hermetic thought. Simply put, it means that there exists a transpersonal, asocial structure that is more coherently explained on its own terms and without recourse to reductive notions within the social sciences. Whereas much of contemporary post-structuralist and postmodern theory as a matter of course automatically ‘flattens’ the cosmic into the social (producing the idea that a cosmic, spiritual dimension to human life is really only a mask obscuring its actual psychoanalytic, Oedipal origins and/or its construction by discursive power structures), this dissertation tries to do exactly the opposite. I consider the cosmic as a ‘real’ domain constitutive of the human condition.

A sure indicator of the intellectual contribution of the ‘cosmic’ domain can be found in the intellectual territory within which this dissertation primarily finds itself. In broad terms the ‘space’ which this work examines is that known to philosophy as panpsychism. While quite out of fashion nowadays, the panpsychic proposition has had a remarkable longevity, and was a particular intellectual instrument in the critique of the Cartesian philosophy as it emerged in the 17th century. And it is by no means ‘dead and buried’ in contemporary times: Erwin Schrödinger, Freeman Dyson and Jean Charon (to name but three ‘high-profile’ theoretical physicists) all hold to variations of the panpsychic hypothesis. In a nutshell, the panpsychic hypothesis claims that mind or consciousness is manifest in all actualities in the world. The seemingly big jumps between virus (a ‘two-state’ creature sometimes ‘inorganic’, sometimes ‘organic’) and unicellular organism, between cockroach and cockerel, mountain gorilla and humankind are rather seen as contiguous points on a
continuous and infinite continuum that moves from (what modern science considers to be) lifeless, inorganic matter, through humankind and up to the celestial beings above (according to the Hermetic view). All bodies and their elemental constituents (i.e. subatomic objects like electrons) therefore have an ‘inner’ life. The panpsychic hypothesis recognises no essential, disjunctive break or difference between the living and the non-living.

The panpsychic hypothesis is that part of the ‘cosmic’ domain which imagines each point on an infinite continuum of bodies (the idea of the infinite being one of the defining characteristics of the cosmic) as being a ‘psychic moment.’ In this understanding, Being is constituted by infinite division, all of which divisions resolve into the harmonious order (kosmos) of things.

Even a history of the imaginary of panpsychism would be quite outside the scope of most dissertations, so in keeping with my proposal to observe the activity of changing imaginaries, I have narrowed the beam to a particular focus: the morphology of three interconnected figures that represent a subtle, hypercelestial counterpart to human corporeality and their intermediary functioning within the intellectual economy articulated by Hermeticism. These figures are a part of the micro/macrococomic economy which, as Couliano has noted, leads to, and is constitutive of, the notion of the ‘cosmization’ of humankind. The three figurations are: the Gnostic/Hermetic mythologem of the divine photic spark (spinther) within, the idea of the ‘subtle body’ and that of the anima mundi. These three are morphologically connected (are but variants of each other) and, I suggest, are a very early form of the idea that psyche is continuous throughout nature. Each chapter of this dissertation takes as its object of discussion a particular aspect of the Alexandrian/Hermetic concept of the anima mundi and/or its attendant localisations, the subtle body or the ‘alien light’ (spinther) within. Inherent within these conceptions is a metaphysics of light which began in the remote past and has continued to guide our thinking even up to Einstein’s ‘luminal limit’, a concept fundamental to any analysis of 20th century physical theory. The greater part of this dissertation is thus devoted to unravelling the morphological thread of the ‘luminal liminality’ represented by these figures.

In the late 19th century Lucien Poincaré stated,

For a long time the more or less avowed ambition of the greater part of physicists has been to construct all the possible forms of corporeal existence out of particles of ether. It would be pretty safe to say that for Poincaré the ‘long time’ in question began in the 17th century and continued up until his own times. Contrariwise, one of the implications of this dissertation suggests that the idea that matter is constructed of ether, or perhaps more
succinctly, that matter is reducible to space,\textsuperscript{5} is much more ancient. I will suggest, in fact, that without the notion of an \textit{anima mundi}, the development of ‘field theory’ and the conception of Einstein/Minkowski space-time would not have been possible.

Mindful of all the foregoing, there is no getting around the fact that much of this dissertation constellates around the ‘big philosophical questions’ -- principally that of the mind/body duality and the relationship of thought to the Real -- but I have tried to avoid delving into the many and varied arguments which have been generated by these questions and which would distort the stated task of this dissertation. Yet some discussion of these questions and arguments is both inevitable and unavoidable, given the nature of my thesis. An examination of elements and changes in the imaginary of Hermeticism and natural philosophy would be a dull project indeed if all it amounted to was a description or inventory of morphological shifts within a particular imaginary. It is the \textit{meaning} of these shifts that holds interest, and their place in the structures that constitute the particular intellectual objects I will be examining.

\textbf{Ideal Objects or History in Four Dimensions}

Perhaps that which distinguishes this dissertation from previous critiques of the standard, progressivist account of the history of science is that I propose a model around which such a critique may be engaged -- the model of the ideal object. The theory behind the positing of ideal objects is contained in the first part of this section. The beginnings of a theory of \textit{vertigrality} in which the Hermetic principle of the interdependence of anthropology and cosmology is re-deployed as a hermeneutical tool is pursued in extended fashion in Chapter II. For the moment one should note that the term \textit{vertigral} is a neologism which encols two words: vertical and integral. Implicit within this neologism therefore is the idea that the history of human thought reveals an integral, ineluctable vertical dimension that concatenates metaphors linking that which is below with that which is above, the sublunary with the celestial. Vertigral ideas and/or figures are thus sure indicators of the presence of the cosmic domain within any discourse.

One of the most famous (and influential) \textit{vertigral} fables within Western thought is that found in Book VII of Plato’s \textit{Republic}. In the entirety of Western thought it maintains a central position in articulating humankind’s struggle to apprehend the cosmic, the ‘greater world,’ and the ineluctable boundaries constraining such a quest.

Plato’s ‘myth of the cave’ describes how a number of people are imprisoned together facing the back wall of a cave. Behind the prisoners is a small rise behind which is a fire; behind this again is the entrance to the cave. From the prisoner’s point of view, reality is comprised of a series of flickering shadows cast onto the wall -- in fact their own shadows produced by the
fire laying unperceived behind them. Plato then proposes that one among the prisoners is able to break free of his shackles and turn around to see the cause of the two-dimensional world of shadows: the fire hidden behind them. Not only that, but after passing the fire he walks further and is soon able to leave the cave entirely and enter the real world, the world of three-dimensions illuminated by the true source of light, the sun.

This fable of Plato’s is the one most often cited in accounts of the genesis of the ‘metaphysics of light’ in the West, but only one person (as far as I know) regarded this story as the first account of reality described in terms of spatial dimensions. Plato of course does not explicitly describe his two worlds in terms of 2-D and 3-D, but such a description is certainly implicit in his allegory. The individual who first noted this peculiarity within Plato’s myth was C. H. Hinton (1853-1907). Hinton was a mathematician who, along with many others at the turn of the century, became fascinated by the idea of a fourth-dimension invisible to our normal human perception. For Hinton we are all like the prisoners in Plato’s allegory. Just as they mistake the world of two dimensions for the real world of three dimensions, so our perception of a world of three dimensions is really but a vastly impoverished perception of a fourth dimensional reality.

Like Plato himself, Hinton realised that the best way to introduce the idea of a greater reality hidden behind our limited perceptions was to describe, by analogy, what reality would be like for someone living in a 2-D world (in Plato’s fable this 2-D world is represented by the shadows playing on the wall). In his essay, ‘The Fourth Dimension’ (1904) Hinton asks us to imagine a sheet of film suspended horizontally in space. If a spiral is passed vertically through the sheet of film, the point of intersection will appear as a moving point that will describe a circle on the surface of the film. If we were two-dimensional beings living on the surface of this sheet of film we would only be aware of the point moving on the surface (imagine observing a car travelling around in circles in a desert landscape). The actual object, the cause of this phenomenon (the 3-dimensional spiral), would be invisible to inhabitants of such a 2-D world. As Hinton notes,

In the film the permanent existence of the spiral is experienced as a time series -- the record of traversing the spiral is a point moving in a circle. If now we suppose a consciousness connected with the film in such a way that the intersection of the spiral with the film gives rise to a conscious experience, we see that we shall have in the film a point moving in a circle, conscious of its motion, knowing nothing of that real spiral the record of the successive intersections of which by the film is the motion of the point.5 (my italics.)

If I was able to plunge my hand through the surface of the film, an inhabitant of this 2-D world would see a succession of bizarrely changing shapes and colours -- first four dots would appear (the tips of my fingers), then they would expand to become huge big pink
ovoids, another would soon appear (the thumb) and then they would all suddenly become one huge ovoid and then rapidly shrink again into a dot. The 2-D inhabitant on the surface would be entirely unable to connect this succession of shifting shapes with our 'wholistic' experience of a 3-D hand. In a similar manner Hinton reasoned that if we of the 3-D world were suddenly plunged into a 4-D world, our experience of that world would be limited to seeing oddly shaped 3-D objects suddenly appearing, growing, changing shape, changing colour and disappearing seemingly at random and with no apparent logic connecting them.

The notion of ideal objects that I am proposing in this dissertation is analogous to the notion of objects existing in a fourth dimensional space. Rather than a world of physical objects however, it is a 'problem space' of ideas, images and conceptualisations. Of central importance is the notion that ideas and conceptualisations possess a logical dimension outside of time, such that the force of certain ideas will become apparent to certain individuals outside of material, causal factors. The usefulness of the concept of a 4-D ideal object as a hermeneutical tool is found in the fact that it relieves the historian of having to laboriously demonstrate the existence of material 'influence' across comparatively large expanses of historical time. If we remember that time is our stuttered perception of 4th. dimensional objects, then we are forced to regard it as a form of interference that prevents us from seeing the 'whole picture.' We are then encouraged to envision sets of ideas as operating in a logical space independent (heuristically, and only to a certain extent) of the constraints of the forces of production, ideological shifts and the material exigencies of a given period. This is certainly not to say that these standard tools of historical analysis should be abandoned -- that would be quite absurd. The concept of ideal objects just provides but another tool that may be useful in explicating in a perhaps richer manner certain manifestations in the history of ideas.

