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# **Threshold Mathematics** v4.01

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## **What's missing that makes maths such a turn-off for so many and fascinating for a few?**

*And what's the deeper significance of Zero, One, Pi,  
the Golden Ratio, the Fibonacci series, the Primes,  
Negative and Imaginary numbers  
... for a start?*

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Postscript

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## Prologue

Professor Marcus du Sautoy, in his book *The Music of the Primes*, laid it all out with masterful clarity and flair - the big tease about the *Primes*, that is. All about to be revealed... but then... hold on. Not quite yet. Ever closer but never quite getting there. What in maths is called *asymptotic*: the line and the curve that are converging ever closer, yet never quite make contact. And that seems to symbolize the fascinating story of the primes, 'the most tantalising enigma', the biggest unresolved mystery in mathematics.

The essence of it has been the lack so far of (a) any meaningful explanation of the distribution of the prime numbers and (b) as an extension of this, any kind of proof or disproof of the now legendary *Riemann Hypothesis*.

*Threshold Mathematics* has looked at both in a radically different way and asked: Could these long running failures all along have been the inevitable consequence of asking the wrong questions, based on false assumptions, themselves passed on unquestioningly through generations? And since the desired solutions have not been found after extensive expert analysis of the numbers, would it be more fruitful to look at the bigger context?

This work is, therefore, as much about how we have come to think about quantifying and numbers as it is about mathematics itself along with its various conundrums. It was mathematician, Kurt Godel, in the 1930s who showed that there are some statements which can neither be shown to be true nor untrue within mathematics, news which was apparently not at all well received at the time by many leading mathematicians.

Other broader questions arise. Could there be a vital factor missing that makes mathematics such a turn-off for so many, yet deeply fascinating in its rationality, complexity and beauty for a small minority? How significant is its exclusion of those essential *living qualities* we experience as *willing* and *feeling* from our thinking? For that omission leaves us with the sterile, lifeless, mathematics most of us were taught at school and that Western physical science adopted as its official language of authentication. Mathematics is, after all, just another human pursuit, a language, although a highly developed and specialized one.

Perhaps one of the reasons why fascination with the primes and Riemann enigmas has taken on such significance is because it turns out to be the key to some very profound questions - that is, questions of a kind we are discouraged from addressing or even contemplating in our divided materialistic/mystical cultures. There are many well documented quotations from mathematicians speculatively alluding to this profundity.

In the text that follows it's proposed that Riemann's Hypothesis can neither be proved nor disproved because of two key factors: first, a fundamental lack of understanding of what the prime numbers signify in the bigger cosmic context; and second, a discrepancy in the number system of the culture in which Riemann operated, and which still persists today, concerning the 'real' *number line* and *zero*, again in relation to the bigger context.

Du Sautoy has said that mathematics is essentially "*ethereal*" and that the primes are "*timeless numbers that exist in some world independent of our physical reality.*" That would seem to be a promising starting place. Or is it still a no-go area, a taboo subject?

# 1. The Threshold is...

In the following extract from a broader *Threshold* work, we focus on a few so called 'irrational', ie mysteriously enigmatic, features of current orthodox mathematics. These include *pi*, *The Golden Ratio*, *The Fibonacci Series*, *Imaginary Numbers* and *The Prime Number Sequence*. In so doing we find that there is a coherent pattern, an order within which each of them performs an essential functional role.

For example, once it is realised, from the *Threshold* perspective, that the apparent irrationality of the *prime number sequence* results from the merging of two simple sequences based on one consistent rationale, the obvious key question arises: *What significant principles do these two sequences represent?*

And once we grasp what the prime numbers actually signify, it follows that *Riemann's* intuitively sensed *Hypothesis*, unproven since 1859, is essentially sound but mathematically unprovable.

## First: Overview + Insight

One way to resolve an apparently insoluble problem within any system is to bring to the **whole** situation a sense of **polarity**. This involves gaining:

(1) an *overview* in order to see the system as a whole within its greater context, as well as how it has evolved into its present state, and

(2) maximum *insight* to penetrate to the effective centre, heart or core of the situation.

Combining these two views enables us to detect the primary dynamics of the system and thus its essential *meaning*, what it's *meant* to be and do.

In this particular work, the fundamental human questions regarding who or what we are – in the individual and universal sense – and what we're doing here are not addressed. They are, however, acknowledged as essentials of the bigger context in which mathematics and all other disciplines find themselves.

**Mathematics** seems to be widely understood as the quest to discover ever clearer, more accurate and consistent patterns within this fragmented universe, to find order within apparent randomness. As a code or language, it consists of various ways of ordering and quantifying information about the reality it serves to describe. It is, essentially, a *mental* discipline which means it has the potential for endless abstraction.

Among the better known special features of this mathematical order would be such *values* as those represented by the symbols *pi* and *phi* (The Golden Ratio), and sequences of numbers such as the *Fibonacci series* and the *prime numbers*.

Among its most fundamental unresolved questions would be: 'What is actually meant by the symbols for *zero*, *one*, and the so-called *negative*, *irrational* and *imaginary numbers*? These questions inevitably lead to fundamental *polarity* issues such as: Which is primary: subjective or objective? Quality or quantity? Consciousness or matter?

The *threshold* approach, effectively, views current mathematics – with its discrete numbers and consequent enigmas and conundrums – from a higher dimension. This embraces the continuity, movement and polarity within the wholeness behind the frozen fragmentation, and enables us to see pattern and coherence not apparent from the lower dimensional view. It's an extension of the principle by which some problems, insoluble in two dimensions, can be solved in a three dimensional context.

## In context

In the tradition of Einstein's mind experiments, there follows next a *scenario*, a model to serve as a context in which we can view mathematics as a system, a language, a code. How valid this is will show in how well it helps us resolve known problems and understand ongoing observations. For present purposes the model is much simplified.

It's also based on the following explicit assumptions.

## Assumption 1: At the Threshold

In order to gain the power of *overview* and *insight*, we need to mentally put ourselves at the critical *threshold* where the fundamental polaric forces of the cosmos, *contraction* and *expansion* or **gravity** and **levity**, are in a state of dynamic balance. That is, at the border, the interface of the gross *physical* realm and the subtle, pre-physical **aethereal** realm.

This *Aether* has nothing to do with the 19th century, materialistic, so called *luminiferous ether*, the existence of which was supposedly but falsely disproved by the Michelson-Morley experiments. More recently, the speculative notions of *dark energy*, a *zero point field*, *morphogenetic fields*, *the quantum vacuum* and physicist Professor Paul Davies' *quantum ether* all seem to be pointing to the need to re-acknowledge the ever-present, all-pervading *Aether*.

An introduction to this Aether is the 2006 book ***Aether - The Transcript*** ISBN 1-900034-10-7 and its partner, audio CD-ROM ***Aether - Knowledge is Power***. These include reasons why the Aether was written out of the script of Western science but has never actually gone away. Meanwhile, in the view of UK professor of mathematics, Martin Huxley, most mathematicians are Platonists, and in Plato's time – before the era of materialistic science – the Aether was very much a reality.

