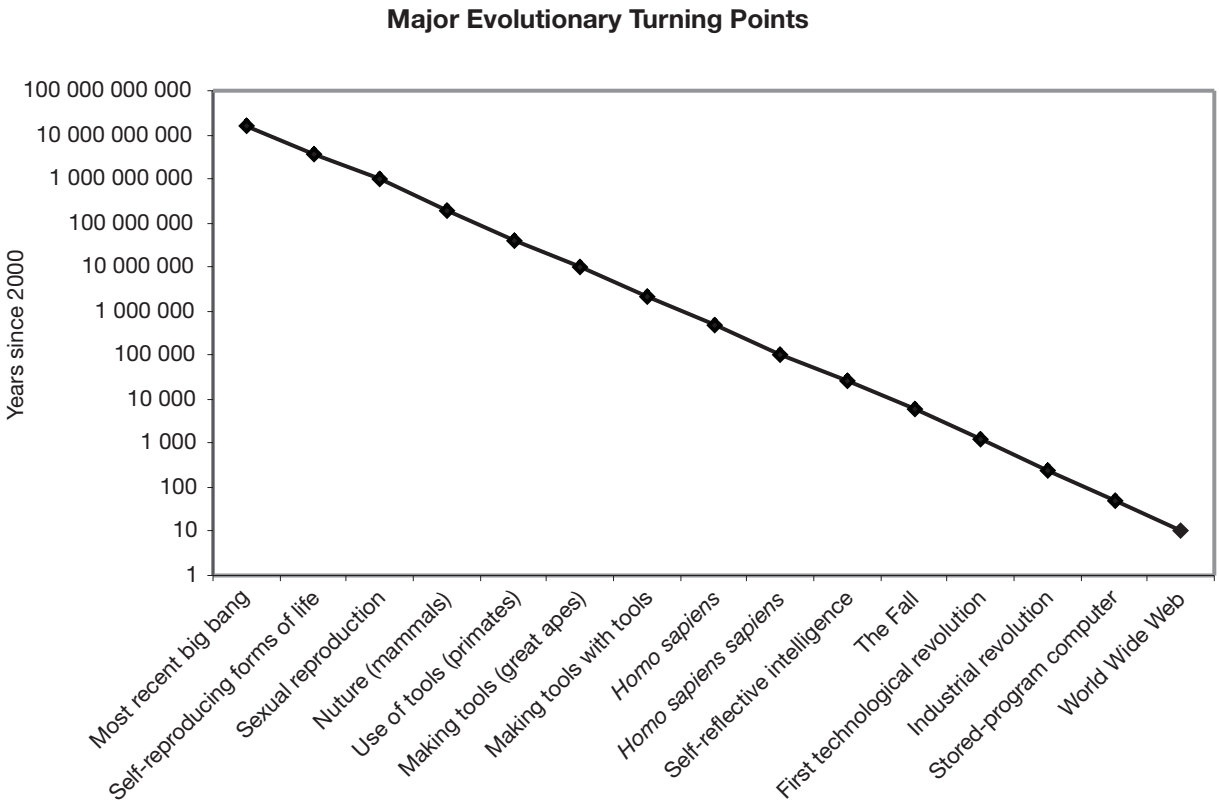
The Singularity in Time

The Omega Point of Evolutionary Convergence



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Contents

Introduction

This essay, which could also be called a paper, for it includes detailed references as endnotes in the conventional academic style, is complementary to my poster presentation 'The Two Dimensions of Time', to be given at the forthcoming Science and Nonduality conference, and my proposal for Project Heraclitus, making some suggestions on how we could accelerate the convergence of science and ancient wisdom through the magical synergy of working harmoniously together with a common vision.

The essay has been inspired by one with a similar title by Peter Russell, published in *The Mystery of 2012: Predictions, Prophecies & Possibilities*, an anthology of 26 essays commissioned by Tami Simon of Sounds True. While I have been familiar with Peter's evolutionary model for 25 years, for this closely matches my own, I was not previously aware of Terence McKenna's Timewave Zero, published in *The Invisible Landscape*, "a book which purports to explain all and everything", written with his brother Dennis after they both experimented with psychedelic substances in Amazonian Columbia. They described this shamanic experience as getting in contact with the Universal Logos, in the mystical meaning ascribed to this word by Heraclitus.

As I have a similar experience, without the use of psychotropic drugs, I am using this opportunity to describe what it means to live at the Omega Point of evolution, which Peter, among others, describes as a singularity in time. In the first instance, I have written this essay for myself, for I find that writing helps to improve the clarity of ideas. The central point here is that the Singularity (with a definite article) is essentially mystical, as Pierre Teilhard de Chardin saw, not technological, as people like Vernor Vinge and Ray Kurzweil believe. Based on my own direct experience of Absolute Consciousness, I trust that this essay makes it crystal clear that human beings are not machines and nothing but machines and therefore that artificial intelligence in computers is impossible.

Proving this in a sound scientific manner has been a central theme of my life since September 1964, when I wrote my first computer program in Fortran as an exercise to calculate the roots of a quadratic equation. However, this study did not begin in earnest until January 1974, when I was promoted to systems engineering manager in an IBM sales office in London. Inspired by Abraham Maslow's hierarchy of needs, which I learned about on management training courses, and Thomas A. Harris' *I'm OK—You're OK*, I began a process of self-inquiry to discover what it truly means to be a human being, in contrast to the other animals and computers. However, it was not until I resigned from my marketing job with IBM in May 1980 that I was able to devote myself full time to this fascinating research project, conducting a thought experiment in which I imagine that I am a computer, whose only function is to integrate all knowledge into a coherent whole, guided solely by the Logos, completely free of all external authorities.

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Evolution is an accumulative process of divergence and convergence, proceeding in an accelerating, exponential fashion by synergistically creating wholes that are greater than the sum of the preceding wholes through the new relationships that are formed, apparently out of nothing. Well, not quite. This 'nothing' is actually the Divine, Cosmic Matrix, from Latin *māter* 'mother', which we can most simply call Consciousness, Ultimate Reality.

The creative power of Life arises in the Eternal Now from the Matrix, the Divine Essence we all share as Love. Heraclitus, the mystical philosopher of change, called Life the Logos, the immanent, rational intelligence governing the Cosmos, not just creating the diversity of forms, but organizing them into coherent wholes as well. In *Process and Reality*, when studying the concept of the Ultimate, Alfred North Whitehead, who co-authored the indigestible *Principia Mathematica* with Bertrand Russell, called this creative evolutionary process *concrescence*, from the Latin *cum* 'together with' and *crēscere* 'to grow', pointing out that creativity is the principle of *novelty*.[1] This growing together produces forms and structures that are quite new, that have never been seen before, such as this essay you are reading now.