A contemporary scientific idealisation may help in further refining the concept of an ideal object. Contemporary 'chaos' mathematicians often talk of the 'phase space' of a process. By this is intended the mathematical description of all possible states of the object or process under examination. A point in three-dimensional space needs only three coordinates for its description -- its phase space is minimal. Yet if the object, an electron for example, possesses other qualities besides static spatial location -- spin, direction, velocity etc. -- then a larger number of coordinates are necessary. These coordinates constitute the 'dimensionality' of the geometry of its logical space, and the set of all possible states of the electron is known as the phase space of the particle. This 'space' then becomes the description of the 'overall structure of the totality of the objects of the kind you are considering', as mathematician Ian Stewart notes.
Furthermore,

By using the word ‘space’ it becomes possible to exploit analogies with ordinary space, for example, the idea of continuous motion. Clearly, in mathematical idealisations of phase space, space becomes time, and time space. Phase space is also fractalic: the initial and final conditions, and all states in between, are always inherent in any ‘moment’ that one may choose to observe. My utilisation of the term ‘ideal object’ similarly holds to this collapse of seriality, with some important qualifications.

In terms of my area of analysis (broadly speaking, the history of ideas), I am clearly not dealing with idealised mathematical points (‘coordinates’) -- I cannot therefore attempt to produce a rigorously defined ‘phase portrait’ of the intellectual objects I will be examining; such would be properly a task for a geometer or topologist, if indeed such a project were possible. I am not saying that such a project would be impossible of course, but it is certainly beyond the means and intentions of this work. What I can attempt however is to sketch the broad outlines of what I conceive to be the insistence of certain intellectual objects possessing a fourth dimensional stability, and suggest the logic by which these objects have been defined and utilised as they have appeared at certain moments in historical time. The three key ‘luminal’ figures I examine within this dissertation are examples of such ideal objects.

Here is another fable, formally equivalent to that of Plato’s fable described at the beginning of this section. A number of blind wise men are presented with an elephant by some ruling monarch. Each is asked to describe what is in front of them. One man situated in front of the elephant touches its trunk and declares the animal to be a giant python. The man behind the elephant contradicts him and says that it is a very small snake -- he is grasping the elephants tail. All the blind wise men disagree as to the true nature of what is before them, because each reports from their own comparatively limited perspective. The monarch, possessing a ‘global’ perspective, sees the animal in its entirety. Similarly it is important to remember that in regard to the notion of ideal objects we can only observe distinct bits or fragments which may or may not cohere at a given time (thus allowing us the opportunity of recognition), and then only to separate again. This is an illusion precipitated by our time-bound consciousness, an illusion furthermore hypostatised in the discipline of ‘history.’

Ioan P. Couliano
I am indebted principally to the late Ioan Couliano for the notion of ideal objects and their usefulness in understanding the morphology of certain intellectual concepts throughout
history. It is in his study of religious and philosophical dualism, *The Tree of Gnosis*, that Couliano first proposes the existence of something he calls ‘ideal’ or ‘logical’ objects:

[I]deal objects are systems operating in a logical dimension and cannot go beyond their (generally quite simple) premises. Systems are *fractal*ic in nature, that is, they tend to produce solutions ad infinitum according to (simple) production rules.¹⁰

Couliano advances this idea in opposition to the modern(ist) theory of historical transmission which constrains the historian to find a precedent or linking moment in history -- ‘influence’ in other words. According to Couliano this is an illusory quest. The re-emergence of ideas and concepts in history is often a case of ‘cognitive transmission’ where ‘principles are communicated, even in the elusive or allusive modes, from human mind to human mind, where they continue to work according to the specific patterns of the human mind.’¹¹ Concepts do not have to be borrowed from preceding historical manifestations as they are ‘digital’ patterns hard-wired into the human mind, working ‘according to the logical paths accessible to all of us and still unchanged for perhaps sixty thousand years.’¹²

It is important to examine the import of these statements. Most people trained in the humanities might well immediately object to the idea that ‘specific patterns of the human mind’ could have such a determining influence on human behaviour; and certainly the idea that these specific patterns have remained unchanged for sixty thousand years seems a rather rash and unsubstantiated statement. Hard-won battles to defend the ideas of ‘free will’ and ‘self-determination’ within the course of European history make such propositions difficult to countenance at first glance. Yet no-one would object to the notion that ‘habits of thought’ seem to be transmitted across not only generations but cultural boundaries as well. One of the most important functions of communication within a community is the transmission of ‘unifying’ habits of thought without which no such notion of ‘community’ would be possible at all. And it is certainly uncontroversial nowadays to maintain that these cognitive habits perhaps originated in the earliest of human communities -- Freud’s theory of the functioning of unconscious drives, and the ancient enactment of the ‘primal crime’ is predicated on just such a claim. Couliano then, like Freud and many 20th century anthropologists, holds to the idea that communities of people will react to phenomena in similar ways; that their responses will fall within a generally delimited set of possible responses. What seems so objectionable in Couliano’s characterisation of human thought? The answer is of course that he seems to be suggesting that, at the most fundamental level, human cognition is governed by a simple set of logical combinations, the term ‘logical’ necessarily implying a mechanical determinism to human thought.
I think the important point to remember is Couliano’s conception of cognitive systems as being fractal. He notes that extremely complex systems can be generated by ‘simple production rules.’ This is beautifully demonstrated in the work of Mandelbrot, where quite simple algorithms produce literally infinite variations within a single fractal. Couliano’s conception of the generation of a ‘system’ is therefore one of deterministic chaos rather than Laplacian ‘billiard ball’ certainty. In regard to the idea of deterministic chaos physicist Paul Davies has concluded that,

[Chaotic systems] have severely limited predictability, and even one such system would rapidly exhaust the entire Universe’s capacity to compute its behaviour. It seems, then, that the Universe is incapable of digitally computing the future behaviour of even a small part of itself, let alone all of itself...This conclusion is surely profound. It means that, even accepting a strictly deterministic account of nature, the future states of the Universe are in some sense ‘open.’

He notes that many people think that this suggests that human ‘free will’ is therefore no illusion, a salient point in regard to Couliano’s notion of a fractal cognitive economy. I do not wish to argue one way or the other on this issue, yet it should also be borne in mind that the very idea of ‘free-will’ itself is essentially the product of historical contingency. In fact the idea of free-will is a comparative newcomer within the intellectual history of the humanities, being, as it is, the product of medieval theological controversy.

We observe the genesis of Couliano’s ideas in the influences of his studies in structuralist anthropology (such as Levi-Strauss) as well as his interest in the recent contributions of cognitive science. Primarily a student of religion (under the mentorship of Mircea Eliade), Couliano was a polymath who held several PhDs and was not scared to transgress the traditional boundaries of study within the history of religions. Towards the end of his tragically short life Couliano adopted the notion that the study of human thought could be guided by the recognition of ahistorical structural affinities.

According to Couliano, religious dualism is a system which, throughout a period of time, develops permutations according to a logical decision tree; the choices are ‘always already’ present as potentialities, inscribed in something like Teilhard de Chardin’s noosphere or Karl Popper’s ‘third world’ of the intellect. Some of these binary branches are actualised across time, and some will remain virtual. This ‘cognitive method’ (as Couliano calls it) thoroughly rejects a trivial understanding of the notion of history. Couliano therefore accepts the full import of Gregory Bateson’s conclusion that the word ‘history’ is quite meaningless: it is an explanatory principle that does not in itself explain anything. Its usage therefore must be regarded as a rhetorical manoeuvre which
'states the limits of our knowledge', signposting the inevitable cognitive catastrophe point beyond which all discourses must surely collapse.

Couliano's 'specific patterns of thought' occupy the same explanatory ground as the cognitivist ideas of Noam Chomsky. I suggest that they also share a similar attitude to the question of the possible instantiation of these cognitive structures. Chomsky once suggested that if a Martian were to land on Earth, her/his first observation concerning human languages would be that they are essentially all the same. To explain these apparent similarities Chomsky has proposed the existence of an organ he calls the LAD ('Language Acquisition Device') within the minds of all human beings. Expanding upon this idea, Chomsky has further proposed that the human mind is composed of a series of interconnected faculties -- there is a 'face-recognition' faculty for example -- that mirror the physiological development of organs such as the heart or those that constitute the visual system:

The capacity to deal with the number system or with abstract properties of space -- capabilities that lie at the core of what we may might call the human 'science-forming faculty' -- are no doubt unlearned in their essentials, deriving from our biological endowment.

If it is objected that contemporary neuroscience has thus far found no evidence for the presence of a 'science organ' for example, Chomsky provides an important counter-argument:

This talk of 'mental organs' should not mislead. We can discuss a physical organ -- say the visual system -- in terms of its abstract properties, knowing little about its physical realisation. Nothing more than this is implied when one speaks of the mind as a system of mental organs, or when one studies these organs and their interaction as systems of mental representation and mental computation.

It is the functioning of the organ that is worthy of study, not its 'physical' (or nonphysical, for that matter) instantiation. For Chomsky and Couliano there is a systematicity underlying cognitive phenomena and this systematicity is, in theory at least, amenable to abstract specification. In other words, 'organicity' is simply systematicity.

In support of his view of the utility of the ideal or logical object as a hermeneutical tool Couliano boldly states:

Fascination with religion derives...from the same [logical, cognitive] source, for religion, like philosophy, science, and even literature, is equally a computational process.

Here Couliano is clearly adopting a contemporary cognitivist position with more than just a little relationship to the ideas of Noam Chomsky. This cognitivist viewpoint becomes
even more apparent when he further relates what he characterises as the systemic ‘computational’ boundedness of the human mind to games. He states that ‘human beliefs and theories are related to human games’ in the manner in which they all are ‘transformations of each other.’ Here I imagine he is referring to the formal, ‘digital’ nature of many human games (recognition of which led to the invention of Von Neumann and Morgenstern’s ‘Game theory’ in the late 1940s.)