Our *threshold* is not a specific location in space, but has the lively, turbulent, transforming characteristics of what some scientists call the *zero point field*. It's a kind of level, like the critical temperature level at which water is transformed into vapour and vice versa. Its essential *polarity* is acknowledged, albeit rather uneasily and in a negative way, by Western science in, for example, its paired concepts of matter and anti-matter or gravity and anti-gravity.

Perhaps the most powerful benefit to be gained from awareness of this threshold is a simultaneous *two-way perspective* on the world. I can look *outwards* from my unique, physically located point of consciousness, my attention *radiating* outwards in any direction. I also find that my consciousness can expand indefinitely so that I'm looking *inwards* from all directions at once. Then I can choose to zoom in and *focus* on any particular part of the world - a practical exercise in linking the absolute and the relative.

This inward seeing enables the expanded, 'greater I' to view the contracted, 'little I' in as wide a context as seems appropriate. We could liken this to viewing a whirlwind from the *stillness* found both high above it and at its centre, the eye of the storm - both qualitatively different from the turbulence in between. We can also look at mathematics this way.

'*Less is more*' is an enigmatic yet common expression which carries the implicit notion of polarity. From the dense *physical* perspective, less of the gross, physical-material means more of the subtle, mysterious 'something else' of the opposite quality, while from the subtle *aethereal* view, less of that means more of the gross physical-material.

Although we are considering a *pre-physical* era and level of reality, we can envisage our scenario as an imaginary spherical bubble rhythmically contracting and expanding around a focal centre-point of gravity. The dynamic of this fundamental polaric relationship provides a clue to the essential nature of what we might call *pure* or *potential energy*.

### **Assumption 2: Polarity + our own presence = Threefoldness**

We acknowledge our own conscious presence as an essential part of the whole situation, which therefore consists of (a) observer, (b) the act of observing and (c) that which is observed. To ignore any of these three essential elements from our investigations would leave an incomplete, false picture, as is the case with the so-called 'objectivity' of Western science which persists with this unrealistic ideal, despite the contrary findings of Quantum physics. We can, however, transcend the dilemma by explicitly acknowledging the presence and unavoidable participation of the subject, ie the observer, who then has an objective presence in the situation.

### **Scenario**

Now to our **scenario**. Let's first imagine a void consisting only of a universal consciousness. Its first stage and level of existence before any manifestation is the pre-physical, continuously changing, indefinable, vital state of being, long known in the Western world as the **Aether** which comprises various levels within its unity. Einstein explicitly asserted that space without the Aether is inconceivable, although he did not require it for his theory of Relativity.

Within this ethereal medium or matrix is brought into being a specific *point* of focussed consciousness. The point automatically constitutes a *centre* around which there simultaneously comes into existence a *sphere*. Resulting from the dynamic relationship, the tension, between its periphery and its centre point, this sphere constitutes a kind of *resonant cavity* (RC) in which is generated a rhythmic pulsating of *contracting* and *expanding* movement, as waves of subtle, pre-physical *energy*.

In this polarity there seems to lie a clue to the resolution of the *wave-or-particle* dilemma of modern physics. With point-centred *gravity* drawing *inwards* and periphery-based *levity* drawing outwards, the continuing tension represents a general tendency towards re-establishing an equilibrium state.

As the pulsating proceeds back and forth, *standing waves* (SWs) are propagated which themselves create ever smaller sub-spheres within the original. The result is increasing *density* towards the centre point with *rarity* towards the periphery. The smaller the RC, the faster the rhythm of resonance within it, ie the higher its pitch, note or tone. This would seem to be a potentially endless inward progression.

A distinction is drawn in this work between *rhythm* and *frequency*.

*Rhythm* in a system implies continuous, subtle variation in the timing of movements due to the ever changing circumstances, inner and outer.

*Frequency*, although more convenient for comparing and calculating, implies a fixed, mechanically regular sequence of exactly equal timings. This means it's an idealised, abstract, average value. In this project we'll work with rhythm, since it's closer to reality.

The increasing density around the centre creates *interference* effects which inhibit the inward/outward wave movement. Eventually a critical level of obstruction or stasis is reached at which physical *matter* begins to form – first gaseous, then liquid, then solid.

This all happens at the critical *threshold* between the two distinct realms within the greater oneness. *Matter*, then, is amassed energy in an endless variety of forms, in a continuous process of disintegrating and being released/redeemed back into the ocean of cosmic potential energy, the *Aether*.

Taking a much longer view, we can see our original sphere as one of countless interacting spheres, all spinning and spiralling through a yet greater cosmos. The resultant distorting effects of their combined influence give rise to the endless variety of physical forms and shapes of the physical-material world. Thus we have many partial forms or *parts* of that one *wholeness*, ie *quantity* and *diversity* within the primal *quality of unity*.

We can also see our individual human selves as points within that universal consciousness, temporarily embodied in earthly matter formed around such centres, and held in suspension at the critical border level, the *threshold*, between the two cosmic polar forces. The deeper such a point of consciousness has become embedded in solid, earthly matter, as energy locked in gravity-bound inertia, the more it tends to interpret the world around it accordingly - that is, as patterns formed by the separated bits and pieces in its surroundings. This would seem to account for the present tendency to classify, count and calculate, ie *quantify*, as a preferred way of gaining some control over our earthly circumstances.

Given the specific focus of this particular work, our *scenario* encompasses but does not deal with the vast process of cosmic and natural evolution – that is, from a rarefied 'nothingness', in strictly physical terms, to our present dense material universe.

### **The descent into matter**

This scenario is a much simplified account of how consciousness, universal and individual, makes what is sometimes called the '*descent into matter*' - as fluidity becomes solidity, as movement becomes crystallised, as flow becomes frozen form.

Our model or scenario, then, is not like a mechanical structure of pre-assembled bits. It's more like a *stereogram* image which, at first, looks like an amorphous mass of detail to which we need to adjust our gaze. Then, if we 'get it', the main features of a recognisable form begin to emerge before our eyes... and suddenly it's there, visible as if in 3D where it was not visible before, although nothing about it has physically changed.

So, taking the *threshold* approach, we don't start with numbers and symbols, which are the *end products* of certain processes and mental activities. We start with the dynamic, fluid, moving energy processes of the cosmos which *generate* the world of material forms. Those numbers which orthodox mathematics labels *irrational* are so called because they do not fit into its own limited *rationale*. The labelling of other numbers as *transcendental* does seem a more balanced approach.

## **2. EMU numbers / Threshold numbers**

### **Equal Measure Unit (EMU) Numbers**

Normal systems of numbers are based on the assumption that in all circumstances within a system, one specific *unit* is exactly equal in value to any other such *unit*, ie they are rigidly standardised. We'll refer to these numbers as *equal measure unit (EMU)* numbers .