One of the first people to study this evolutionary phenomenon as a whole was Jan Christiaan Smuts. In 1925, after being defeated at a general election in South Africa, where he had been prime minister, he wrote the seminal book *Holism and Evolution*. Smuts, a man of many contradictions, had been a brilliant scholar in his early life in the natural sciences, the arts, and the law, and took the opportunity of comparative leisure to describe the scientific philosophy that guided his life.[2] As Wikipedia tells us, "After Einstein studied *Holism and Evolution* soon upon its publication, he wrote that two mental constructs will direct human thinking in the next millennium, his own mental construct of relativity and Smuts' of holism."[3] We can see why from the Greek root of *holism*: *ὅλος* 'whole'. And coincidentally, *whole* derives from Old High German *heil* 'health', cognate with *holy* and *healthy*.

In the Preface to *Holism*, Smuts highlighted a factor in the physical and biological sciences that he felt had been neglected. As he said:

> This factor, called *Holism* in the sequel, underlies the synthetic tendency in the universe, and is the principle which makes for the origin and progress of wholes in the universe. An attempt is made to show that this whole-making or holistic tendency is fundamental in nature, that it has a well-marked ascertainable character, and that Evolution is nothing but the gradual development and stratification of progressive series of wholes, stretching from the inorganic beginnings to the highest levels of spiritual creation.[4]

In summary, "The whole-making, holistic tendency, or Holism, operating in and through particular wholes, is seen in all stages of existence, and is by no means confined to the biological domain to which science has hitherto restricted it. … Wholeness is the most characteristic expression of the nature of the universe in its forward movement in time. It marks the line of evolutionary progress. And Holism is the inner driving force behind that progress."[5]

At about the same time, apparently independently, the French palaeontologist, geologist, and Jesuit priest, Pierre Teilhard de Chardin began to study "the significance of the human being within the vast cosmic process of evolution", writing two essays on the subject in 1928 and 1930. But it wasn't until the end of the next decade that he wrote his 'great book' called *Le phénomène humain*.[6] However, as the Jesuit order forbad this book to be published during Teilhard's lifetime, it was published posthumously in 1955.[7]

Bernard Wall and Sarah Appleton-Weber then translated it into English in 1959 and 1999 as *The Phenomenon of Man* and *The Human Phenomenon*, respectively.

Rather than using Smuts' *holism*, Teilhard briefly referred to *hologenesis*, the name of a theory of evolution first propounded by Daniele Rosa in *Ologenesi* in 1918 and later adopted by George Montandon in *L'Ologenèse humaine* in 1928 to account for the origin of human races.[8] We could thus use *hologenesis* as a generic term for what Teilhard called *cosmogenesis*, extended into *biogenesis*, *noogenesis*, and ultimately *Christogenesis*, in Teilhard's terms. Furthermore, *hologenesis* embraces *morphogenesis*, *phylogeny*, *ontogeny*, and all other growth processes where wholes emerge that are greater than the sum of their preceding wholes.

Now when Teilhard looked at evolution as a whole, he called the predominant pattern he saw the 'Cosmic Law of Complexity-Consciousness': the greater the complexity of the forms that emerge, the greater the consciousness.[9] As he said, "Evolution is an ascent towards consciousness," therefore it "must culminate forwards in some kind of supreme consciousness." Teilhard called the glorious culmination of evolution its Omega Point, which is also the Alpha of the world, both referring to the universal Christ, the consummation of *Christogenesis*.[10]

Specifically, he saw that all the thinking elements on Earth would individually and collectively converge in a 'superarrangement', a gigantic psychospiritual operation, which he called a kind of *megasynthesis*.[11] Teilhard was not the first to have such a vision. In 1619, in Ulm, at the time a small Bavarian village, where Albert Einstein was later born, René Descartes had a dream of "the unification and the illumination of the whole of science, even the whole of knowledge, by one and the same method: the method of *reason*".[12] However, the Cartesian scholar Bernard Williams has said that while such an idea was still a reasonable project in the first half of the seventeenth century, such a project would be regarded as a piece of 'megalomaniac insanity' in the modern world.[13]

Williams is not the only one to have had such a limiting belief. Many postmodernists, emphasizing individual analysis over collective synthesis hold similar views. For instance Jean-François Lyotard attacked the idea that philosophy can restore unity to human learning and develop universally valid knowledge for humanity.[14] Similarly, the ecophilosopher Henryk Skolimowski has said that it is preposterously arrogant of physicists to attempt to finish the map of knowledge once and for all—to say the last word about the Universe—in what is called the Grand Unified Theory of Everything.[15]

So given the widespread scepticism we see in the world, does this mean that Teilhard's magnificent vision is unrealizable? Well, there is also a great optimistic movement to the contrary, seeking to turn the divergent competitive tendencies of evolution into cooperative convergence. For as Teilhard said, "The way out for the world, the gates of the future, the entry into the superhuman, will not open ahead to some privileged few, or to a single people, elect among all peoples. They will yield only to the thrust of *all together* in the direction where all can rejoin and complete one another in a spiritual renewal of the Earth."[16]

Exponential growth

But what does it mean to reach the Omega point of evolution? Well, perhaps a little mathematics could shed some light on this visionary experience. The mathematical function that describes accumulative processes, such as evolution, is the exponential one, expressed as e^x, where e is the exponential constant, 2.71828. Now this function has some interesting properties. The rate at which it changes accelerates exponentially and the rate at which acceleration accelerates also accelerates exponentially, and so on. The

exponential function thus describes the amazing rate at which evolutionary change can occur through the power of synergy, when new relationships are created out of 'nothing'.

Now, because the accumulative processes of evolution accelerate exponentially, the time periods between successive significant turning points diminish exponentially; greater and greater changes happen in less and less time, as we have been witnessing in the hyperexponential expansion of the Internet during the past couple of decades. This phenomenon is most simply depicted in a geometric series of distinct terms, diminishing from *a* by a constant factor, let us say *r*, where *r*>1. Now, an infinite series of such terms does not diverge to infinity—as would be the case if *r* is equal to or less than one—but converges to a finite limit, which we can call a mathematical singularity, expressible in this formula:

$$\sum_{i=0}^{\infty} \frac{a}{r^i} = \frac{ar}{r-1}$$

For instance, when $a = 1$ and $r = 2$, we have:

$$1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \cdots = 2$$

Such geometric series depict the essential characteristic of accumulative processes, such as the cumulative interest we pay on our mortgages. Similarly, if banks loan 9 times more money than the deposits they have in the bank, known as the required reserve ratio, then in total they can lend up to 90 times more than the initial deposit, for in this case $r = 10/9$ and the limit of the sum of the infinite series is 10.[17] As is becoming crystal clear, such a debt-based economy is unsustainable, causing severe psychological and ecological damage, driving humanity to the brink of extinction.