It is important to note the characteristics of such formal games. Firstly, the sort of game Couliano is referring to resembles a formal system in which tokens are moved and manipulated according to a fixed set of rules. Games such as chess, go, noughts-and-crosses and ‘Chinese-checkers’ are all examples of formal games, whereas billiards, marbles and football clearly are not. In a formal game all the tokens (button, pebble, draught etc.) have an initial position from which manipulations are carried out, these manipulations being determined by the rules of the game. The digital nature of these games is found in the necessity of notating either the changing of position of a token or the changing of its type. The token is therefore differentiable by type and position. A digital formal system must also always have a ‘positive’ outcome. In other words, it must be algorithmic -- always having a definite solution. Formal games are all finitely playable in the sense that the moves must terminate somewhere before infinity -- in practice, this can be an astronomical number of ‘moves’, yet even if they continue up to the greatest integer before infinity and terminate there, they are in principle finite.

For Couliano much of human thought possesses the same characteristics as a formal game or system: its initial conditions (or tokens) are quite simple (like the ‘light’ and ‘darkness’ opposition in dualist religious conceptions); it is subject to definable rules (it is subject to the ‘grammar of thought’ which has been with us for millennia) and all possible moves will be played out within a definite time frame, even if that time-frame appears to be astronomical. This last point needs to be underlined, for it is here again that the 4-D ideal object comes into play. An ideal object is the sum total of all possible states of play of the ‘game.’ This is what Couliano means by stating that human belief systems and theories are ‘game-like’ in their transformations of each other: these transformations are the diachronic manipulations of the tokens (simple ideas/identities) the sum-total of which reveals the synchronic ideal object. The manipulation of these initial simples (usually a binary pair) yields, over time, a certain evanescent object -- an ideal or intellectual object - - when considered in terms of four dimensions.

In terms of Couliano’s study of religious dualism in The Tree of Gnosis, a dualistic view of humanity’s place in the universe has only a certain number of possible intellectual outcomes or viewpoints, all of which may be manifested over time, yet, because of the
changing morphology of such arguments over time, they will not always be recognised as
being part of the same ‘dualism object.’ Couliano’s ideal objects are therefore like
Hinton’s spiral: the history of any set of linked ideas is really the experience of the
dynamo-morphology of a single 4th dimensional object experienced as a series of
transversal temporal sections. Just like Hinton’s 2-D inhabitant, our experience of the
ideal object is one of seeing parts of it appear, change shape and disappear over historical
time and never realising that these seemingly disparate ideas are actually just ‘cross-
sections’ of the one 4-D object.

Couliano’s conception of ideal objects is indebted to two principal influences: the concept
of morphology and Einstein’s early 20th century reconceptualisation of time and space.
The word ‘morphology’ was first coined by Goethe in his *Metamorphosis of Plants* (circa
1790). For Goethe morphology included the theory of ‘form, formation, and
transformation of organic nature.’ Goethe was in quest of what he called the *Urpfplanze,*
or archetypal plant from which all others arose. It was the poet Schiller who first pointed
out to him that what he was seeking was the ‘type’ or Platonic archetype behind plants,
and not an actual plant. One of the most fruitful and daring expositions of the Goethean
concept of morphology early this century was that of biologist D’Arcy Thompson in his
*On Growth and Form.* Influenced by advanced mathematical ideas, particularly
Riemannian geometry, D’Arcy Thompson utilised the concept of topological deformation
to describe changes in form, the morphology, of various living creatures.

**Continuity-Deformation**

While his work has been criticised for its ‘idealisation’ of certain mathematical
transformations when applied to living organisms (that is, he was charged with
attempting a revival of ‘Pythagorean’ mathematics), D’Arcy Thompson’s remarkable
images lend weight to the possibility of identifying a dynamo-morphology working
across history in regard to certain sets of related ideas. These sets of interrelated ideas are
really the result of the process of *continuous topological deformation* of a central
mythologem. This may be explained by way of analogy. Imagine an object seen through
an anamorphic lens: a familiar face for example becomes grossly distorted, perhaps
unrecognisable. Yet we know that there exists a strict correspondence between all and any
idealised points within the image and its source. Angles of incidence, the refractive index
of the lens and careful calculations of their interaction would account for the
transformation in the image -- we *know* intellectually that it is the same face, even though
we may not recognise it at first.

Similarly the method of this dissertation is the pursuit of *homeomorphisms* (‘same-
shape’) within the imagination of natural philosophy and Hermeticism. I propose that
there is a fourth dimensional continuity, a ‘shape’ to certain ideas that is manifested not only in experimental science, but in Hermetic philosophy, Gnosticism, the Kabbalah, the visual arts and even music. The working analogy is that of coordinate topology where ‘rubber-geometry’ operations are carried out on a topologically defined object. Here an object -- a sphere for example -- is imagined to be made from rubber such that it may be subjected to topological distortions of a high degree. Throughout these distortions -- called ‘deformations’ -- the ‘local neighbourhood relations’ (a section of the object defined by the set of local Cartesian coordinates) and the formal continuity of the transformed object are left unchanged. In other words, the relationships that define the object (Chomsky’s ‘abstract specifications’) are left essentially unchanged despite the ‘pressures’ of history which may ‘deform’ it.

This should in no way imply that I am careless of the differences exhibited between various formulations or sets of ideas; it is rather that I am seeking to find figural similarities that, woven together, both reveals the presence of and foregrounds the functioning of ideal objects.

Oswald Spengler
A secondary influence on this dissertation is the much neglected *The Decline of the West* by Oswald Spengler. In this work Spengler proposes the existence of what he calls *ur-symbols*. As with Couliano’s ideal objects, Spengler’s *ur-symbols* are objects around which constellate certain tendencies of thought never directly recognised, rather their presence is inferred by the recognition of similarities in patterns of thought over broadly defined eras. For his part, Spengler was never shy of making audacious statements regarding these heuristic patterns:

Who amongst present-day historians realises that between the Differential Calculus and the dynamic principle of politics in the age of Louis XIV, between the space-perspective of Western oil-painting and the conquest of space by railroad, telephone, and long-range weapon, between contrapuntal music and credit economics, there are deep uniformities? 25

It was only in the period directly succeeding the ‘gallery of monsters’ of Non-Euclidean geometry, and the popular surge of interest in the fourth dimension in the late 19th century (largely because it was thought to explain the existence of ghosts and apparitions of all sorts) that Spengler could have entertained such notions. For Spengler history was a vast transcultural web within which he sought to distinguish the morphology -- he states outright that Goethe’s theory of morphology and Nietzsche’s ‘will to power’ are his two guiding lights -- of certain patterns of consciousness, of the *ur-symbols*.

All fundamental words like our mass, substance, material, thing, body, extension (and multitudes of words of the like order in other culture-tongues)
are emblems, obligatory and determined by destiny, that out of the infinite abundance of world-possibilities evoke in the name of the individual culture those possibilities that alone are significant and therefore necessary to it... The choice of prime symbol in the moment of the Culture-soul's awakening into self-consciousness on its own soil -- a moment that for one who can read world-history thus contains something catastrophic -- decides all.\textsuperscript{27}

This 'catastrophism' is surely too extreme a view, and one that does not bear too much examination. But the idea that we may recognise certain iterative conceptions weaving throughout a great period of time is, I think, worthy of attention.

Although I do not often refer to the concept of the ursymbol in this dissertation (I prefer Couliano's more recent formulation of the ideal object), Spengler's supporting thesis that human history is amenable to organisation around particular forms of consciousness is also, I think, a useful heuristic procedure. Spengler divides human history into three categories: Classical, Magian and Faustian. Magian consciousness, for example, is contrasted with Faustian consciousness. Spengler sees the latter as being formative in the rise of modern(ist) science, the former of a worldview that encompasses both alchemy and Hermeticism.

To recapitulate:

Contemporary mathematician René Thom, in outlining the benefits of his theory of 'catastrophe modelling',\textsuperscript{28} notes that the acceptance of his methods and theory requires an unequivocal 'abandonment of a universal mechanism and Laplacian absolute determinism.'\textsuperscript{29} To underline his point he rhetorically asks, '[B]ut have these ever been anything but wishful thinking?'\textsuperscript{30} I suggest that in the late 20th century the Laplacian model of the deterministic propagation of influence throughout a system, whether one of billiard balls or individuals within a historical period, is but one of several possible models, and one moreover which may be superseded by alternative 'acausal' models, such as that suggested by the idea of ideal objects.\textsuperscript{31}

In terms of this dissertation it needs to be stressed that the notion of ideal objects is just a heuristic tool, not a strict method that I will rigidly adhere to. The thesis of this dissertation is not designed to depend on the 'scientific' legitimacy of this conceptualisation. Nonetheless the recognition of homeomorphisms in the history of ideas, while of course necessarily less exact than the demonstrations of coordinate topology, is, I suggest, a genuine extrapolation nonetheless from its intellectual forebear in 'imaginary geometry.'\textsuperscript{32}
Expanding History: Le Goff, Binary Oppositions and the Paradigm Shift

In his *The Medieval Imagination* Jacques Le Goff proposes that it would be more accurate and useful for the historian if one were to consider an extension of the Medieval period. As Le Goff himself points out, this in itself is nothing particularly new: historians have disputed the boundaries of the period ever since the term ‘Middle Ages’ was coined in 1469 by Giovanni Andrea, the Pope’s librarian, in recognition of the break between the ‘ancients’ and the ‘moderns’ of the Renaissance.

Le Goff is not particularly impressed by the concept of the Renaissance as an historically bounded, discernible era either and it is partly in an effort to ‘let the air out of the inflated concept of the Renaissance’ that he proposes that the ‘medieval period’ should be considered as beginning around the third century C.E. and continuing until the middle of the 19th century. It is only in the 19th century, he maintains, that one perceives such large-scale political and social changes (such as the Industrial Revolution, ‘mass democracy’ and the colonial dominance of Europe) as to warrant the recognition of a paradigm shift in Western consciousness. ‘Contemporary history’, he states, ‘begins in the middle of the nineteenth century.’

One of the most interesting consequences of this radical re-alignment of historical perspective is the clear implication that the Kuhnian ‘paradigm shift’ of the 17th century ‘scientific revolution’ never happened. In this view, the scientific advancement of the mechanical thesis becomes but one more stage in the gradual development of ideas already inherent in medieval intellectual culture and not a disjunctive moment that marked the birth of the modern world.