Since humans have been able to reproduce standardised objects, such as bricks or coins, there seems to have been a strong temptation to look at the world around us as though it were similarly made up of some kind of minute, identical building blocks. It's as though each of us, as an infant, was given an identical set of cubes which can be joined together in any number of combinations, and was taught that this is how everything in the world is actually constituted.

We need to be aware, however, that this teaching does not coincide with the continuity, the fluid, ever changing, natural and cosmic reality of expansion/contraction, rarity/density, levity/gravity, or with how our consciousness or feelings function. The cosmos is not an assembly of cubic centimetres or any other such units. There is a fundamental incompatibility here. The EMU number system has, nonetheless, proved a very useful mental device when applied within the physical-material realm and within the range of scales to which humans can readily relate.

However, the incompatibility becomes increasingly problematic nearer the extremes of the human scale of comprehension, in both time and space. Here a growing sense of meaninglessness is experienced in trying to come to terms with extremely big and extremely small numbers. And pointing beyond the extremes of space and time we have our vanishing limits, conveniently signposted as *infinity* and *eternity*.

### **All numbers are bi-polar**

Because the aethereal realm is of a qualitatively different order from the physical-material basis of an EMU system, any alternative system would have to include such qualities as the inclusive wholeness, continuity and fluidity of natural growth and transformation... for a start. Each number, including zero and the primes, consequently can be understood as being bi-polar in having two aspects:

(a) Within the number system, their strictly quantitative, exclusive, 'discrete bit' characteristics, and

(b) Within the bigger cosmic picture, their qualities as elements in a continuous, all-inclusive reality – in which 'prime number' means much more than just another number with some exceptional mathematical characteristics.

It follows that the expression 'generating prime numbers' has two distinctly different meanings.

In (a) it means mathematically calculating them from other numbers.

In (b) it means that there's a bigger ongoing generative/formative process in which those values known as prime numbers are significant markers of proportion and resonance, as we'll see later. So establishing the 'generating principle' is, essentially, not about mathematically eliminating certain numbers from a given sequence.

Meanwhile, we have at least become more aware of the limitations of any EMU system.

### **The grid filter**

Out of the rigid, precise EMU standardisation emerged what we might call a *grid* mentality. It serves as a kind of filter through which we look out at the physical world and assess it in terms of EMU cubes, squares, lengths, weights etc. And we are taught that all forms are assemblies of 'building block' particles, micro-digital, separate *bits*. In digital computer graphics, '*bitmap*' images – composed of mosaic-like squares – give a visual example of this view, whether illustrating curves or straight lines.

Such a conception is so convenient for measuring, counting, calculating and constructing - ie controlling - that it easily becomes a delusion, a false idea of how Nature and the cosmos actually are. This conception treats the end product of the cosmic formative process as if it were the beginning. For example natural curves are seen first as made of bits or points, rather than as the aftermath or trail of a curved movement pattern.

This kind of mindset seems to arise in those cultures which prioritise *measuring* and *quantifying* - as if *quantities* are somehow more real than the *qualities* which we actually experience first, ie as primary. The *grid* can then become a trap, a prison, imposing rigid restrictions on imagination, inspiration and intuition. It can also insulate us from the less precise, less easily controllable, fluid, fiery realm of our instincts, intuition and feelings.

In the attempt to dominate and control our world, the grid way of thinking has proved very useful. But it ignores the wider and longer term harmful consequences of such an exclusively *quantifying* attitude on our *quality* of life.

### **Zero and One**

The meaning of *zero*-ness and *one*-ness go right to the heart of all questions about quantity and, therefore, mathematics. The way orthodox mathematics uses the symbols for **zero** and **one** is symptomatic of the materialistic culture in which it has evolved. For example, the materialistic version of *zero* signifies an empty space, an absence of any material objects, while *one* signifies a single unit of something, as opposed to no such units or more than one.

Such usage demonstrates *binary* thinking which, in its exclusive *yes-or-no, on-or-off* terms, fails to acknowledge that there is always a greater wholeness which includes all pairs of polar opposites. Binary thinking is the fundamental flaw at the root of all our current unstable digital technology.

Regarding **zero**, the *threshold* view reveals a clear *polarity*, inextricably linked with the notions of **infinity** and the **infinitesimal**. We can conceive of an *outward* infinity of ever expanding/extending proportions disappearing into the beyond. Then there's its polar opposite, an *inward* infinity, a *vanishing point* of unimaginable smallness, also known to some as the *infinitesimal*. From our threshold we can sense these vanishing points or planes as *portals* between the aethereal and physical realms, where the inward journey reunites with the outward.

The *infinitesimal* seems to imply the idea of both the *wormholes* of the physicists and the rabbit hole through which *Alice* entered her *Wonderland* (in a story written by a mathematics lecturer). They also seem related to the *quantum* idea of the smallest quantifiable amount of energy and to the ancient Greek concept of the indivisible *atom*. And they offer a key to understanding the 'less is more' principle of *homeopathy* which works first on the aetheric level which then affects the physical body.

In the 17th century there was a historic dispute on this theme between Newton and Leibnitz which we can now see as a *polarity* issue. They were both reaching for the transcendent level beyond the physical, but from polar opposite directions. Leibnitz, through the *infinitesimal*, emphasised *consciousness* which he expressed in the subjective terms of our irreducible *self* or *monad*. Newton raised the level of thinking from concepts set in physical *space* to the more aethereal dimension of *time*, with his *moments* which occur in a context of continuous *motion* and *flux*.



*Zero*, then, from the *threshold*, represents what we experience and recognise as a transitional moment or event. Viewed from the physical side, it's inherently paradoxical - the something somewhere between the EMU building blocks or between the boxes in a grid. We can, therefore, consider the symbol for *zero* either as representing a limitless void full of potential in which no separate objects exist... OR as simply an empty gap-filler in our decimal-based, EMU number system to denote that there are no units, tens or hundreds etc in their allotted places. Thus we have the *pre-zero* void and the *nominal zero* of the mathematical number system.

The number **one**, can be treated as either representing a **unity**, a wholeness, a wholon, inclusive of any number of parts OR as a single, separate **unit** of something, an exclusive part. This is the fundamental polarity of *whole* and *part* which are always *relative* terms, ie in the manifest world there is always a bigger, inclusive whole/wholon and a smaller included part.

A *wholeness*, in this work, is always taken to be a relative phenomenon, a something with its own identity which is not merely the sum of its parts. Yet it is temporary, transient and also in continuous interflow with the greater wholeness of which it is but a part. Simple examples could be a piece of ice floating in water or a vortex formed in that water.

### **The Number Line**

From our *threshold* position, the soundness of the traditional *Number Line* with a *zero* at its mid-point begins to look questionable. For here the space occupied by zero seems to represent some kind of definite gap between -1 and +1, between the negative and positive dimensions. By contrast, the year 1BC ran directly into year 1AD, with no 'year zero' in between - only a critical, *infinitesimal* moment of transition.