We can call the imminent collapse of the global economy a singularity in evolutionary history, a term coined by Victor Vinge in a NASA paper in 1993 called 'The Technological Singularity'. As he said in his Abstract, "Within thirty years, we will have the technological means to create superhuman intelligence [in machines]. Shortly after, the human era will be ended." Continuing, Vinge said,

> From the human point of view this change will be a throwing away of all the previous rules, perhaps in the blink of an eye, an exponential runaway beyond any hope of control. Developments that before were thought might only happen in 'a million years' (if ever) will likely happen in the next century. … I think it's fair to call this event a singularity ('the Singularity' for the purposes of this paper). It is a point where our old models must be discarded and a new reality rules. As we move closer to this point, it will loom vaster and vaster over human affairs till the notion becomes a commonplace. Yet when it finally happens it may still be a great surprise and a greater unknown.[18]

Of course, if and when computers can perform most tasks performed by human beings today more cheaply, it will be the economic imperative of our times to replace more and more jobs by machine, and the global economy will collapse like a house of cards, for somewhat different reasons. For unemployment would then rise to 20, 30, or 50%, who knows where the limit might lie? Ray Kurzweil has studied this gloomy prospect in such unreadable tomes as *The Age of Spiritual Machines* and *The Singularity is Near*, promoting 'strong AI', the assertion that the artificial intelligence of computers could potentially exceed any level of human intelligence, successfully performing any cognitive task that a human being can, including such skills as pattern recognition and the command of language.[19]

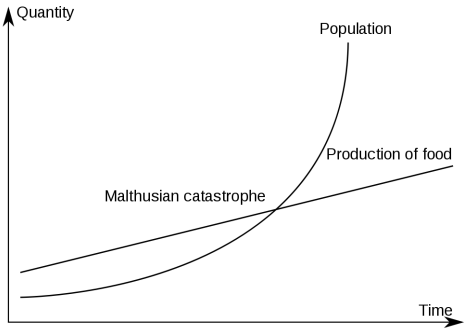
This means, of course, that computers would soon be able to perform the tasks of financiers more efficiently and effectively than the bankers, brokers, economists, and accountants who perform them today. Not only this. The jobs of chief executive officers and governmental leaders, such as presidents and prime ministers, would similarly be automatable. So would the jobs of software developers, programming

the machines that would replace the jobs of economists and politicians. Is this possible? Could computers program themselves without human intervention?

Having read the opening couple of paragraphs in this essay, you will know that the answer to this question is a resounding NO! However, many scientists, technologists, philosophers, business executives, and politicians, disconnected as they are from Reality, do not know this. So as a principal purpose of this essay is to breakthrough the limiting beliefs that both mainstream and alternative academia hold about human potential, let us pursue Kurzweil's reasoning a little further.

Essentially, Kurzweil seems to be saying that artificial intelligence is a function of the calculating capacity of computers: "By 2019, a $1,000 computer will match the processing power of the human brain."[20] This is another example of exponential growth processes, known as 'Moore's Law' after Gordon E. Moore, the co-founder of Intel, the chip manufacturer, published a paper in 1965 indicating that computers would double in power every two years.[21] However, Moore is well aware of the limits of evolutionary growth. As he told a meeting of the world's top chip designers and engineers on 10th February 2003, "No exponential is forever." Irrationally, he then went on to say, "Your job is to delay forever."[22]

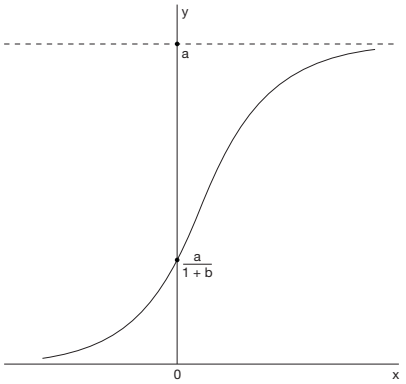
One of the first to note the limits of evolutionary growth processes was Thomas Robert Malthus, who studied the growth of human population in *An Essay on the Principle of Population*, first published in 1798. As he said, "I think I may fairly make two postulata. First, that food is necessary to the existence of man. Secondly, that the passion between the sexes is necessary and will remain nearly in its present state." He then went on to say, "The power of population is indefinitely greater than the power in the earth to produce subsistence for man. Population, when unchecked, increases in a geometrical ratio. Subsistence increases only in an arithmetical ratio. A slight acquaintance with numbers will shew the immensity of the first power in comparison with the second."



Although the capacity of the Earth to support human needs has improved somewhat since then, this situation has become known as the Malthusian Catastrophe, illustrated in this diagram. In 1838, Pierre François Verhulst published an equation that simply showed the limits of population growth in this equation:

$$\frac{dP}{dt} = rP\left(1 - \frac{P}{K}\right)$$

where $P(t)$ represents the population at time t, r the intrinsic growth rate, and K the carrying capacity, or the maximum number of individuals that an environment can support.[23] Integrating this equation gives the logistic function, so named by Verhulst in 1845, whose general formula is below, illustrated in this diagram, applicable in a wide range of applications, the familiar S-shape of the basic learning or growth curve.[24]



$$y = \frac{a}{1 + be^{-cx}}$$

However, as Erich Jantsch and Peter Russell showed in *The Self-Organizing Universe*[25] and an essay called 'A Singularity in Time',[26] respectively, successive growth curves can stack up on each other, producing a more expansive growth curve as the envelope of particular growth curves. But is there a growth curve that defies this limit, the envelope of all growth curves in the Universe? Indeed, there is.

In *Education and the Significance of Life*, J. Krishnamurti said, "Intelligence is the capacity to perceive the essential, the *what is*, and to awaken this capacity, in oneself, and in others, is education."[27] Essentially, what Krishnamurti said in this most wonderful book about education is that when we are free of our personal, cultural, and collective conditioning, then there is no limit to the Awakening of Intelligence, as he also said in a book of dialogues with this title. Essentially, consciousness can expand until it becomes coterminous with Consciousness itself, which imposes no limits. For as the quantum physicist Amit Goswami has said, the entire world of form is possibilities of Consciousness.[28]

But how can we become free of such mechanistic conditioning? Well, as the Advaita sages Ramesh S. Balsekar, who was the President of the Bank of India, and Vijai Shankar, who was a medical practitioner engaged in fundamental cardiac research, have said, there is no doership, no separate being who can be said to have control over our lives, including the Supreme Being. So, if this miracle happens, it would happen without human or divine intervention.