As a further consequence of Le Goff’s somewhat mannerist expansion of a period of consciousness, the putative ‘Carolingian Renaissance’ of the 8th. and 9th. centuries, the ‘Twelfth Century Renaissance’ and that of the *Quattrocento* are all subsumed into a single period of relatively continuous change, change which is nonetheless recognisable as proceeding from within a time having a recognisable ‘shape’ and characteristics. Le Goff is quite clear as to what informs these characteristics: the shape of the extended medieval period is that of a ‘dominant ideology that was neither a reflection of the material base nor an idealist motor of history but an element essential to the operation of the feudal system. This was an age dominated by Christianity...’ More particularly two powers, two polar fields of the medieval imagination dominated all ideological, social and philosophical discourse: God and Satan.

The Middle Ages, in the extended sense intended here, were a time of struggle between God and the Devil. Satan was born at the beginning of the Middle Ages and died at the end.
Le Goff suggests that this struggle between God and Satan allowed the production of certain key ideas in the history of the West, of ‘conscience’ for example. This was the product, according to Le Goff, not only of changes in religious/philosophical ideas, but also of changes in art, literature and music.

The struggle between God and the Devil, according to Le Goff, saw its final round in the 19th century. The age of the telegraph and the railway system, the steamship and international mail; the times of Faraday and Maxwell, Kropotkin and Krupp -- not to mention Karl Marx, Charles Darwin and Sigmund Freud -- all this finally allowed Nietzsche’s Zarathustra to triumphantly declare, ‘God is dead!’, and with that, it seems, the Almighty’s opponent perished as well.

As he himself makes clear, Le Goff’s formulation of the medieval mentalité revolves around a fundamental dyadic figure: God and the Devil. As a consequence, certain possibilities follow; these can be considered logical corollaries, products of this particular hermeneutical engine. They are possibilities, not necessities, but they are possibilities that are inevitably bounded by the initial conditions of Le Goff’s analysis: the dialectics of God and Satan. It is with an appreciation of these initial ‘binary’ conditions that we can discern the logical space in which the medieval mentalité would -- almost of necessity -- be played out.

I should point out that, for my purposes at least, Le Goff’s simple binary opposition is by itself inadequate to explain the complexities of his expanded medieval consciousness. Although Le Goff is clearly implying a complex of attendant ideas remarkable enough to justify the selection of these two as representative icons, investing these two personae with such an all-embracing explanatory dominion over such a long period seems unjustifiable. From the beginning through to the end of Le Goff’s medieval period mankind was always much more than the plaything of an exclusively Christian God and an equally Christian Devil: some of the medieval world’s greatest ideas were connected to the Christian weltanschauung only by the exigencies of avoiding the interest of the Inquisition. The ideal object generated by the binary figures of God and Satan should therefore be considered, I think, but one amongst several that operated within Le Goff’s medieval period.

I see clear benefits in reconsidering and reconfiguring the standard time-frame of history in the manner proposed by Le Goff, but I should point out that his ideas are by no means widely accepted by historians nor do they sit well with many medievalists. Umberto Eco, for example, divides the medieval world into two ‘quite distinct’ historical periods: one that begins with the fall of the Roman empire (Le Goff’s initial period) and ends around
1000 C.E.; another that follows the 10th. century and concludes in the ‘Age of Humanism’. Eco even goes so far as to say that the period of the ‘Dark Ages’ (that is, from the time of the barbarian invasions and the ‘fall’ of Rome until the 10th. century) ‘were a period of incredible intellectual vitality, of impassioned dialogue...a time of journeys and encounters, when Irish monks crossed Europe spreading ideas, encouraging reading...In short, this is where modern Western man came to maturity...’

This was a period of such surprising intellectual efflorescence, he maintains, that it rivals even the late medieval period. Note too that Eco places the maturation of ‘modern’ Western consciousness before the tenth century, thus ‘back-dating’ our modernity considerably compared to the estimations of most historians, and quite alarmingly compared to Le Goff’s time-table.

Yet if we provisionally grant Le Goff’s recalculations, what is it that makes his extended Middle Ages a useful device?

Just as the debate over what constitutes the cultural/historical set of signs which distinguishes the postmodern from the modern constantly seems to find traces of one still surviving -- indeed thriving -- in the other, so it is that a greatly extended view of what is basically a re-conceptualisation of Western European consciousness is useful in observing the continuity of affect of some quite ancient concepts throughout the greater part of European civilisation. As Le Goff recognises, his extended Middle Ages cannot be absolute in its origins and decline, ‘...a certain legacy of the old, a certain continuity of tradition, remained’ in the new world of the modern era, which begins for Le Goff in the 1850’s. And if this is so, then a logical corollary should also hold. Thus a certain ‘co-existence of asynchronisms’ can be recognised in the medieval period, asynchronisms which had their origins in the period immediately preceding it and which were carried through it -- constituting a thread of their own -- into Le Goff’s modern period and beyond. Doubtless these asychronic ideas/figures have their origins in the earliest communities of homo sapiens, but for the purposes of this dissertation the verification of the antiquity of such origins is unnecessary -- as the theory of ideal objects makes evident.

As mentioned at the beginning of this section, one of the most interesting aspects of Le Goff’s proposal for an extended Middle Ages is the idea that the celebrated scientific ‘paradigm shift’ of the 17th century is an illusory heuristic. In Le Goff’s reformulation, the innovations of the 17th century were really just elaborations upon, or the refining of, ideas that had been around from (quite possibly) well before the 12th century. I would unequivocally say that the scientific ideas which impinge upon my discussion all find their origins within that nexus of religious/philosophical/scientific musings that began in the ‘Alexandrian’ period. This period is rather elastic, and has much more to do with the
ascendancy of particular ideas than the political/cultural dominance of the city of Alexandria in the first few centuries of this millennium. As E. R. Dodds points out, this was an age when similar religious ideas were given parallel expression by such diverse movements as the Gnostics, Neo-Platonists, Stoics, Hermeticists, Orphics and Chaldean theurgists. Accordingly it would be better to invoke the concept of the Alexandrian mentalité, acknowledged by several authorities, to best encapsulate and locate the experimental syncretism that is so characteristic of the period. An essential key to the Alexandrian mentalité is the figure of the ‘vertical’ scheme which portrays reality as composed of successive emanations deriving from an ineffable singularity -- a variant of the idea of the panpsychic continuum. All the themes and ideal objects dealt with in this dissertation are ultimately dependant upon this vertical scheme, the reformulation of which requires my utilisation of the neologism vertigral.

In a view that I aim to endorse, Michel Serres has stated that,

I am convinced that [the history of religious conceptions] forms the deepest plate in the history of cultures. By plate I mean what earth scientists mean by the word...A plate that is deeply submerged, buried, often opaque and dark, that transforms itself with infinite slowness but which explains very well the discontinuous changes and perceptible ruptures that take place above.

The achievements of the putative paradigm shift of the 17th century are all, I maintain, the result of the insistence of certain metaphysical ideal objects, their apparent discontinuity in the history of ideas the result of the ‘infinite slowness’ with which our perception of the overall Gestalten of such ideal objects is burdened. Along with Serres, I am convinced that, if one is to give credence to the concept of certain figures informing human thought at all, one will find their first manifestations in societies the weltausschauung of which will be shaped initially and predominantly by religious/metaphysical ideas -- here the assessment of both Serres and Le Goff (with his God and the Devil opposition) regarding the significance and longevity of the religious impulse in Western history find complete accord.

**Hermeticism and the Postmodern**

Somewhat resembling the method of Le Goff, this dissertation exploits the possibilities inherent in the adoption of a new ‘way of looking’ rather than concentrating on the single-minded pursuit of any one particular intellectual quarry. The new perspective provided by the transhistorical concept of ideal objects entails a parallel pursuit of the transdisciplinary method. The ‘objects of analysis’ of this transdisciplinarity -- the Gnostic spark, the subtle body and the anima mundi -- are key aspects of what may be called the shared ‘metaphysical imaginary’ that subtends both Hermetic physics and natural philosophy. Yet this dissertation is not an attempt to somehow resurrect what is often regarded (quite unjustifiably) as the derelict reputation of metaphysics, but rather an attempt to unveil the
peculiar resiliency of certain figures and images that inform my chosen fields of speculation (this resiliency of certain figures is, I suggest, an indication in itself of the insistence of ideal objects). Furthermore I have attempted to situate the ideas and figures examined within a transhistorical, dialectical field which, I hope, both illustrates the utility of the concept of ideal objects and demonstrates the strengths of exploring such a heuristic of displacement in terms of a postmodern re-examination of the natural sciences in the late 20th century.

In his *Cosmopolis: The Hidden Agenda of Modernity*, Stephen Toulmin suggests that following the ‘destructive work’ of philosophers such as Dewey, Heidegger, Wittgenstein and Rorty, philosophy is faced with three options. It can, for instance, continue to follow the increasingly discredited research programme of pure theory, that is, the trajectory of modern European philosophy; or it can look for less theoretical ways of working that might produce new tools for philosophy (by which he means an amplification of Wittgenstein’s conception of philosophy as method rather than system); or

it can return to its pre-17th century traditions, and try to recover the lost (‘pre-modern’) topics that were sidetracked by Descartes, but can be usefully taken up for the future.\(^{46}\)

Toulmin’s call for a grand re-orientation of philosophy is perhaps rather presumptuous, and his summary dismissal of many of the aims and aspirations of the philosophy/science of modernity rather reckless (not to mention that his call to re-write the future history of science/philosophy mirrors in its chauvinism the very project he wants to criticise and replace), but it does provide at least a reasonable account of why a new approach to the natural sciences is necessary. Toulmin’s solution to the perceived crisis is to suggest a return to the methods and outlook of pre-modern thinkers like Montaigne. This latter represents for Toulmin the sort of thinker who was more sensitive to the circumstantial nature of individual issues, and much less concerned with a project that sought to discover the measure of absolute truth by which any and all problems could be gauged -- modern(ist) science, in other words.