Since Western science does not yet openly acknowledge the universal presence of the all-pervading Aether, *zero*, implying a distinct empty space situated between the *potential* negative numbers and the *actual* positive numbers, is an artifice, an anomaly. This idea of zero is somewhat similar to the idea (or ideal) in science of a so-called *perfect vacuum*, something which doesn't physically exist in Nature and is therefore a meaningless term, except as an idea.

Such anomalies will inevitably arise in a frozen abstraction like the number line - that is, an abstraction from a dynamic, everchanging reality in which two polar opposite forces are continuously and rhythmically interacting. Perhaps an updated version of the *infinitesimal* would be useful here.

Meanwhile, the central balancing point of a revised number line could be labelled *minus/plus one*. This point would serve as a portal for accessing the great void of aethereal fullness implied by zero. And the inherent *ambivalence* of zero would then be acknowledged by the negative and positive numbers representing the aethereal and physical realms. This balancing and cancelling out is pertinent to our reading of Riemann's Hypothesis.

### **Negative Numbers and their derivatives**

The word 'negate' means to deny the existence of something. *Negative* numbers express the *idea* of something not manifest or present in a *quantifiable* form, as opposed to the *actual* manifest presence of whatever it may be. That leaves a negative number as a

*potential* or virtual something. A *debt*, for example, is the idea of a potential payment of a certain quantity of something. A seed holds, in non-physical space, the potential physical organism it's destined to become, given the right conditions.

This realm of an unmanifest, ie non-physical existence is the very nature of the *Aether*. Mathematical formulations derived from a *negative* value can therefore be understood as signifying the more subtle, potential, aethereal realm - the polar opposite of the positive numbers which signify the more gross, actual physical realm.

### **The symbol *i*, Imaginary Numbers**

*i*, representing the *square root of minus one*, is a mathematical value much used in science. It expresses a strange kind of *ambivalence* which we can now interpret in the context of the universal cosmic *polarity*. For minus one, mathematically, is the product of combining - of multiplying together - *minus one* and *plus one*. This apparently anomalous outcome would seem to be the result of the EMU number system's inadequacy for dealing in a wholistic way with the relationships of negative and positive numbers and with zero and one.

Being the product of minus one and plus one places *i* right at the interface, the border, the *threshold* between the numerically *negative* aethereal and the *positive* physical. And significantly, given the rhythmic pulsating of the cosmic polar forces, *i* is much used in engineering formulations concerning *rhythm*. From our *threshold* view, *i* symbolises that continuously rhythmic and ambivalent state of the cosmos, with the two polar opposite forces represented by the positive and negative numbers. Physics acknowledges this in the idea of matter as vibrating energy patterns and anti-matter as its polar opposite.

**Complex numbers** are peculiar combinations of *real* and *imaginary* numbers, part of the bizarre *Alice through the Looking Glass* world referred to by Professor du Sautoy, which does seem like a kind of metaphor for our threshold.

**Fractions** (from the same root word as *fragment*) express the *idea* of *oneness* divided into EMU *parts*, which then stand as separate entities within that oneness.

### **Cardinals / Ordinals and Ambivalence about counting**

The two basic kinds of ordinary numbers are *cardinals* and *ordinals*.

**Cardinals** represent *manyness*, how many there are of whatever is being referred to: 1, 2, 3 etc. They imply a fixed, static, finite, condition, a state akin to the physical, spatial, material world of separate, exclusive entities.

**Ordinals** represent a kind of presence implying *beforeness* and *afterness* in a *sequence*: 1st, 2nd, 3rd etc. They indicate a progressing, changing, non-finite process, more akin to the unmanifest, living, aethereal realm, implying a continuous, inclusive flow of changing conditions or stages, both temporal and spatial.

The clear distinction of meaning between them has become con-fused in everyday usage, with cardinals being substituted for ordinals, which indicates the current dominance of the *materialistic* mentality. For example:

9/11 refers to the 9<sup>th</sup> month and 11<sup>th</sup> day - whereas 24/7 refers to 24 hours, 7 days.

*Chapter One* is the 1<sup>st</sup> chapter, and *Version 2* the 2<sup>nd</sup> version and so on...

And the dispute as to whether the recent millennium should have been celebrated a year later than it was indicates an underlying lack of clarity about numbers and counting.

Meanwhile, the *primes*, as we'll see later, seem to serve as both ordinals and cardinals.

### **The Focus/radius Line**

Back with our original sphere, if we now envisage an imaginary line drawn radiating out from the centre point to any point on the peripheral plane, such a line would be what's known as the *radius* of the sphere. Conversely, looking inwards from the periphery towards the centre point, in the polar opposite direction, this line could also appropriately be called a *focus*, since it leads to the focal centre-point.

### **Pi : from sphere to cube, from circle to square – across the threshold**

We can now see that there will always be a direct and constant relationship between the length of the *focus/radius line* and other dimensions of the sphere it spans, as measured in EMUs of length, squares and cubes. Translated into numbers, that constancy is expressed through applying in various formulae the familiar, unresolvable numerical value 3.142... represented by the symbol *pi*.

So, from our *threshold* view, ***pi* is the translator, converter or scaling factor between (a) the aethereal realm of the sphere and circle and (b) the physical-material realm of the cube and square.**

EMU calculations involving *pi* will always be approximations because of the fundamental qualitative difference between the rarefied, spiralling curves of the *aethereal* realm and the dense, crystallised forms of the *physical-material* realm. A hurricane can be frozen and reduced down in a picture to a pattern of quantifiable lengths, squares, cubes, velocities etc. But without including the *context* of the converging atmospheric forces, we gain little understanding of the dynamics behind the phenomenon.

### **Phi : the Golden Ratio**

**The symbol *phi***, also known as the *Golden Ratio* or *Mean*, represents a value which, it is suggested here, **expresses a constant relationship of proportion between the unmanifest potential of the *aethereal* dimension and ideal forms in the *physical* dimension.** The *golden mean* is sometimes defined as 'the middle course between two extremes'.

The numerical symmetry of 0.618 :1 and of 1:1.618 would seem to indicate a balancing point or *threshold* in this 2-way cosmic polar relationship of *transformation*. This may, however, vary at different levels of the rarity/density continuum in the cosmos, away from or towards Earth's surface.

Through the ages, humans have aesthetically appreciated this relationship of *proportion* between the two realms – as is widely evidenced in many sacred structures in architecture, art and design, for example in ancient Greece. This would seem to be because forms which are proportioned according to these ratios resonate harmoniously with the proportions inherent in our our own structure.

### **The Fibonacci Series**

The *Fibonacci Series* is a **variation of the relationship represented by *phi***, it is suggested here. However, it only applies to the material level of existence, after matter has come into being and become the world of natural organic forms. As such it is mainly applicable in the *outwardly* extending direction, from central-physical density towards peripheral-aethereal rarity; ie in *growth*. And, as a numerical series, it only begins to converge closely with the *Golden Ratio* after several stages in its progression.