However, in ancient times, the shamans in the Altai Mountains in Siberia, in Mesoamerica, and other indigenous regions, discovered that by ingesting certain naturally occurring plants, such as mushrooms, they could induce an altered state of consciousness, thus revealing the Divine, Cosmic Matrix, which we all share, but which is normally hidden from everyday life. Such experiences differ significantly from the Rishis in the Indus valley, who similarly experienced Ultimate Reality by looking directly within themselves, without the need of biochemical enhancements, described in Chapter 11 of *Bhagavad Gita*, when Krishna showed Arjuna the Ultimate Cosmic Vision.

In the 1960s, many rediscovered these chemicals, not the least Timothy Leary, Ralph Metzner, and Richard Alpert at Harvard University, who wrote about their experiences in *The Psychedelic Experience*, first published in 1964, using the *Tibetan Book of the Dead* as a guide. As Ralph says in *The Expansion of Consciousness*, "a psychedelic experience … typically leads to a more or less total deconstruction of one's worldview, the model of reality and of social relations that we have come to accept through our upbringing and education."[29] This is one way of becoming free of the religious, scientific, and economic conditioning that causes us to behave more like human automata than the Divine beings we truly are.

But is there another way? Could what Stanislav Grof and Charles T. Tart call non-ordinary,[30] altered states of consciousness[31] ever become everyday, ordinary Consciousness? For as Barry Long said in a seminar in 1987 in Bristol, England, which I attended, enlightenment, whatever we might mean by this much misunderstood word, is an ordinary, everyday phenomenon, encapsulated in the phrase "Pass the jam, please," as we might say at the breakfast table. Well, as there is no separate being that is in control of our lives, who knows, and *Who Cares?!*, the provocative title of one of Ramesh S. Balsekar's many books.

All we can really do, as individual, social beings, is to flow as freely as possible with Life, recognizing "What is not meant to happen will not happen, however much you wish it. What is meant to happen will happen, no matter what you do to prevent it. This is certain," as Ramana Maharshi wrote when his mother tried to persuade him to return home from Arunachala in December 1898 or January 1899.[32]

So in this essay, let us look at how different beings and cultures over the ages have attempted to view the accelerating, exponential pace of evolutionary change. We begin with Teilhard himself, making some comparisons with Aurobindo Ghose's evolutionary worldview, as expanded by Ken Wilber. We then move on to the Mayan calendar, especially Carl Johan Calleman's cosmic mapping to the Gregorian calendar, using an evolutionary constant of 20, r in the formula on page 3. Nick Hoggard then refined this model using the Feigenbaum constant in chaos theory of 4.6692, noting that this constant is very close to $\sqrt{20}$, which is 4.4721, interpolating the geometric factor of 20 in the Mayan calendar. We then

look at Terence McKenna's evolutionary model, using a factor of 64 (2^6), the number of hexagrams in *I Ching*, induced by psychedelic experiences shared with his brother Dennis.

All these evolutionary models terminate at a singularity, at a finite point in time. This might seem strange, for surely evolution can continue indefinitely. In particular, there is a widespread belief that the technological society that provides us with many creature comforts will continue unchanged, in the belief that human nature is unchangeable and that computers are the leading edge of evolution.

However, none of these evolutionary models describes what it actually means and feels like to pass through *the* Singularity, living at the Omega point of evolution in everyday life. Neither do they tell us how we might collectively reach evolution's glorious culmination. So the final two sections of this essay briefly describe what could happen here, described in full in my as yet incomplete and unpublished books *Wholeness: the Union of All Opposites* and *Returning Home to Wholeness*, an evolving autobiography.

In essence, if we are to discover whether computers could ever exceed human intelligence, we need to conduct a thought experiment in which we imagine that we are a computer that switches itself off and on again so that it has no programs within it to tell it how to function, not even the bootstrap program that normally loads the operating system from an external hard disk. From this *tabula rasa*, the computer then has the task of organizing all knowledge into a coherent whole, a convergent evolutionary, learning process that Divine, Cosmic beings can accomplish, guided by the Logos. This experiment in learning then carries us to the Singularity in time, as all the divergent paths of evolution converge at its Alpha/Omega point.

After we pass through the Singularity, the world looks utterly different, for we no longer look at the Universe, and hence human society, through fragmented filters. There are no longer any cultural or cognitive inhibitors to the expansion of consciousness and the awakening of intelligence. It is not possible to describe this wonderful experience to others, any more than we can describe a beautiful sunset to someone else over the telephone. Yet Wholeness is our Authentic Self and True Nature. So we all know the Truth in the depths of being, once the clouds of unknowing are dispersed.[33] As more and more people pass through the Singularity, evolution will thereby carry us collectively to what might be called a gigantic, ecstatic orgasm, yet resting in Stillness, in the Presence of the Divine, at the end of time, in the Eternal Now, a notion made famous by Eckhart Tolle's best-selling *The Power of Now*.

Teilhard's four-stage model

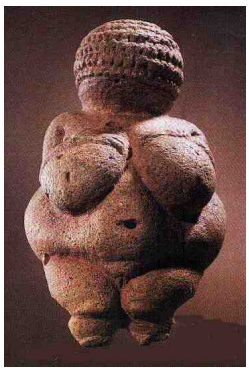
Although Peter Medawar called Teilhard's *The Phenomenon of Man* an 'incoherent rhapsody',[34] it is easy to present his holistic evolutionary model in simple terms. Teilhard saw evolution in four stages, physical, biological, noological or mental, and spiritual, which he called Prelife, Life, Thought, and Superlife in the four parts of his magnum opus. While Teilhard did not explicitly describe the duration of each of these stages and the transitions between them, we can see that each is much shorter than the previous ones because accumulative evolutionary change accelerates exponentially, illustrated in this table:

Evolutionary stages, years ago					Transition stages, years ago		
Teilhard	**Type**	**Start**	**End**	**Duration**	**Start**	**End**	**Duration**
Prelife	Physical	14,000,000,000	4,500,000,000	9,500,000,000			
					4,500,000,000	3,500,000,000	1,000,000,000
Life	Biological	3,500,000,000	25,000	3,500,000,000			
					25,000	5,000	20,000
Thought	Noological	5,000	50	5,000			
					50	-50	100
Superlife	Spiritual	-50	-300	250			

As this table indicates, we are currently in the middle of a 100-year transition period between what we can call the mental-egoic age (the self-centred me-epoch, focused on conflict and competition) and the age of universal spirituality (the socially centred us-epoch, focused on peace and cooperation). We can say that this radical transformation of consciousness began with the counter-cultural movements of the 1960s, symbolized by 'flower power', sometimes induced by consciousness-expanding psychotropic drugs, such as LSD.