Accepting the fact that late Renaissance thinkers seem more concerned with practical and ethical issues than their future modernist counterparts, for some reason Toulmin neglects to consider alternative pre-modern views also offered by late Renaissance thinkers. He mentions the influential theoretical speculations of a revived Neo-Platonism and its practical offshoot, natural magic. He notes too that thinkers never lost sight of a ‘taste for the variety of concrete experience, [and] for empirical studies of natural phenomena’ that accompanied this revival.\(^{47}\) Yet he does not seem to consider that the Renaissance taste for Neo-Platonic and Hermetic speculation is another possible source for his critique of
modern(ist) science. Rather than reclaiming the abandoned field of the Renaissance rhetorical tradition, this dissertation endeavours to explore the alternate possibilities suggested by the Hermetic project.

Yates and Kuhn
When Thomas Kuhn published his *The Structure of Scientific Revolutions* in 1962 it caused an immediate simultaneous eruption of protests and accolades in the scientific community and the community of historians/philosophers of science. Only a few years later on the other side of the world, another text would have equally as important an impact, yet would receive proportionately less acclamation and critical response: Frances Yates’ paper *The Hermetic Tradition in Renaissance Science*. Both works presented a radically different analysis of the modern scientific project from the standard analyses that had preceded them. From the point of view of this dissertation, there are also some interesting similarities between what would at first glance appear to be two quite distinct achievements.

One of Kuhn’s most insightful conclusions is that ‘normal science’ is predicated on a community with shared beliefs (his famous paradigms). One of the consequences of this is that the previously accepted narrative of the history of science -- that it consists of brilliant intellects who heroically struggled against the ignorance of their contemporaries, finally triumphing in such a way as to totally shift prevailing models and perceptions of the workings of the universe -- is really somewhat of a mythic construction. Kuhn’s analysis suggests that contrary to the heroic/individualistic myth, the history of working scientists reveals profoundly conservative behaviour rather than an environment conducive to, and encouraging of, innovation. He also found that despite working scientists (pursuing ‘normal science’) professing adherence to a strict order of experiment and induction, this was hardly ever the case. In short, following Kuhn and in support of Toulmin’s case, we may say that the scientific endeavour is as riddled with ideologically perpetuated exigencies as any other human project.

Frances Yates’ paper proposed that the Hermetic philosophers, usually thought of as being peripheral, pre-scientific thinkers, or at the most generous, negligible proto-scientific thinkers, were in fact the bridge that connected the pre-modern and modern conceptions of science. These thinkers stood, as it were, at the ‘catastrophe cusp’ that allows scholars to divide the history of thought into two neat narratives: post- and pre- the pivotal ‘scientific revolution’ of the 17th century. She demonstrated that were it not for the continuing influence of certain ideas of the Hermetic philosophy, many of the research projects subsequently pursued by modern(ist) science may never have begun or have yielded such rich results. In a series of books she continued to elaborate this central
thesis, much to the consternation of many historians of science who preferred to see a clear, qualitative distinction between a ‘scientific’ mentalité and what they still saw as the hopelessly mystical consciousness of the Hermeticists.

The similarity between Yates and Kuhn’s theses is that both share the view that the scientific project is profoundly conservative: old ideas die hard, as the saying goes. If we accept this characterisation, it is comparatively easy to see the scientists of the 17th century as being individuals whose mental outlook was still dominated by antique ideas and modes of conceptualisation. It is possible, therefore, to reconceptualise the new ideas of the mechanical philosophy as essentially old ideas in new guises. In other words, a number of intellectual objects were subject to morphological deformation yet the deep grammar (in Chomsky’s sense of a determinative structure) remained essentially the same.

The contemporary scholar of esotericism Antoine Faivre considers modernism and its attendant ideology as a form of ‘distorted esotericism.’ The sense of this assessment suggests a sort of continuity obtaining between the more outré ideas of the pre-scientific era and our own times, even if this continuity constitutes a distortion of the original ideas. If I invoke my previous analogy of an image anamorphically distorted by a lens and align it with Faivre’s thesis, he seems to be suggesting that if we were able to avail ourselves of the correct ‘refractive index’ we might recognise the original within the present deformation. Therefore rather than seeing Hermetic philosophy as constituting a bridge between two distinct worlds (the prescientific and scientific worlds) as Yates is inclined to do, a bridge moreover which was subsequently dismantled and abandoned, the notion of ideal objects inclines me to the view that certain Hermetic figures were never jettisoned from the scientific project -- they were in fact the spine of many of its idealisations, suffering merely a contemporary anamorphosis -- and furthermore, are still with us. If Faivre is correct in his assumption that modernism is an anamorphically disfigured esotericism, then it behoves us to enquire what a less distorted esotericism could mean for a postmodern re-assessment of natural philosophy. If we can grant that an important consequence of the ‘postmodern condition’ is the recognition of the plurality of knowledge practices, then it is evident that the Hermetic tradition is a little tapped resource which might provide material for further elaboration after the manner suggested by Toulmin.

In a more positive assessment of the scholarly return to an examination of abandoned worldviews, Faivre has recently stated:

[There] is an intense curiosity -- which is part of our postmodernity -- about all possible domains of knowledge in the past of mankind. It’s also linked
to...the failure of ideologies, the failure of modernity, in the sense that modernity can be defined partly in terms of ideologies....And scholars in these fields [of spiritual research] tend to be interested in fields like Western esotericism, because they are not something vague...but constitute a specific field with a specific referential corpus. 49

It is worthwhile, I think, to briefly contrast this attitude with that found in a well known essay by Umberto Eco, ‘The Return of the Middle Ages.’ In this essay Eco attempts to define ‘Ten Little Middle Ages’ with which modern historians and cultural theorists seem to be concerned: the Middle Ages as pretext (where various artistic works use the ‘Medieval period’ as a fanciful background, but do nothing to help one understand the period); as ironical revisitation ‘in order to speculate about our infancy’ (Ariosto, Cervantes and Monty Python are given as examples); as a barbaric age (Wagner, Ingmar Bergman, ‘Sword and Sorcery’ novels and comic books); as one of the obsessions of Romanticism (Walpole’s Vathek, Lucas’ Star Wars trilogy of films); the time of the philosophia perennis ([T]here is a lot of hidden medievalism in some speculative and systematic approaches of our time, such as structuralism); as national identities, Decadentism, philological reconstruction, expectation of the Millennium and lastly, as Tradition. It is this last category which Eco spends most time in debunking.

Eco’s ‘Tradition’ is that of la pensée sapientielle, or occult philosophy; a ‘rather ramshackle structure, swarming with Knights Templars, Rosicrucians, alchemists, Masonic initiates, neo-Kabbalists....Anti-scientific by definition, these Middle Ages keep going under the banner of the mystical weddings of the micro- with the macrocosm...’ 52

Yet it is precisely Eco’s contention that occult philosophy (the product of fanciful modern characterisations or otherwise) is ‘anti-scientific by definition’ that needs to be contested, for it is an unfortunate cliche of modern scholarship.

I would counter that the occult/Hermetic tradition precisely parallels the scientific tradition. By this one does not mean that the parallel path constitutes a series of exact, point-for-point isomorphic relations, rather that one can observe a sort of osmosis of ideas, figures and structures that cross-inform theorists following the two paths. Furthermore, the differences between the philosophia perennis and the (occult/Hermetic) Tradition are certainly not as clear as Eco would have us believe: his different categories are utilitarian, academic conventions rather than absolutes.54

Eco’s dismissive phrase ‘mystical weddings of the micro- with the macrocosm’ is representative of his oddly unscholarly attitude in this area, an attitude that would seem to dismiss the study of one of the most enduring constructions within the Hermetic imaginary. The idea of the microcosmic/macrocosmic relationship is one of the key
figures of the Western Hermetic tradition, a figure closely aligned with the Scholastic
invention, first attributed to St. Augustine,\textsuperscript{55} *omnes in omnibus* (‘all in everything.’)\textsuperscript{56} Almost certainly derived from earlier sources, this figure is one of the most productive
themes of the Western mystical tradition, concerned as it is with ‘the unity of time and
eternity, of the finite and the infinite, of the visible and the invisible, or of the divine one
and the created many, centred in a plurality of self-knowing individuals.’ The all-in-
everything model is still very much alive in today’s scientific debates: fractal algorithms,
generators of perhaps the most startling iconic representations of *omnes in omnibus*,
produce everything from topologies for use in weather forecasting to vertiginous images
printed on t-shirts. It is also a model which, I suggest, could be relatively easily
reformulated (with the aid of fractal mathematical theory) as a useful model within the on-
going debate as to the orientation and responsibilities of a postmodern scientific culture.

*Contra* Eco, Faivre suggests that rather than a ‘ramshackle’, cobbled together pseudo-
discipline, esoteric studies can constitute a rigorous area of scholarship, with an
established canon of texts and methods of research. Importantly, Faivre suggests that
these research methods should reflect the current trend towards interdisciplinarity in the
human sciences. Eco’s derisive characterisation of Hermetic/occult studies as the pursuit
of ‘intemporal ecstasies’ (his hypostatisation of the modernist, progressivist conception
of history is at its most extreme here) seems to me to be a particularly *good* reason to
pursue them, and I would suggest that it is precisely this spirit that animated the work of
two scholars whom Eco sees as purveyors of illusory Middle Ages, Henri Corbin and
Gilbert Durand.

While Faivre is quite right in stating that the discipline of Hermetic studies certainly has a
recognised corpus of texts, I would like to employ a slightly more elastic sense of this
field of study than he is proposing. As an introduction to its characteristic worldview, the
Hermetic outlook contrasted with that of the ‘new philosophy’ of modern science may be
concisely defined in this manner:

The separateness implicit in dualistic explanations of relationships conduces to
an essentialistic interpretation of the world, a world of ‘things’ characterised
by discreteness, finality, closedness, determinateness, independence, a world
in which one thing is related to the ‘other’ extrinsically. By contrast, a polar
explanation of relationships gives rise to a holographic interpretation of the
world, a world of ‘foci’ characterised by interconnectedness, interdependence, openness, mutuality, indeterminateness, complementarity,
correlativity, coextensiveness, a world in which continuous foci are
intrinsically related to each other.\textsuperscript{57}
The two authors of this passage were in fact attempting to describe the worldview of Daoism, not Hermeticism, but there is clearly a considerable correspondence between their description and the Hermetic worldview, a correspondence which the verigralist hermeneutic makes clear. The ‘polar explanation’ of relationships referred to above is of course that of the Yin/Yang polarities inherent in the Daoist philosophy of the Taiji, yet if we substitute ‘micro/macrocospic couplet’ for the polar relation, or nous/mens, the passage becomes a succinct introduction to Hermetic theory. It is the ‘open’ and intercausal net of relationships that Hermeticism develops that, in my view, makes it an obvious contender in the explication of postmodern theories of a future science. More particularly it is my hypothesis that the Hermetic worldview conceptualises the Real as being a communicative economy. When this interpretation of Hermeticism is entertained, a number of interesting reconceptualisations of contemporary scientific ideas are made possible.