Both the *phi* and *Fibonacci* series can be expressed geometrically as a particular kind of **spiral**, each of which can be seen to generate a series of rectangles. So here we have a demonstrable connection between the aethereal and the physical in the continuity of a spiral, a critical line, spawning a series of separate quantifiable forms.

### **The Zeta Function**

The *zeta function* is a mathematical device first applied to the primes by the great mathematician, Euler. It was later elaborated by Riemann. The simpler version produces an *infinite* series of decreasing *reciprocals* from 1, 1/2, 1/3, 1/4... when x, signifying the 'power' of the denominator, equals 1. It coincides with the musical *Harmonic Series*, first established by Pythagorus, and as such is relevant to our *inward* progression of diminishing RCs. It also shows the primes to be an *infinite series*.

From the threshold perspective, the zeta function symbolises the pattern of a real and fundamental cosmic process. It concerns the series of proportional resonances set up in the formation of the physical universe. However, when mathematicians, in an abstract way, speculatively substitute different values for those proportions, the results may or may not bear any meaningful relation to the reality being symbolised.

One significant outcome of Euler's efforts here was the discovery of an unexpected convergence of *addition* and *multiplication* in the primes. These were found to exhibit both functions simultaneously, implying that they have a *dual* nature. Seen from our *threshold*, multiplication, as in *geometric* progressions, is about the quality of *proportion* which is essentially aethereal, while addition, as in *arithmetic* progressions, is strictly about EMU quantities which derive from the physical-material realm. This would suggest that the prime numbers represent those values where the aethereal and physical realms coincide, where they balance or cancel out into a kind of equivalence or zero value.

**Threshold numbers, then, are those values – including *pi*, *phi* and *i* - which enable transition and transformation across the threshold we have been considering.**

## **3. The Primes & Riemann**

### **One basic question**

Given their unique numerical properties, what does the peculiar and apparently irrational sequence of the primes signify?

### **Three questions mathematicians have long been asking about the primes**

1. How many primes are there up to any point in the normal Number Line?
2. Can *Riemann's Hypothesis* be conclusively, mathematically proved?
3. Is there a mathematically sound formula for predicting the next prime number?

### **Riemann: What's the relevance?**

*Riemann's* abstract, artificially constructed 'landscape' (see du Sautoy's book) is no more than an elaborate graph, a visual illusion produced by combining three numerical grids. It does, nonetheless, reveal a certain consistency of pattern in the numbers. And this has long been felt to be basically sound by many mathematicians - so much so that theories

have been constructed on the assumption that it is so, despite the continuing absence of any conclusive proof after a century and a half.

The way that it seems to convey a deep, intuitive truth somewhat resembles how dreams, archetypal forms and artistic works have their effect, ie at a non-intellectual level of our consciousness. Meanwhile, the quest for a 'perfect' proof illustrates a fundamental difference between the more idealistic approach of mathematicians and the more pragmatic approach of scientists, ideas and ideals being essentially *aethereal*.

### **Cultural assumptions**

It's suggested here that the problem has remained unresolved because of certain unsound but unquestioned *assumptions* in the culture behind Riemann's thinking, concerning both mathematics and bigger cosmological issues. For there does still seem to be an irresistible tendency to reduce the significance of the greater reality indicated by the primes and by Riemann down to EMU mathematical terms and reasoning. And this would seem to be why the primes as a sequence have not been found to reveal a clear EMU pattern. They seem to tell of something else entirely, something beyond numbers.

### **Two-faced primes**

Our *threshold* view reveals that the primes have their own inherent *polarity*: they have two aspects, so to speak, as *Euler's Product* showed. A crude analogy would be a valve or duct connecting two distinct spaces and therefore simultaneously part of both.

1. In the aetheric, pre-physical, order and formative process, the primes serve as *ordinals*, simply 1<sup>st</sup>, 2<sup>nd</sup> etc with no EMU number values, while...

2. Within the EMU 'real' number line, they stand as *cardinals* with distinct number values. These two aspects of the primes are qualitatively different. So their connection cannot be established by direct calculation, only indirectly by *inference*.

### **The cosmic fretboard**

Let's return to our imaginary focus/radius line between the periphery and the centre of the cosmic sphere, our original RC. Moving inwards, the ever closer together standing waves (SWs) intersect our line at ever shorter intervals. The intersections mark out the periphery of each smaller, concentric sub-sphere contained within it, each resonating at a correspondingly faster rhythm or higher pitch.

Now let's imagine our line to be a string stretched along the neck of an imaginary musical instrument whose hollow body is the original RC. A series of frets along the neck mark out the proportionate distances along the vibrating string for producing particular notes within a harmonic order, which is done by pressing and thereby shortening the string. A harmonic order means a series of notes in harmonious resonance with the one fundamental tone of the original RC.

(Physical *sound* is quantifiable whereas the quality of *tone* is aetheric.)

Significantly, only at certain frets can we produce what are known as 'harmonics'. They are the more subtle sounding notes produced by lightly and momentarily touching the string above those frets while it is being plucked, so that the whole string vibrates in harmony with its simultaneously shortened length. That is, instead of just the shortened length vibrating as a result of the string being pressed down. These special fret positions would seem to parallel where our focus/radius line is intersected by the RCs.

At all other possible positions - or sizes of RC - the result would be a cancelling out of resonances, which leaves us only the prime/harmonic positions. This direct relationship between the resonance of particular shorter lengths and the whole length of the string parallels the way that prime numbers are only divisible by, ie are resonant with, oneness.

Regarding harmonic systems, the Western 12 note, *even tempered scale* is an artificial creation of an EMU, 'building block' culture. It has proved very useful and creatively empowering in many ways. However, it has also inhibited the potential for some subtle and deeply expressive music only possible when not restricted by such a 'grid' system.

### **Inwards/outwards**

The fundamental rhythmic alternating between periphery and centre produces two separate and differing sequences of SWs and their resulting RCs. These are the *inward* and the *outward* sequences. Because of the increasing density towards the centre, the impulses or waves of the *outward* sequence are more obstructed at their outset than the waves of the *inward* sequence.

This would seem to account for the discrepancies between (a) the ratios of the *Fibonacci* series at its lower number values, close to the centre, and (b) the constant value of the *Golden Ratio (phi)* - until they begin to coincide more closely after about a dozen steps of the Fibonacci series.

So the sequence of prime numbers consists of two progressions going in polar opposite directions but merged into one series of EMU numbers - ie two mutually opposed sets of statistics. This is not the same as, but somewhat like, superimposing two sequences of temperature changes, both set out in order of lowest to highest values. However, one represents a phase of *falling* temperature and the other a phase of *rising* temperature, and when combined, the two number sequences do not exactly coincide. The result is an apparently irrational series.