Such consciousness-altering biochemical substances had been discovered by the shamans living towards the end of the transition period between the biological and noological stages of evolution, because even then the fragmented, fearful mind—induced by the divergent tendencies in evolution—was beginning to dominate the psyche. We were thus beginning to lose what makes human beings different from the other animals: self-reflective Intelligence, which is Divine, so I usually capitalize *Intelligence*.

As Teilhard said, "what constitutes the truly 'intelligent' being is the fact of being 'reflective'." A species had emerged on this planet that not only knows something, but could know itself, "no longer to know, but to know that it knows".[35] This was a truly momentous change in evolutionary development: "The birth of thought presents itself to us … as a discontinuity, just like the first appearance of life."[36]



But when did self-reflective Intelligence begin to appear? Well, the evidence indicates that our forebears were given this great gift long before the dawn of history, some 5,000 years ago. Perhaps the first indications of our ability to project into our outer worlds what we can see in our inner are the cave drawings that have been found in south-west France, dating from between 15,000 and 35,000 years ago. The many figurines of fertility goddesses that have been found across Eurasia provide further evidence.[37] For instance, this famous figurine, found in Willendorf in Austria, is estimated to be between 18 and 20,000 years old.[38]

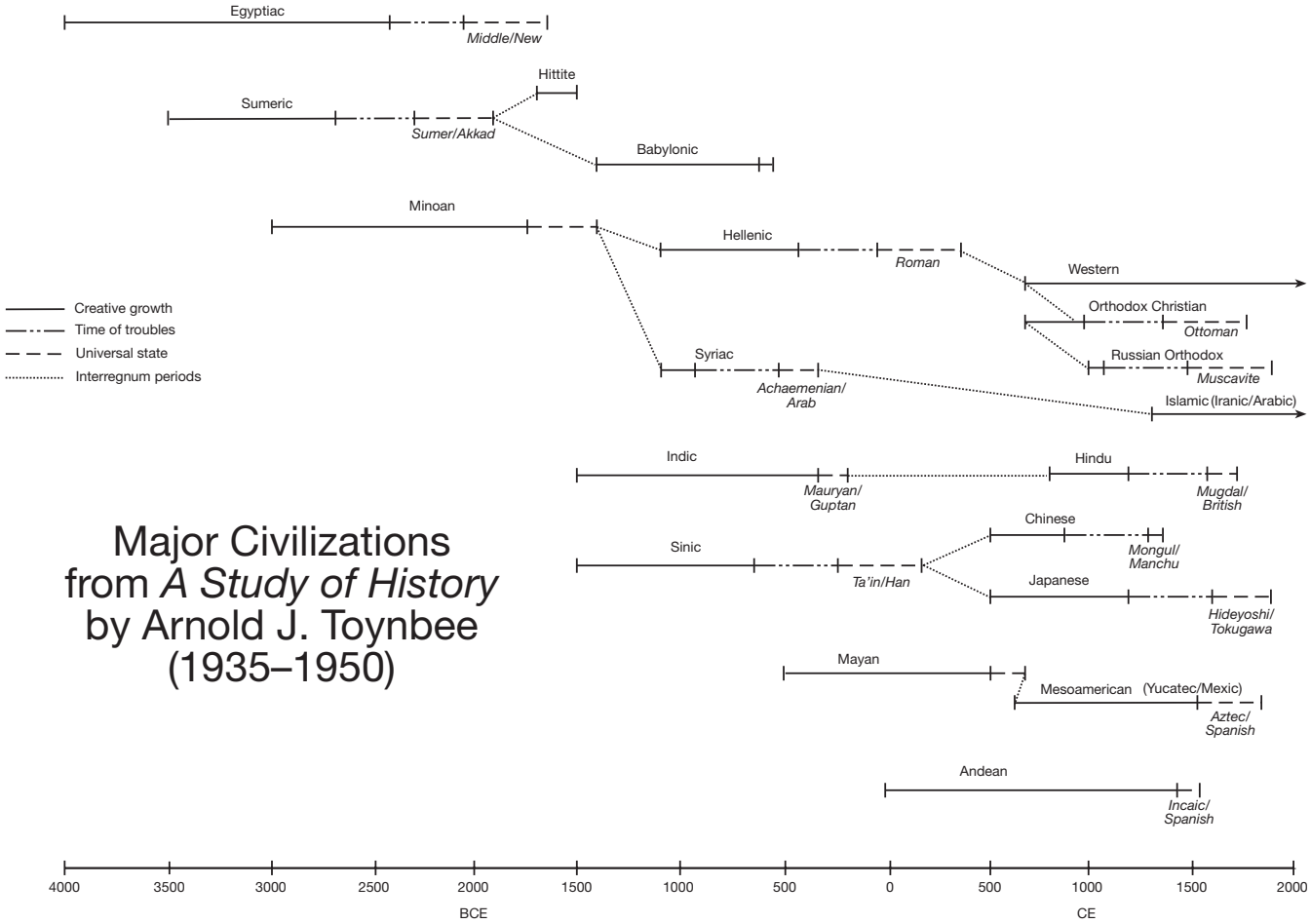
Because of such finds, the transition period between the biological and noological stages of evolution has become known as the Great Mother Goddess epoch. By all accounts, it was a relatively peaceful period, sometimes thought of as a golden age or paradise, as indicated by such myths as Tibetan Sham-bhala: "a place of peace and prosperity, governed by wise and compassionate rulers. The citizens were equally kind and learned, so that, in general, the kingdom was a model society."[39] We can see why this was so by mapping human phylogeny onto ontogeny. Our ancestors during this period were like infants in adult bodies, having no cognitive past, no cultural conditioning to constrain their innate intelligence.