In terms of this dissertation Hermeticism includes not only the texts of the Hermetica themselves, but the entire attendant literature that was produced by the intense study of Hermetic conceptions from the Renaissance onwards. This conception of Hermeticism is modelled after the sense employed by the Hermetic scholar Julius Evola.\textsuperscript{58} Evola saw the alchemical project and the ancient Hermetic philosophy as modal expressions of the one Tradition, the aforementioned \textit{la pensée sapientielle}. Whether the idea of a secret, continuous Tradition has any validity is of no particular interest to me, but it is quite evident that the historical manifestations of both alchemy and Hermeticism in the 16th and 17th centuries do share similar concepts, worldviews and figures. These are enough, I believe, to justify entertaining the idea that they are intertwined pursuits, resembling perhaps the twin strands of helical DNA: the one (Hermetic philosophy) being the philosophical rationale, the theory, behind the practical expressions of the other (alchemy.)

Furthermore I am reluctant to prematurely restrict the undeniable resonance of the word ‘hermetic’ itself, invoking, as it does, metonymic associations such as ‘secret’, ‘chemical’, ‘seal’, ‘hidden’ etc. This is not deliberate obfuscation, but rather a strategy ever open to the possibilities implied within the Hermetic imaginary.

\textbf{A Postmodern Science}

It was René Descartes who formulated the decisive intellectual orientation for what would become the science of the modern era. It is his primary distinctions which made it possible for anyone -- including Eco over three centuries later -- to distinguish between the ‘scientific viewpoint’ and the ‘pre-scientific.’ Descartes’ intellectual coup was of two parts. The first was the product of an evening reverie: his dream that mathematics was the ‘mother of all the sciences.’ He thus re-instated a project that had been left virtually unattended since the time of Nicholas of Cusa, and it was a dream which would have
such a large influence on the subsequent history of science that it is difficult to underestimate its prescience. The second coup was the result of the project of radical scepticism recounted in his *Meditations*, that series of deductions which finally allowed him to declare *cogito ergo sum*. That which Barfield ironically calls the 'prolonged historical event' of the scientific revolution was galvanised into being in this putative moment of insight. Most significantly, despite -- or perhaps because of -- Descartes' emphasis on the role of the distinguishing intellect (*res cogitans*), its structural opposite (*res extensa*), found a new exactitude of definition, a definition which had heretofore been quite problematical. As Barfield succinctly notes:

The word 'matter' came to signify, in effect, that which the senses can, or could, perceive without help from the mind, or from any other source not itself perceptible by the senses. While the above definition does not admit of the considerable debt to Neo-Platonic rationalism still inherent in Descartes' formulation of *res extensa*, it is nonetheless clear that Descartes, with one cut of the 'Cartesian guillotine' (to use Barfield's expressive metaphor), attempted to settle once and for all a question that had begun with Plato (at least for Western Europe) and fell into neglect after Leibniz' times: to what extent could one ascribe a *rational* component to matter? For Descartes the answer was clearly that there was none. Thus a stream of thought that found perhaps its fullest expression in the work of Giordano Bruno (who held that the perceptible world and the imperceptible spirit were inextricably mixed), was seemingly 'nipped in the bud' and the history of science can be written with this incontrovertible reference point to guide us -- or so most historians of science would have us believe. This assessment is rather premature, and wilfully ignores the considerable debt the developing scientific *mentalité* owes to microcosmic figuration. Yet if one still clings to the standard account of scientific history it is quite easy, as Eco does, to characterise the Hermetic/occult tradition as anti-scientific: any variation of the Cartesian orthodoxy is by very definition anti-scientific and heretical. This becomes a comparatively trivial observation, and one which is easily dismissed, when one considers the potentially rich field of ideas suggested by a recontextualisation of Hermetic studies within the postmodern debate.

What, then, would be the characteristics of a postmodern science? As the complete determination of such a future science is beyond the bounds of this -- or any! -- dissertation, I have limited myself to the simple question of how certain aspects of Hermeticism may be seen to present the original or alternative conceptual models in certain areas of research. Nonetheless, a couple of key suggestions form the basis of the ideas I will be pursuing in this work.
Firstly a postmodern science would seek to actively reject that which Michel Serres has called the *command/obedience couplet*. First succinctly expressed by Francis Bacon, the couplet codifies the seemingly paradoxical assertion that the natural philosopher should both obey the (soon to be explicitly formulated) ‘laws of nature’ while simultaneously advising him to follow the exhortation in *Genesis* that humankind is to exercise its lordship over all of nature (through the utilisation of these same laws). This last injunction was also one of the main ideas expressed in the Hermetic *Asclepius*, the principal text by which Hermeticism was known and understood throughout the Middle Ages up until Ficino’s translations of further texts of the *Corpus Hermeticum* in the early 14th century. In the early 17th century therefore natural philosophers were already armed with ample ‘divine’ support for a programme which would eventually reveal itself as the ideology behind the actual and potential ecological crises of the late 20th century. A postmodern reassessment of this programme would embrace the examinations of the ideological underpinnings of scientific practice such as those suggested by Toulmin, Habermas, Feyerabend etc., as well as attempt to provide alternative models drawn from a wider field of knowledges -- the Hermetic tradition being one of these.

The immediate logical corollary of the above would be a concomitant rejection of the aforementioned Cartesian mind/body dichotomy. There is little doubt that the division of the world into one of cognising (human) subjects over against inanimate objects, processes and mechanics has been of great aid in the ideological triumph of modernist science -- and the vitiated benefits of instrumental reason need no reiteration by myself. Such an opposition would be replaced by a more rigorous research project that might address the ‘interzone’ between these two simplistic idealisations: such a realm is beginning to be explored in cybernetic and communications theory, for example. These latter would also benefit from a greater familiarity with the outlook explored in the Hermetic tradition. All of these re-orientations should provoke, one would hope, a consequent change in the value-belief system of scientific culture.

Theoretical physicist David Bohm in his *Wholeness and the Implicate Order* suggests that a new scientific worldview may be accomplished by recognising that,

...the proper order of the operation of the mind requires an overall grasp of what is generally known, not only in formal, logical, mathematical terms, but also intuitively, in images, feelings, poetic usage of language, etc....This kind of overall way of thinking is not only a fertile source of new theoretical ideas: it is needed for the human mind to function in a generally harmonious way, which could in turn help to make possible an orderly and stable society...this requires a continual flow and development of our general notions of reality.\(^{61}\)
Unbeknownst to Bohm, the re-oriented worldview he seeks already exists: in their essentials Bohm's hopes reflect the fundamental notions encapsulated in Hermeticism. Not insignificantly, Bohm's call for the future inclusion within scientific discourse of modalities distinct from the formal and logical is an attempt at reparation for the removal of these forms of expression very early in the development of the scientific project. Is often said that the prohibition against literary and/or metaphorical expression is that which characterises the divide between Hermeticism and the development of the 'new philosophy.' Fundamental to the development of the Royal Society was a call for a form of language which would signal a break with that which had characterised natural philosophy before it. As Nicholson has noted, this took the form of manner of writing which rejected poetic and overly figurative phraseology in its description of scientific investigations.\textsuperscript{52} Bohm's suggestion that this constitutes an illegitimate limitation on the activities of scientific cognising is a suggestion aligned with my own. The holistic manner of Hermetic thinking can possibly provide an antidote to several under-theorised aspects of current science.

**Figuration and the Imaginary**

In attempting to delineate what one could possibly mean by a history of the imagination, Le Goff suggests that, 'the history of the imagination has its own primary sources, and these quite naturally are the products of the imagination: literary and artistic works.'\textsuperscript{53} He further observes that, among other things, the imagination is 'a matter of images, this being one of the things that distinguishes the imagination from representation and ideology', adding that both the latter are 'often purely intellectual.'\textsuperscript{54} This last observation is symptomatic of the uncritical manner in which many thinkers view the functioning of the intellect, obscuring the fact that the 'intellect' itself has a long history, in which its functioning is itself subject to the exigencies of a changing imaginary.

Le Goff's definition of primary sources for a history of the imagination is for my purposes clearly inadequate and, I would suggest, approaches the arbitrary. One is entitled to ask, why not works of the scientific or the political imagination? Surely images, figures and metaphor are substantial elements here as well. In speaking of the imagination therefore we should acknowledge its formative function in nearly all forms of discourse.

There are two questions attendant to my investigation of key aspects of the imaginary of Hermeticism:

[a] **What distinguishes the 'imagination' from an 'imaginary'?**

That which distinguishes a particular 'imaginary' from imagination in general is the acceptance of a simple abstract specification of the 'set' of objects that might constitute a
particular imaginary. In a similar manner to that in which a mathematical set of objects \{1,2,3,5,8,13,\ldots\} may also be specified by the operations that might define its objects (addition of the previous prime [the Fibonacci series]), my definition of the set of an imaginary includes not only those objects which anybody would immediately recognize as an ‘image’ or figure but also those *operations* of the imagination that manipulate the relationships obtaining between them. I realize that the enfoldings of these two ways of specifying a set within the idea of the set itself might provoke surprise from a mathematician, but as stressed earlier, I am not aiming for mathematical precision. The operations found within the set of an imaginary are the activities of what in Renaissance times was privileged as the *vis imaginativa*, the ‘power’ (*vis*) of the human creative function to recall and manipulate representations. Therefore when I speak of an imaginary I not only intend the set of images, for example, constituting the ‘imaginary of the machine’, but also the operations of the imagination that are associated with, and are generated by, that particular set of images. In other words I want to include the attendant set of cognitive practices that are associated with and support a particular imaginary. An imaginary is therefore constituted of (a) images and figures and (b) the complex of ideas they represent and that qualifies them as belonging within any particular imaginary. Two examples might suffice to demonstrate these distinctions.