### **The primes are...**

Bringing together our two lines of approach, we recognise how the coincidence of the mathematical *zeta function* (when  $x = 1$ ) with the musical *harmonic series*, offers a crucial clue linking the origins of the cosmos, the so called *music of the spheres* and mathematical logic. We recognise how, in EMU terms, the progression of numbers known as the *primes* corresponds only to those cosmic 'frets' which produce the harmonic series of notes resonant with the *one* original RC, the whole cosmos. As numbers, they are only divisible by the number *one*.

The primes thus symbolise irreducible wholes, *wholons*, complete integral forms. They are like bubbles or eggs whose proportions express the balancing of inward and outward forces, and that zero level is represented by the surfaces or planes that are their surrounding membranes. *Resonance*, at particular rhythms, can create and disintegrate forms, and physical science deals extensively with the rhythms or frequencies of waves. The primes, then, represent a precisely proportioned series of critical rhythms.

So, a pattern of progression begins to emerge.

- It starts at the *aethereal* periphery with the first and biggest number of all which is **one**.
- It progresses infinitely inward, with the ever decreasing sized sub-spheres in ever closer proximity, as their number rises. At the centre, the smallest number is **one**.
- The process involves two-way rhythmic movement.

However, as we move into the extremely large numbers and the fast vibrational rhythms of very small RCs, it all becomes inconceivable, inaudible, meaningless and irrelevant to our human scale of experience and appreciation. Which raises the question as to what benefit there might be in trying to extend the sequence of primes *ad infinitum* - except perhaps as an exercise in obsessive counting or for devising hard-to-crack security codes. And both of these seem like clear signs of an endless spiralling off into absurdity.

## 4. Beyond mathematics – Riemann's significance

### Some things are beyond mathematics

In the 1930s mathematician, Kurt Godel, established that some axiomatic principles cannot be proved or disproved from within the existing discipline of mathematics. This seems to apply to the many attempts to prove or disprove *Riemann's Hypothesis*. The 'problem' of the primes, therefore, can only be comprehensively tackled from outside the confines of current mathematics. Otherwise we find ourselves locked into a vain search for some mathematical 'holy grail'.

In the bigger context which our *Threshold* view brings, we can now appreciate an overall pattern of principles governing several previously enigmatic, and so called 'irrational', features of mathematics. We find *meaning* and consistency, as opposed to merely uniqueness and utilitarian value, in *pi*, *phi*, the *Fibonacci* series, *i* and the *primes*. Other significant numerical values can also perhaps now be re-assessed on this basis.

The solutions, as we have found with *pi* etc, do not lie in the numbers themselves. Consequently, we've extended our thinking beyond the current limits of orthodox mathematics, and through this approach have become aware of some of the limitations of the EMU number system.

**By extending the conceptual context within which it is viewed, we have found *Riemann's Hypothesis* to be essentially correct.** That context is now summarised.

### (A) **Polarity-within-wholeness** (the governing principle)

*Consciousness/matter, rarity/density, aethereal/physical, levity/gravity, outward/inward, expansion/contraction, radius/focus, negative/positive, Golden Ratio/Fibonacci series, ordinals/cardinals, resonant cavities/prime numbers ...*

### (B) **The formative process**

Pulsation between periphery and centre of an original cosmic sphere, RC1, creates standing waves which form, within that original *one* sphere, a series of concentric sub-spheres, RCs which are in resonance with it alone.

The RCs - in order of decreasing magnitude and faster rhythmic resonance - correspond to the musical *Harmonic Series* (HS).

The HS is known to coincide with the mathematical *Zeta Function* (when  $x=1$ ). The Zeta Function (when  $x=1$ ) is an *infinite* series starting from *one*.

The HS is, therefore, an infinite sequence of resonances, its fundamental (lowest) tone being that of the original *one* RC.

Primes are numbers mathematically resonant only with number one, and all EMU numbers can be reduced down to combinations of primes.

Thus the **prime numbers** in their dual role, are:

- (a) a series of *ordinals* representing the infinite inward sequence of RCs which are resonant only with the original RC1, and
- (b) those *cardinal* numbers divisible only by themselves and the number one.

### **Working definition (of the primes)**

**The primes**, expressed as EMU numbers, represent a scale of measures of the cosmic formative process, between the potential unformed aethereal realm and actual physical form, through resonance. As such, they constitute a bi-polar cosmic number system.

**Riemann**, it is suggested here, intuitively sensed the universal threshold between the two polaric forces of the cosmos and expressed this balance, through the language of mathematics, as his critical line of zero values.

We are now adding that:

1. Only in the *primes* is harmonic resonance 'crystallised' into EMU number values.
2. *Phi* and the *Fibonacci Series* are scaling measures of that transformative process.
3. The *zeta function* (when  $x = 1$ ) expresses the unfolding sequence of resonances.
4. *Imaginary numbers* express the balancing and cancelling out between the negative/potential/aethereal and the positive/actual/physical realms.

So Riemann's inspired assertion that the primes 'very probably' represent a mathematically consistent progression, demonstrable as an infinite line of zeros, has proved sound. **The essence of his hypothesis has been shown to be correct**, and our reaching this conclusion has involved no mathematical calculations. Any subsequent technical calculating and formulating is left to the experts in this field.

On the level of *intuitive inspiration* being expressed in limited physical-material terms, we can see some parallels with, say, Einstein's *curved space*, Newton, the alchemist, and even Charles Darwin. For Darwin did put his apparently materialistic evolutionary theory in a much more open ended context when he said "*I am inclined to view the world as if it were the result of designed laws but with the details left to chance.*"

### **Proof = ?**

The question of what constitutes a valid *proof* for whom is whole other subject in itself. But by the standards of the Clay Mathematical Institute (USA), our *threshold* approach does significantly '*shed light on... the mysteries surrounding the prime numbers*', and has found that their '*distribution among all natural numbers does follow a... pattern*' such that the next one may be predicted.

### **The primes, six-ness and the 'twins'**

All the primes can be seen from our threshold to occur within a consistent numerical pattern - in which the 'perfect' number **6** is significant. The number 6 is called 'perfect' in mathematics because it's factors, 1,2 and 3, when either added or multiplied together, give the same result, 6. This combining of the functions of addition and multiplication is also, significantly, characteristic of the role the primes play in the zeta function.

And there's a clue in the old trick: *Take any prime greater than 5, square it, add 17, divide by 12, and the answer will give a remainder of 6, or on a calculator .5 (1/2 of 12).*



The significance of six-ness, beyond the merely symbolic mathematical statement  $(1+2+3) = (1 \times 2 \times 3)$ , will be dealt with in a later publication.

The pattern in the occurrence of the primes, within the EMU number system, is as follows. There are two sequences of numbers, representing the two polar directions described earlier. One of these starts with the void which for now we're calling *pre-zero*, and the other starts with 1 or 7. Each is an arithmetic progression with 6 as the increment, which gives two sequences: pre-0, 5, 11, 17, 23, 29... and 1, 7, 13, 19, 25, 31... The three factors of 6 are excluded, if it's assumed that 1 is not a prime number.