Then suddenly, all hell broke out on Earth, as described in such books as Riane Eisler's *The Chalice and the Blade*. What Maria Gimbutas called the war-mongering Kurgan culture swept across Old Europe from around the Black and Caspian Seas.[40] As Riane tells us, "Ruled by powerful priests and warriors, they brought with them their male gods of war and mountains, [and …] gradually imposed their ideologies and ways of life on the lands and peoples they conquered."[41] At about the same time, the Aryans invaded the India subcontinent. We know that they came from the same region because studies of European, Indian, and Persian languages show that they have a common ancestor, known as Proto-Indo-European (PIE).[42]

The dawn of the patriarchal epoch also brought the first civilizations based on cities, for *civilization* and *city* have a common Latin root *cīvis* 'citizen'. Of the first five civilizations in Eurasia, four were based along rivers, "in a narrow band around 30 degrees latitude in the temperate zone": Sumerians in Mesopotamia between the Tigris and Euphrates rivers, Egyptians in the Nile valley, Indians in the Indus valley, and Chinese along the Yellow river.[43] The exception was the Minoan culture on the

Mediterranean island of Crete, which marked the transition from the matrifocal to the patriarchal epoch as studies of the Linear A and B scripts indicate, the latter being deciphered as an early form of Greek in the 1950s by Michael Ventris.[44]

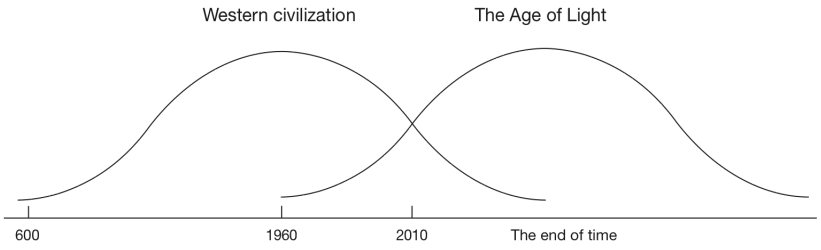
In *A Study of History*, Arnold J. Toynbee identified some twenty major civilizations, a 12-volume tome measuring half a metre in the University of Stockholm library. Thankfully, D. C. Somervell has produced a 2-volume abridgement of this magnum opus, enabling us to depict the timeline of these civilizations in this diagram, the only two extant today being the Western and Islamic civilizations:[45]



Using human pattern-recognition skills, which no computer could ever have, Toynbee saw that all civilizations go through various stages, the most important of which are creative growth, a time of troubles, and a universal state, when the creative energies that brought the civilization into being become ossified. Toynbee summarized the reason for the death of civilizations in this way:

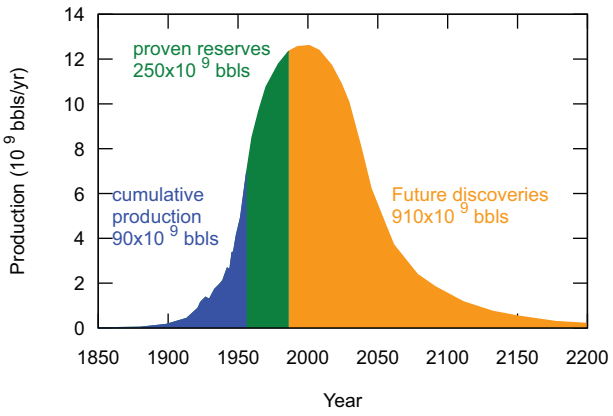
> The nature of the breakdowns of civilizations can be summed up in three points: a failure of creative power in the minority [the leaders who brought the civilization into being], an answering withdrawal of mimesis on the part of the majority, and a consequent loss of social unity in the society as a whole.[46]

Today, as we collectively pass through evolution's great Singularity, all these civilizations in the patriarchal epoch are destined to die, including the re-emerging Chinese and Indian ones, illustrated in this diagram, adapted from Fritjof Capra's *The Turning Point: Science, Society and the Rising Culture*:[47]



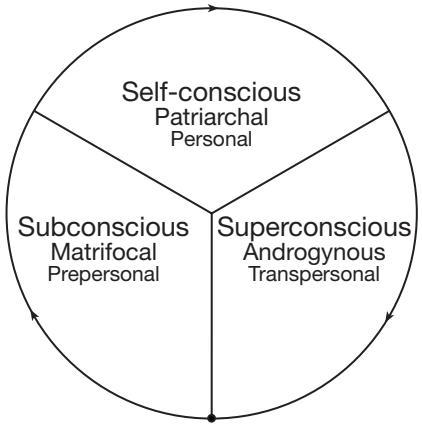
The principal reason why all these civilizations must die is that they are based on the false assumption that we human beings are separate from God, Nature, and each other, when the truth is that we all live in union with the Divine at every instant in our lives. As a consequence of evolution's divergent propensities, Western civilization especially is based on seven pillars of unwisdom, misconceptions of God, Universe, Nature, humanity, money, justice, and reason. Most particularly, because we have become separate from our Immortal Ground of Being, we need to receive a gigantic life-shock in order to deal with such immediate practical issues as peak oil and climate change.

M. King Hubbert originated the notion of peak oil in a paper on 'Nuclear Energy and the Fossil Fuels' that he presented in 1956 to the American Petroleum Institute when working for Shell. Using some very simple mathematics, he showed that the ultimate cumulative production of such finite resources as oil, gas, and coal must follow a bell shape curve, illustrated here, taken from his original paper, captioned 'Ultimate world crude-oil production based upon initial reserves of 1250 billion barrels'.[48]



Mathematically, this curve is closely related to the logistic equation on page 4, the left- and right-hand sides depicting growth and decay, respectively. For all structures in the Universe, including the entire physical universe that we currently live in, go through a birth, growth, decay, and death cycle, arising from our Divine Source and returning there at the end of their lifespans, from a few nanoseconds to zillions of years. In the case of our own bodies, this was typically threescore years and ten, as the psalmist said in the Bible,[49] but today is much longer in many cases. The bell curves in the diagram on page 8, depicting the crossover of civilizations that we are currently passing through, are other mappings to the fundamental Cosmogonic Cycle that governs the Universe.

So as evolution passes through its Singularity, the most important lesson that we are learning is that there is no death, for everything in the relativistic world of form is an illusion, an abstraction from or appearance in Consciousness, called *maya* 'delusion' and *lila* 'play of the Divine' in the East. It is only when we are egolessly free of the fear of death that we can come fully alive as human beings.