Le Goff would no doubt consider the empiricist psychological theory known as ‘associationism’ to be ‘purely intellectual’ and therefore unconnected with a history of the imagination. Yet associationism is derived from a theory that presents spatial relationship (particularly contiguity) as the dynamic behind its descriptions of mental activity. It presupposes an imaginary ‘interior theatre’ wherein objects are observed to be ‘placed’ in contiguous relationship with each other. Thinking is therefore akin to stage-managing this interior theatre, following the promptings provided by nature. This is clearly an imagistic, figurative conception without recourse to which associationism would have failed to possess explanatory force. This imagery provokes ideas such as binary pairing, ‘correspondence theories’ of cognition and the essentially atomistic nature of things in the world.

The contemporary physical concept of a ‘sub-atomic particle’ is also clearly constituted in terms of an imagistic figure. Subsumed within this portmanteau of contemporary physical theory we see quite clearly not only the idea of the ‘classical limit’ as some sort of threshold -- replete with all its attendant imagery of stepping off the threshold of a secure domain to plunge into the ‘unknown’ (i.e. Heisenberg’s ‘Uncertainty Principle’ or Bohr’s ‘Copenhagen Interpretation’ in relation to quantum phenomena) -- but an imagistic economy that includes fragments, points, wholes and ‘molecular’ structures imagined as akin to tiny solar systems. Certainly this economy includes some very rarefied images.

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(points, 'lines of force', vectors etc.), but this in no way lessens the imagistic nature of such conceptualisations. The ideas attendant to this way of picturing the atom, that follow from this figure, include the notions of mechanical, gravitational 'attractive forces' operating within the mini-solar system, activity imagined as a series of collisions and linear non-reversible time. These images and these ideas are all included in the 'imaginary of the atom.'

[b] What is a ‘figure or ‘figuration’?’
In simple terms, a figure (or figuration) is a particular recurrent manner of organising information. A musical figure, for example, is a theme or motif which is subject to various transformations. In Western music one is able to follow this figure as one ‘follows a figure in a drama’; the figure and its various transformations in time comprise an abstract imaginative entity. It is this abstract quality that delineates a figure and which allows it to embrace both an image constructed by a text (Homer's 'wine-dark sea', Eliot's 'still point of the turning world' for example) and images drawn, painted or otherwise inscribed.

Furthermore certain key figures are capable of being held in the 'mind's eye' as a kind of organising heuristic over various discourses. This notion has a venerable history. Marsilio Ficino himself regarded the pursuit of philosophy as being an initiatory process whereby one was granted the knowledge of certain figurae.

These figurae, characters of an inner phantasmagoria staged by the soul itself, represent the modality by means of which the vision of the soul opens before the oculus spiritalis.66

Boehme too thought that all exterior form, all manifestations of the phenomenal world, were a form of language or Figur presented for the 'interior eye.' Of course the figurae of Ficino and Boehme were much more involved (akin to hieroglyphs) than those figures I will be examining, but the mechanics of the notion is there.

An imaginary is primarily an archive of figurations. But where specifically are these archives of figurations? Principally they are found within texts -- an image here, a turn of phrase there -- but they are not only found in texts. Painting, sculpture and even music of a given period will demonstrate the coherence of a particular imaginary. A simple example is that of 'harmony.' We find for instance that the Renaissance artist Piero della Francesca derived many of his compositions from the arrangement of abstract geometric figures, these arrangements supposedly providing a harmonious composition. These were not any arbitrary set of figures however. Nearly all of his compositions demonstrate a strong familiarity with Neo-Platonic figures and symbols. This same imaginary of harmonia provided Boethius with his analysis of music, there being a geometric relationship
between consonant notes in a musical scale. Robert Fludd constantly returned to the utilisation of the figure of interpenetrating triangles as symbols of the microcosmic/macrocosmic relationship just as did Piero della Francesca before him. There is a particular ‘weight’ to this symbol of the triangle (even today every child learns about ‘Pythagoras’ theorem’ in school): it directly points to the mythical origin of these ideas (with Pythagoras), and moreover suggests the persistence of a particularly pervasive ‘Pythagorean imaginary.’

This brings me to my last qualification. The boundaries of the set of objects constituting a particular imaginary are not so easy to delimit. The Pythagorean imaginary includes not only those ideas/figures attributed to Pythagoras himself, but also those ideas/figures that these ideas/figures generated -- Neo-Pythagorean ideas, for example. Now if one were pursuing the specifics of a Pythagorean imaginary one might be expected to make a clear distinction between the Pythagorean and the Neo-Pythagorean imaginary, and perhaps rightly so. I am not, however, attempting such a task in this dissertation. By this I mean that the set of an imaginary is really a set of densely interconnected figures, and these interconnections enter into contact with the members of other imaginaries. This is only to be expected if we are to give the imaginative faculty any sort of formative role over diverse discourses.

In the following chapters I will be examining several interconnected imaginaries: that of the machine; of the subtle, sidereal body; of the anima mundi and of the Gnostic spark (‘alien light.’) The interconnections between these different imaginaries (or indeed other imaginaries) may perhaps be pictured in this manner:

![Diagram of interconnections between different imaginaries]

The idea that the imaginary of the machine intersects with the panpsychic imaginary or that of the anima mundi (this intersection is not pictured in the diagram) -- something
which is not immediately, intuitively obvious -- is the central thesis explored in Chapter I, for example. Likewise the various intersecting imaginaries schematised above are pursued in extended fashion in subsequent chapters.

As a consequence of the difficulty in exactly defining the borders of any particular imaginary, it is not possible to delineate the borders of 17th century natural science, or its attendant sub-disciplines such as optics or mechanics, in quite the same way in which we might define the various disciplines pursued in contemporary science. This is for the simple reason that the borders were in the process of forming: no-one in the 17th century imagined that natural philosophy would eventually become a system of specialised disciplines. Today the borders between high-energy particle physics and hydrodynamics are reasonably clear -- we just have to walk down a university corridor and observe the signs on the doors to know how delimited these fields of study are today. In Newton’s era, optics and what we would now call the science of perception were inextricably linked. More than that, perception, the properties of lenses and the propagation of light were part of a greater ‘metaphysics of light’ that had grown from ancient times up until that of Newton. As a consequence of this non-specialisation within natural philosophy the elasticity of the imaginary of 17th century optics, for example, demonstrates a far greater degree of amplitude than would that of today’s optics.

W. G. Leibniz, Robert Fludd and The Metaphysics of Light

Under the influence of Ernst Mach, Pierre Duhem and others convinced of the necessity of ridding science of the last vestiges of metaphysical inclinations, modernist science, since the late 19th century, has persisted in the dream that its goals can be effectively pursued through the process of amassing statistical correlations between phenomena, with the advancing of hypotheses concerning the causes behind these phenomena constituting unwarranted metaphysical speculation. In fact, from the late 17th century onwards, most scientists and philosophers regarded the search for causes as unconscionably ‘Aristotelian.’ Even today it is proposed (by A. N. Whitehead for example\textsuperscript{68}) that it was the long influence of Scholastic Aristotelianism that was responsible for the slow progress of the physical sciences before the signal scientific achievements of Copernicus, Galileo and Newton achieved the final liberating rupture with the past.

Yet the ‘moment’ of the rejection of metaphysical speculation in which modernist science was born never really happened. Even Newton’s famous rejection (non fingo) of hypotheses was immediately (and controversially) contradicted by his speculations on the ‘sensorium’ of God in the very same \textit{General Scholium} of his \textit{Principia}. The corpuscularianism which has guided the physical sciences since the 17th century is also
quite clearly a metaphysical assumption -- and, more importantly perhaps, remains so to this day. The positivist programme, most radically represented by the eliminativist Mach who believed that all talk of ‘atoms’, ‘forces’, ‘causes’ etc. were extraneous fictions requiring excision from the scientific project, has quite clearly failed to achieve its eliminativist goals.

Rather than rejecting the metaphysical assumptions of the scientific project, I think we must both accept their persistence and re-investigate these assumptions. A possible method is the examination of the figurations that transgress the borderland dividing modern(ist) science and the Hermetic worldview. One of the richest resources for such an inquiry, and one which clearly reveals that which was lost and that which was retained of Hermetic metaphysical figuration, can be found in the work of Gottfried Wilhelm Leibniz. Rather ironically, given the foregoing considerations, Leibniz was one of the thinkers from whom the future Logical Positivists would draw their ideas. The Leibniz I shall be describing however is a figure with whom the Logical Positivist programme would find very little in common; would, in fact, find hard to recognise as even the same man. Yet he is the same man who inspired Bertrand Russell in his pursuit of Logical Atomism, and through Russell significantly influenced Wittgenstein in the composition of his *Tractatus Logico-Philosophicus*. What makes Leibniz so important in terms of this dissertation is his strong connection with the more *outré* aspects of his contemporary culture.

After the work of Yates and others, it should no longer seem inherently implausible that Leibniz would be involved in a stream of thought (the Hermetic tradition) that was so important in the development of the ‘new philosophy’ of the 17th century. It is the unpredictable extent to which he absorbed, modified and consolidated certain key aspects of Hermetic thought that is of intrinsic interest and importance in explicating the central thesis of this dissertation.