When the two sequences are set out in parallel, the so called *twinning* can then be seen as an integral part of the pattern. And as the multiples of each new prime are also eliminated and the two sequences are merged in numerical order into one, we are left with the familiar, infinite prime number sequence. So 'predicting' the next prime in the sequence eventually becomes a matter of deciding at which point it's no longer viable, re computer power, cost etc, to keep eliminating the ever increasing number of non-primes.

From the meta-mathematical, *threshold* perspective of a cosmos in continuous change, *six-ness* can be understood as a unique quality of the cosmic transformative process. It represents each 'cycle' of a vortex traced out in the progressive formation of RC spheres.

#### **Why has a proof of Riemann's Hypothesis proved so intractable?**

First, we have to acknowledge that mathematics freezes and reduces the fluid, mobile continuity of our cosmos down to a grid-like, 'building block', EMU system. This is the artificial abstraction within which Riemann was working. And within it no qualitative distinction seems to have been made between the *ordinal* series (of RCs) with which the primes correspond and the occurrence of the primes in the EMU number line as *cardinals*.

Second, the idea of a mathematical *proof* only has meaning within that system, given all its implicit assumptions of permanence and sameness etc. For within the bigger context of our ever changing cosmic environment, nothing remains truly the same as it was. Thus the inconsistencies of mathematics, a few of which are here briefly addressed.

1. We find we are trying to establish hard, precise, ie finite information about what has been officially designated an *infinite* series. And we are attempting to do this from within the *finite* limitations of an EMU system that assumes *infinity* to mean an endlessly outward, expansive progression. The primes, however, represent an infinitely inward progression. Bearing in mind the logarithmic spirals of the *Golden Ratio* and *Fibonacci*, this also touches upon the classic conundrum of trying to reconcile in exact numbers the cube and the sphere, the square and the circle, the straight line and the curve.

2. *The Number Line*, viewed from our *threshold*, is an abstract, artificial, linear-thinking construction. What it presents as the *negative* scale of numbers is a *mirage*, a projecting of the physical-material world of *positive* numbers on to the unmanifest, potential realm, ie the Aether. And this projection seems to assume falsely that the pre-physical aethereal realm can validly be portrayed in materialistic EMU terms.

3. The position on the Number Line, labelled  $+1/2$ , at which Riemann's transverse line of Imaginary numbers intersects, turns out to be a misleading misconception. It sits midway between zero and one. But the zero on the line, as mentioned earlier, is essentially an

indicator of the interface between the negatives and the positives, between -1 and +1. So some adjustment to Riemann's Number Lines is required.

### Imagine a new number line

If the north/south line is re-positioned to intersect the Real Number line at the point midway between -1 and +1, at what was the zero point or what we could now call '*minus/plus 1*', our picture starts to gain some coherence. For the interaction (or multiplying together) of -1 and +1 at that point produces -1. And  $i$ , the 'square root' of -1, is the first of the Imaginary Numbers which are now at their new place, *minus/plus 1*, on the north/south line intersecting our revised Real Number line. This transverse line is where all the negatives and positives meet and mutually cancel out each other.

As such, it represents the plane where the *aethereal* (negative) and *physical* (positive) realms interface and are in balance. That plane can be represented in 2D as an **infinite line of zeros**, reminiscent of what Riemann seems to have intuitively envisaged, but which he expressed in a more complicated way involving *complex numbers*.

It would also seem to represent the *threshold* which this work has been highlighting and its bigger context, our *scenario* of a polaric, rhythmically pulsating, resonating cosmos. Riemann had the inspired idea for an ingenious mathematical structure which, in principle, was sound but had an inherent design flaw. And since 1859, mathematicians have been analysing it and speculating about it without, it seems, realising there was a fundamental problem of misalignment in the underlying culture and therefore in his design. Consequently, his hypothesis has remained neither proved nor disproved.

### A practical approach

Instead of starting with the abstract numbers and formulae Riemann finished up with, let's assume that there do exist, at some level of reality, phenomena which are expressible in the mathematical language of his hypothesis. A sequence or row of zero values suggests perhaps a line or plane resulting from the balancing and cancelling out where two forces meet. That line could be straight or curved, or perhaps a spiral.

In our *threshold* view of the inward/outward pulsation between the aethereal-peripheral and the physical-centric realms, two similar but not identical spirals which track that process come to mind: the *Golden Ratio* and the *Fibonacci* spirals. These each generate a series of rectangular figures which represent the 'crystallising' of moving, aetheric, potential energy into physical-material form. And the rectangles are generated at a rate proportional to the turning of the spiral. Thus is produced a progression of quantifiable forms from continuous movement.

The rectangular forms could represent our resonant cavity (RC) spheres, now contracted and collapsed under the force of an excess of gravity over levity. These polar opposite aspects of the one process would be expressed in two ways:

1. A continuous spiralling of varying proportions, representing the aethereal dimension.
2. A series of discrete steps or numbers, representing the physical dimension.

A correspondence has already been established in mathematics between stages of a continuous progression of harmonic resonance and a series of decreasing reciprocal number values - in Euler's Zeta Function. This was later made more complicated by Riemann when he introduced *complex numbers* which combine *real* and *imaginary* numbers. Here we reach the heart of the puzzle concerning his famous hypothesis.

### **Riemann's misaligned bridge**

Let's think this through in a practical way, but not get too stuck on concrete images. We can imagine Riemann conceiving of a bridge to make a connection across some kind of dividing line of which he was intuitively aware. But the two halves of the bridge ended up misaligned where they were intended to meet. That was because, unbeknown to him, the two worlds on either side each had a different understanding of zero. And that incompatibility came out in his calculations and design as a shift of  $+1/2$  to the east on the *real number* line. (Remember, this is only an analogy.)

So Riemann then had to introduce an add-on corrective to cancel out the unfortunate misalignment and complete the bridge. Mathematically, the ambivalent nature of Imaginary numbers, which combine the positive and negative and so mutually affect both sides, served this purpose and helped restore the missing alignment - that is, his line of zeros. A simpler 'bridge' could have been built long before, using Euler's Zeta function, had the pattern and meaning of the primes sequence and the fuller meaning of zero been recognised at the time.

The long term unquestioning acceptance of Riemann's understandable but flawed assumption brings to mind the words of Christof, the arch media manipulator in that insightful film *The Truman Show*, when he says: 'We accept the reality of the world with which we're presented. It's as simple as that.'

The prime numbers sequence has also been found to have correspondences with the so called *quantum* realm. Which is not surprising when it's realised, from the *threshold* perspective, that the quantum world, with all its unfamiliar, non-physical characteristics, is an aspect of the pre-physical Aether.

### **So, what vital factor is missing that makes mathematics such a turn-off for so many?**

The brief answer is: *What's missing is one side of the great cosmic equation, that is, the equation which expresses the balancing out of the inherent polarity throughout our whole cosmos, and all within it, towards a state of equilibrium.*

All power, energy and forms arise out of the rhythmic interplay of the universal polaric forces of the cosmos. And all force must originally be *exerted* at some level of existence by some motivating source or act of will (which is not to imply any religious connotations).