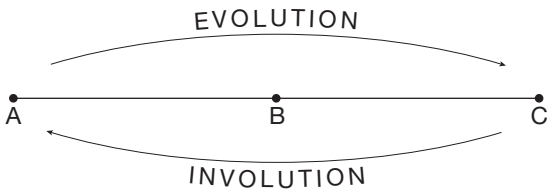


Formless Alpha/Omega Point of Evolution

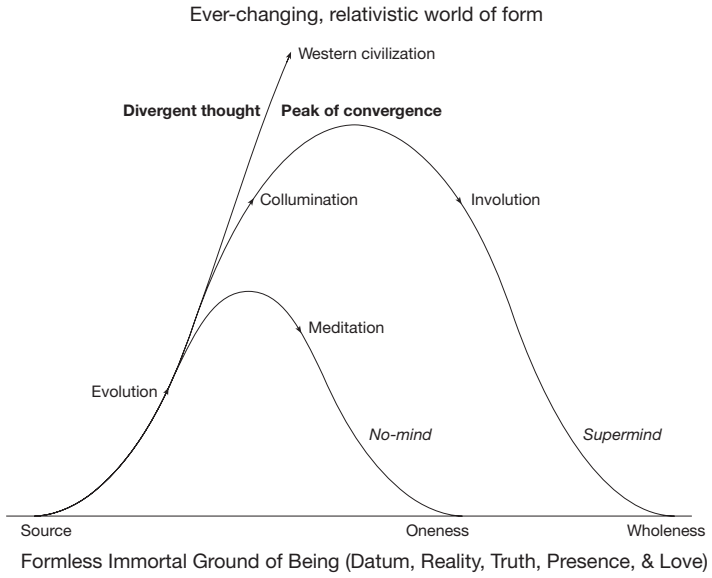
To illustrate this collective transformation of consciousness, Ken Wilber provides a diagram of the three phases of human phylogeny in *Up from Eden*,[50] corresponding to the transition stage between the biosphere and noosphere and the final two stages in Teilhard's evolutionary model. Here it is, somewhat modified, to free it of the Great Chain of Being on which it was based.

As Ken says, the Great Chain of Being is a principle of the perennial philosophy, moving from matter to body to mind to soul to spirit in hierarchical levels of increasing consciousness. "Thus history, from this viewpoint, is basically the unfolding of those successively higher-order structures, starting from the lowest (matter and body) and ending with the highest (spirit and ultimate wholeness)."[51] Teilhard's four-stage model of evolution appears to be following this sequence of the Great Chain of Being.

Aurobindo Ghose's evolutionary model and involution, its inverse, also seems to follow the Great Chain. To Aurobindo, "The word *evolution* carries with it in its intrinsic sense, in the idea at its root the necessity of a previous involution."[52] But this does not make sense, for both evolution and involution actually take place in the vertical dimension of time, in the Eternal Now, not in the horizontal, which is just an illusion, not real at all. Ken has depicted Aurobindo's model in this diagram, using it to illustrate what he calls the Pre/Trans Fallacy,[53] when people conflate the first and third phases of human phylogeny, just because they are both different from the second.



This is a vitally important point. However, Ken's model of evolution/involution does not map my experience, as I passed through evolution's Singularity between January 1977 and October 1983, peaking in the eight weeks between 27th April and 21st June 1980. As no previous theory of evolutionary development or spiritual awakening fully described my experiences during these momentous years, it took me a quarter of a century to make sense of what had happened to me. This happened when on retreat with my last spiritual teacher Nukunu in the Altai Mountains in Siberia in the summer of 2008, when I drew this diagram of three major paths of human ontogeny.



The key point here is that evolution is the outer movement from Formlessness to form, while involution is the return to our Divine Source. If this return happens before evolution has reached its Omega point, as in traditional spiritual paths, the result is Oneness, in union with the Divine. But if all the divergent streams of evolution first converge in the megasynthesis that Teilhard foresaw, then the return leads to Wholeness, fully integrated with the holographic, fractal Cosmos. Of course, people living in Oneness can intuit Wholeness, for Wholeness and Oneness are just two sides of the same coin. However, the coin is biased, with a primary-secondary relationship between Wholeness and Oneness, as the diagram on page 34 shows. Sadly, Ken conflates these two paths in his 3-tier, 12-stage spectrum of consciousness, which has been evolving from *The Spectrum of Consciousness* in 1977 to *Integral Spirituality* in 2006, and presumably to the present day.

We can resolve this dilemma when we follow Andrew Cohen's advice for evolutionaries: if evolution is to become fully conscious of itself in us human beings, "we must be prepared to do battle with the powerful conditioning, conscious and unconscious, of the whole race. That means we have to come out of the shadows and be seen. Like Atlas, we have to be willing to hold up the whole world on our shoulders," realizing that each of us is responsible for the entire evolution of the whole human race.[54]

To undertake this awesome task, we need to see the broader picture, how the exponential rate of evolutionary change since the most recent big bang, 13.7 billion years ago, is leading us through a mystical singularity, rather than the technological singularity being promoted by some computer scientists, such as Vernor Vinge and Ray Kurzweil. There are a number of ways of mathematically mapping periods of time to events in evolutionary history, some of which we examine in the rest of this paper.

The Mayan calendar

The most popular understanding of the singularity that evolution is currently passing through derives from the Mayan Long Count calendar, which lasts 1,872,000 days or about 5,125 years, corresponding to the start of the patriarchal epoch, in a similar manner to several other calendars. Exactly when the Long Count is considered to end is the subject of some debate, dependent on how this Mayan calendar is mapped to the Gregorian one and on what is meant by the end of the calendar.

For instance, John Major Jenkins has said, "The 'zero' date is written 0.0.0.0.0, and the 'end-date' of the 13-baktun cycle is thus written 13.0.0.0.0."[55] Similarly, Carl Johan Calleman has said that this Great Cycle begins and ends at 4 Ahau in the tzolkin calendar.[56] But these statements are like saying that the beginning and end of a year is 1st January and that the twentieth century began in 1900 and ended in 2000, when this year was actually the first in the twenty-first century, by popular decree. So what does all this mean? How can we make sense of what appears to be quite a confusing situation?

Well, the Mayans did not have just one calendar, they had three: the civic calendar was called the haab, the sacred calendar the tzolkin, and what might be called the cosmic calendar, of which the Long Count was the final part. The basic unit in all three calendars was the day, called a kin. The haab calendar consisted of eighteen 20-day periods called uinals, plus five 'waiting' days called vayeb, totalling 365 days,[57] approximately matching the solar year. The uinals acted like months, shorter than the usual lunar months, the first three days in the cycle being 1 Pop, 2 Pop, and 3 Pop.[58]

The tzolkin calendar was rather strange. A day in this calendar was denoted by a number and a glyph, there being 13 numbers and 20 glyphs giving 260 days in all. But these were not ordered like days in a month, as in most calendars. The first three days were 1 Imix, 2 Ik, and 3 Akbal, as if the first three days of the Gregorian calendar were 1 January, 2 February, and 3 Mars. For instance, the 160th day was 4 Ahau.