Leibniz stands, as it were, on the cusp of the shift that saw the final rejection of Scholastic speculation and the development of the new systematic philosophies of Descartes, Locke, and Kant. Yet while living and participating in the development of this new philosophy, he was simultaneously involved in the development of a metaphysical system that demonstrates strong homeomorphic resonances with that of Hermeticism. More importantly, he significantly extended the import of the philosophy of Hermeticism such that we may recognise the insertion into scientific discourse of formative ‘Alexandrian’ figures that have continued to operate within modern(ist) science. Specifically these figures are found in the heretical Jewish mystical system known as the Kabbalah, a system which was to have a very strong influence on the development of Hermetic philosophy in Europe.
The influence of the Kabbalah on Leibniz, while still controversial, has long been acknowledged. It is the *extent* of its influence that is still a point of debate. As a general outcome of this debate, most scholars seem to agree that the influence of the Kabbalah on Leibniz is certainly demonstrable, but of quite minor import in the long run. In other words, the genius of Leibniz’s monadological system (that is, his struggles within the realm of ‘pure thought’) overshadows and outruns whatever possible influence there could have been between the heretical Jewish mystical tradition and the all-embracing metaphysics of the *Monadology*.

I consider this scholarly consensus to be temperate at best, the inevitable result of the scholarly paradigm of trying to find direct links or influences on Leibniz’s work of Jewish mystical ideas. The concepts of ideal objects and vertigality on the other hand allows one to view Leibniz’s work as a ‘moment of density’ in which figures associated with each of these traditions were inserted into the discursive network represented by his friends, associates and the developing new philosophy. I am not attempting to unequivocally ‘prove’ the direct influence of Kabbalistic or other esoteric ideas on the mature philosophy of Leibniz, rather I am attempting to examine the ‘state of health’ of Hermetic formulations -- as facets of certain ideal objects -- in both Leibniz’s work and, as a consequence of this, particular 20th century scientific ideas.

Thinkers from Kant to Russell have all been careful to note the oddness of Leibniz’s monadological philosophy, of its strange figures in terms of the ideas current in Leibniz’s time. The strangeness of the *Monadology* derives, I would say, from the fact that it enfolded into European speculative philosophy a large number of concepts and figures found in the ‘orient’: Kabbalistic and Chinese cosmological ideas that were little known and even less discussed in the larger intellectual community. As few of these concepts are explicitly acknowledged in his work, and are in fact subject to considerable re-configuration, one can say that it is the nature of this ‘genetic drift’ that gives the *Monadology* its peculiar quality. And it is this quality of *drift* which allows the debate on the extent of the influence of Kabbalistic and Chinese philosophical ideas on Leibniz’s monadic philosophy to continue. If the ideas and figures were clearly discernible, there would be no cause for debate: they could easily be determined, numbered even. Yet this is certainly not the case. The very nature of drift suggests that these figures and concepts are subject to transformations, yet transformations which are not so great as to prevent the apprehension of the ‘originals’, so to speak. It would therefore not be going too far to describe the trajectory of these transformations as a *morphology*, and it will be the subject of the final chapter of this dissertation to examine this morphology and its significance.
The alchemist and Paracelsian doctor Robert Fludd is at the opposite extreme to Leibniz in terms of his place in the procession of great natural philosophers. Yet it is precisely in an effort to re-evaluate this *excentric* location that I chose to examine aspects of his work. It is possible to re-evaluate the entire alchemical project not only in soteriological terms (as has become ‘standard practice’ especially following the work of Carl Jung), but also in terms of a re-examination of the role of ‘experience’ in the experimental method itself. I hope to demonstrate the wider significance of the alchemist’s search for the *logos*-pattern revealed in Fludd’s experimental work. I think that a re-evaluation of the experiential/experimental method as utilised by Fludd suggests a set of problematics which may prove useful in the development of a postmodern scientific methodology -- a new epistemological orientation, in other words.

The concept of ideal objects implies that a non-linear approach to the history of ideas is possible. By this I mean that inhering within the various historical manifestations of the object (its ‘cross-sections’ appearing at any given historical moment), the 4-D entirety of the object can be conjectured to be always already present. The logical space represented by the ideal object is not restricted by the ‘arrow of time.’ At certain historical ‘moments’ the variables, perhaps imagined as the Cartesian interstices in a topological space, through lawful morphological deformations, fall closer together, become more densely aggregated -- when this occurs we tend to perceive the outlines of the object more clearly. The ideas within the work of Fludd and Leibniz represent two such moments of density and are an appropriate focus for the conclusion of this work.

1 Couliano (1987), xix.
3 Couliano (1987), 23.
4 Poincare quoted in Meyerson, 248.
5 Meyerson, 248.
6 Hinton, 125.
7 That is, if it were possible to abstract my hand from the continuity of my arm.
8 Stewart, 22.
9 Stewart, 23.
10 Couliano (1992), 7.
11 Couliano (1992), 195.
12 Couliano (1992), 195.
13 The product of infinite recursion.
16 Intending, no doubt, to align his ideas with those discussed within contemporary ‘cognitive science’ which draws heavily upon the ‘computational mind’ model.
17 Couliano (1992), 2.
18 The reference to Kantian ‘faculties’ is quite deliberate on Chomsky’s part.
20 Chomsky, 420.
We may date the beginnings of the ‘cognitive revolution’ (as some have called it) from the first publication of Chomsky’s *Syntactic Structures* in the late 1950s.


Hadamard’s characterisation (1912) of the period which saw the appearance of the mathematical/geometrical revelations of Lobachevsky, Riemann, Cantor, Dedekind etc. in Mandelbrot, 415.


*Vidē* Chapter III.

Thom, 323.

Thom, 323.

The invocation of a mathematical/scientific concept within what is usually considered the domain of the humanities may strike some individuals as an illegitimate importation. I can only reply that it has become ‘standard practice’ for a humanities scholar (particularly in the field of cultural theory) to critically evaluate scientific discourse and concepts utilising the tools of linguistic and cultural analysis, and yet the reverse has seldom been suggested. In other words few humanities scholars have suggested the utility of the importation of scientific tools of analysis into fields of humanities research such as the history of ideas. Of course I am not using the concept of ideal objects as a ‘scientific’ measuring device -- I will be producing no calculations, no mathematical results -- rather it is a background assumption, an attempt to legitimise the methodology I will be pursuing.

Lobachevsky’s (one of the creators of Non-Euclidean geometry in the 19th century) own description of Non-Euclidean geometry.

Le Goff, 10.

Le Goff, 11.

Le Goff, 21.

Le Goff, 22.

Le Goff defines *mentalité* as ‘mental outlook as expressed in discourse and artifacts.’

To be quite fair, Le Goff himself divides his extended Middle Ages into several ‘sub-sets’: the period from the 3rd. to the 7th. centuries he names ‘Late Antiquity’; the 8th. to the 10th. century becomes the ‘High Middle Ages’; the 10th. to the middle of the 14th century (the latter being the period which most historians refer to as the Renaissance) is the ‘Central Middle Ages’; the ‘Late Middle Ages’ began with the great plague (1348) and continued into the sixteenth century, when the Reformation (and nothing so vague as the Renaissance) ended the Church’s monopoly on the Christian religion’ [Le Goff, 10]; and ‘Early Modern History’ from the Reformation until the Industrial Revolution.

Eco (1987), 75.

Le Goff, 10.

The phrase is Witold Kula’s, and is used by Le Goff to characterise certain anachronisms in any historical period. Le Goff wisely stresses that these periods are a ‘mere analytical convenience’, not ‘an ontological reality.’ [Le Goff, 12.]

Dodds, ‘New Light on the ‘Chaldean Oracles,” postscript to Lewy’s *Chaldean Oracles*, 695.

Among whom include such varied scholars as Hans Jonas, Moshe Idol, E. R. Dodds and G. R. S. Mead.


Toulmin, 11.

Toulmin, 27.

In the sense of desiring to conserve old values and ideas rather than the sense of alignment with politically conservative ideas.

Fauvre, 1994 (a), 62.

Eco (1987), 69.

Eco (1987), 70.

Eco (1987), 71.

One is reminded that the word ‘theory’, derived from the Greek *θεωρία*, necessarily implies ‘walking a path’ as the term *(theoria)* originally referred to an individual’s (‘theorists’) *curiosity* such as led Hekataeus or Solon to travel about the world as *spectators* of its marvels. [Cornford, F. M. *From Religion to Philosophy* (NY: Harper Torchbooks, 1957), 200] In terms of early Ionian science, theorists ‘wandered off to take a closer look’ (that is, went on the ancient equivalent of the 18th. century Grand Tour), to improve their knowledge of the world. Our contemporary contrast between ‘theory’ and ‘practice’ is derived from the alternative sense in which the term was used by Pythagoras and his followers: *θεωρία* meant the contemplation of the heavens, an intellectual pursuit different in kind from any pursuits worked
in the mundane world, and superior to them. This latter sense is that generally espoused by Plato; Aristotle clearly holds to the former, Ionian sense.

The term ‘perennial philosophy’ entered Western discourse in 1540 with the publication of Agostino Steuco’s *De perenī philosophia*. Influenced by the remarkable scholar Giovanni Pico della Mirandola’s efforts to reconcile the doctrines of both Plato and Aristotle, Steuco attempted a grand synthesis of all (known) ancient wisdom with contemporary Christian doctrine. This was an effort to demonstrate the existence of an intellectual continuity from the classical ages up until his own times that reconciled both philosophy and religion.

According to Weeks, 9. In fact the words may be first found in St. Paul (1 Corinthians 15:28).


Evola, 1995. Despite his execrable crypto-fascist leanings, Evola was a brilliant and thorough scholar of alchemy and the Hermetic tradition. As to the question of whether there is some sort of ‘inevitable’ connection between esotericism and fascism, I hold that there is no such inevitable connection, and historical examples support this (the Surrealist interest in Hermeticism and the occult was aligned with their socialist revolutionary project, for example). The exigencies of my stated thesis necessitate that I must forego any extended discussion on this point.

Barfield, 7. Barfield also seems to hold that the ‘scientific revolution’ was hardly an ‘event’ within the 17th century. That is why he calls it -- with conscious irony -- a ‘prolonged’ historical event. Like myself, Barfield does not seem to be convinced of the reality of a revelatory ‘paradigm shift.’

Bohm, xiv.

The Royal Society...deliberately adopted a program that hastened the division between two languages, urging members...to put aside the ‘language of Wits and Scholars’ and adopt a clearer, simpler style modeled upon that of ‘Mechanicks and Artisans.’” [Nicholson, 124.]

Le Goff, 3.

Le Goff, 4.


Couliao (1987), 37.

Faivre (1994 b), 64.

Whitehead (1953), 36-37.