In recent centuries the objective, physical-material aspect of our world has been studied in great detail by scientists, but to the neglect of consciousness and the aethereal dimension. So, regarding mathematics, the missing half is all about how we *subjectively* experience and appreciate the *qualities* of quantities, as opposed to how we merely name, count and calculate quantities in an *objective* way.

### **Archimedes and Plato**

Recently, a UK professor of mathematics responded to an earlier version of Threshold Mathematics by quoting Archimede's famous statement about leverage, '*Give me somewhere to stand, and I will move the earth.*' His point was that this equally applies to changing our perspective such that everything 'shifts' and we gain a whole new

understanding. The professor also said he thought most mathematicians are platonists, and in the collective consciousness of Plato's time the *Aether* was very much a reality.

### **Disconnected = polarised**

From our *threshold* view, a general lack in a culture of any deep, direct conscious connection with its vital cosmic environment suggests that there'll surely be some kind of resulting split into binary extremes. In the rarefied mathematical world of dedicated primes specialists, there does seem to be both an extreme focussing on highly complex calculating and an unlimited expansion into ever more elaborate and obscure abstraction.

### **Assumptions not questioned**

The whole *primes/Riemann* saga seems to have arisen from a lack of willingness or ability to question some basic assumptions behind what is taught as mathematics. The result of this compliance is one huge cloud of abstract thoughtforms hovering over mountains of speculative papers, the collective attempt of many agile and creative minds to rediscover the longed for coherence, elegance and clarity, intuitively knowing it's there but inadequately equipped for the job.

The advent of the binary, digital computer hugely boosted mathematical pursuits, both in scale and speed. But perhaps, in the rush, other ways of thinking, not reducible to binary logic, have become further neglected resulting in an even more distorted imbalance. Constructing a system, a world, of mathematics with EMU building blocks and grids has proved very useful and also an endlessly fascinating subject in itself for some. However, to expand mathematics beyond the limits of that constricting worldview would require a much more flexible, organic and aethereal system of concepts and thinking.

## **5. The Aether and mathematics**

### **Whatever happened to the Aether?**

Has the indoctrination process known as education rendered us unable or unwilling to seriously consider the possibility that the timeless, universal Aether does in fact exist? If either, then we are left with the incoherent multitude of substitutes already indicated. Even the highly acclaimed systems theorist and writer, Ervin Laszlo, affirms the Aether in his 2004 book *Science and the Akashic Field*, in which he treats *akasha* as a straight synonym for the (A)ether.

So it's neither something religious nor materialistic. But in this cleverly divided and ruled world, it's what both of those entrenched camps lack. The challenge seems to be more one of unlearning redundant habits by freeing up our thinking and intuition than of adding on more complication.

### **What is it about mathematics?**

Only when we stop and think about it do we become aware of just how steeped we are in the materialistic culture of quantifying and numbers. We've been absorbing it from our infancy when we would have had no awareness of this process going on. Certainly, any childhood talent for numbers and calculating is rightly to be encouraged. But without a counterbalancing development of our sense of wholeness, continuity, quality etc, our thinking becomes distorted - and all the more so when this over-emphasis on *analysis* at the expense of *synthesis* is rewarded with praise, prizes and certificates,

leading to career and financial advantages. We're conditioned to admire cleverness and to ignore or devalue wisdom.

The cold, sterile, precise, abstract qualities mostly associated with mathematics evidently have their appeal to a small minority - as a pure, detached, feeling-free discipline. Yet the obvious passion with which some dedicated mathematicians seek to discover new truths and resolve mysteries does seem to speak of something much more than mathematics. Marcus du Sautoy refers to a high proportion of musicians in the world of mathematics.

However, becoming fascinated, captivated and bewitched by the endless possible permutations it offers can lead to a 'not seeing the forest for the trees' - as well as to our confused culture of endless statistics and contradictory counter-statistics. It's as if there is a heartfelt, intuitive knowing and longing for a deeper understanding of this world. Yet most seem trapped in the grid-view, building block mindset, within a career structure and culture that eventually sabotage that driving, creative urge. The frustrated fascination with the prime numbers and Riemann's Hypothesis, as a number of popular books and various websites confirm, seems to be a case in point.

It's here that we clearly see in action the dubious assumption that '*The answer lies in the numbers*' - an approach taken to painfully obsessive extremes in Darren Aronofsky's film *Pi*. For the central character, a mathematician, numbers took on a hugely inflated significance, amounting to a false mantle of reality.

His quest was as futile as trying to calculate and predict the ripples in a pond by 'freeze-framing' a picture of the pond first - which means you've already lost its true nature and are dealing only with an abstraction.

## 6. Postscript

### In animated suspension

So our *Threshold* view and scenario are perhaps not merely fanciful ideas, but do provide a useful perspective on where and how we human beings are in the bigger picture. We can now envision ourselves held in animated suspension between the subtle, expansive, rarified *aethereal* and the gross, contractive, densified, *physical* dimensions - somewhat like bubbles floating between the elements of air and water.

Without the wholistic view from the *threshold*, the data - numbers, in the case of mathematics - sometimes seem to have no coherent meaning despite obvious consistencies and patterns. And although some people may prefer to use other words instead of Aether - for example, *dark energy*, the *quantum vacuum*, *quintessence* or various *fields*, we'd still be essentially reaching towards the same thing.

### Intuition + intellect

At the *threshold* we transcend the subjective/objective divide through identifying our individual consciousness with the universal consciousness. This is an intuitive mental process beyond intellectual, rational or computational operations. And since we are here venturing into realities beyond the physical-material realm, certain precautions are required. Any conclusions thereby reached must be subjected to intellectual scrutiny to test their practical validity. In the present work, the rational consistency of the numbers arrived at provides such validation.

### **Mathematical models- how real?**

We also need to beware of abstract mathematical models, when employed as tools for scientific investigation into the real world. For here there can be a strong temptation to make observations fit the model which, as an attractively self-consistent approximation, may become an item of unquestionable dogma, an established but false fact or theory. Presently, two contenders for this category might well be *dark matter* and *dark energy*.

### **Test of consistency**

From our *threshold* we can also envisage ourselves being tested to see how deeply our consciousness has been influenced by being embedded in dense, static matter – such that some now believe that matter is the ultimate reality rather than consciousness, despite accepting since Einstein that matter is condensed energy. And energy itself remains an enigma until the cosmic *levity/gravity* dynamic is acknowledged.

### **New thinking, new terms**

Inevitably, the *threshold* perspective requires some new mathematical terms and symbols to handle its extended vision of wholeness and polarity, but that's beyond the scope of this limited paper. And finally, because this *threshold* view cannot be reduced down and forced to fit into the narrow confines of the mechanistic-materialistic, 'boxed in' way of thinking, that does not invalidate it in the greater context of humanity's evolving consciousness.

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