Apparently, neither of these calendars had a way of counting years. For many purposes they were combined into a cycle of 18,980 days, the least common multiple of 260 and 365, nearly 52 years, called the calendar round or short count. A typical calendar round date was 8 Cauac 2 Zip, denoting days in the tzolkin and haab calendars, respectively.

The Long Count, also called the 'Great Cycle' or 'World Age', is 13 baktuns in length, each baktun being divided into 20 katuns, 20 tuns, 18 uinals and 20 kins. So a ninth-century date, when the Mayans were in their heyday, could be 9.18.2.5.17, like saying that 17th June 2003 is 2003.6.17. The first day in the Long Count is thus 0.0.0.0.0 and the last day is 19.19.19.17.19, corresponding to the last day of the twentieth century, for instance: 1999.12.31, 31st December 1999.

As we can see, the Long Count is almost exponential, the one exception being the 18 uinals in a tun, to make a 'year' of 360 kins, rather than 400. However, as such, it does not enable us to map Teilhard's four-stage model of evolution as whole. To do this, we need to look at the Long Count in the context of the cosmic calendar, as Carl Johan Calleman has done. The Mayans also had longer periods of time in their cosmic calendar, called piktuns, kalabtuns, kinchiltuns, alautuns, and hablatuns, each twenty times longer than the later one. For instance, a piktun is 20 baktuns, much longer than the 13 baktuns in the Great Cycle.

But the Mayans did not stop there in their vast view of time. A stele has been found at Cobá in the Yucatán peninsula that gives the date of Creation as 13×20^{21} tuns ago,[59] which is about 27 octillion years (27 followed by 27 zeroes), double the order of magnitude of the Hindu view of

age of the Universe as 100 Brahma years, which is 311 trillion years, or 14 orders of magnitude. Carl Johan has denoted the Mayan cosmic view in this symbol:

13.13.13.13.13.13.13.13.13.13.13.13.13.13.13.13.13.0.0.0.0[60]

Although the Mayan cosmic calendar is vigesimal, based on 20, rather than the 10 of our decimal system, it seems that this stele measured cycles of each period of time, perhaps because there were thirteen gods in the Mayan pantheon. This explains why there are only thirteen baktuns in the Great Cycle and not twenty. However, 13 does not appear in the Long Count except as a measure of baktuns at the highest level. To get round this problem, Carl Johan looks at the Great Cycle as 13 cycles of baktuns, katuns, tuns, 18-day periods, and kins. These 18-day periods, two days shorter than uinals, don't have a name in any Mayan calendar, but are needed to make the exponential model fit.

Now Carl Johan could map the starting dates of the nine major creation cycles in the Mayan calendar to significant evolutionary turning points since the most recent big bang, as this table shows, omitting the last thirteen kins before the singularity. [61]

Underworld	Cycle	Formula	Years before singularity	Initiating phenomenon	Modern dating in years
Cellular	hablatun	13×20^7 *tun*	16,401,171,606	First matter, 'Big Bang'	13.7 billion
Mammalian	alautun	13×20^6 *tun*	820,058,580	First animals	850 million
Familial	kinchiltun	13×20^5 *tun*	41,002,929	First monkeys	40 million
Tribal	kalabtun	13×20^4 *tun*	2,050,146	First humans	2 million
Regional	piktun	13×20^3 *tun*	102,507	Spoken language	100,000
National	baktun	13×20^2 *tun*	5,125	Written language	5,100
Planetary	katun	13×20^1 *tun*	256	Industrialism	(1769)
Galactic	tun	13×20^0 *tun*	13	?	?
Universal	18-kin	13×18 *kin*	1	?	?

These nine underworlds apparently correspond to the nine levels in the Pyramid of Kukulcan in Chichen-Itza, on the Yucatán peninsula, depicted here at the spring equinox. For at this time of the year, it is possible to watch the descent of the Plumed Serpent, in a cycle of seven light waves and six dark ones. Carl Johan calls these seven days and six nights in the cycles in each underworld, extensively mapping these thirteen cycles to significant points in evolutionary history, especially the fifth day and night, as Ian Lungold shows on YouTube[62] and Keith Wyatt shows in his video 'The Quickening' on his website Awakening as One.[63]

Kukulcan is the Mayan name for what the Aztecs called Quetzalcoatl 'feathered serpent', in whose name prophecies have been made for the dawn of an eschatological Golden Age at the end of the Mayan calendar, not unlike the millennial prophecies of some Christians and other religionists. But when is this going to happen? Well, it is not possible to calculate this using the formula on page 3, for there is no reference point to our Gregorian calendar. This is because by the time that the Spaniards conquered Mesoamerica, the Mayans had abandoned the Long Count calendar.

So what Mayan scholars do is use Julian day numbers, which astronomers use to make predictions such as solar and lunar eclipses. Astronomers regard the zero point of their numbering system to be 12:00 UT on Monday 1st January 4713 BCE in the proleptic Julian calendar (*proleptic* means that it is applied to cases from before it was invented), or 24th November 4714 BCE in the proleptic Gregorian calendar. This is taken as the beginning of recorded history. Using this way of measuring time, Saturday, 1st January 2000 had a Julian day number of 2,451,545, which we can call the correlation coefficient when matching the Mayan calendar to the Gregorian calendar.

In Mayan terms, many long-count dates have been discovered with the form 9.w.x.y.z, denoting contemporary events in the fifth to ninth centuries. So we know roughly when the tenth baktun existed and so can work backwards to the beginning of the Long Count. But can we be more accurate? Can we find the precise Julian day or correlation coefficient that marks the beginning of the Great Cycle of 13 baktuns, 5,125 years, or 1,872,000 days?

Well, after many years of considering information from various fields such as astronomy, ethnography, archaeology, and iconography, J. Eric S. Thompson found a correlation coefficient of 584,283, which is now known as the Goodman-Martinez-Thompson (GMT) correlation.[64] This gives the first and last days of the Long Count as Monday 11th August 3114 BCE and Thursday 20th December 2012, respectively. The next day, the winter solstice, is the first day *after* the end of the calendar, when a New Age is supposed to dawn. However, Floyd Lounsbury, supported by Linda Schele, David Freidel, and a number of others, is promoting 584,285 as the correlation coefficient, giving 23rd December 2012 as the first day after the end of the calendar.[65] I don't know the reasons for this.

Carl Johan Calleman has argued for another correlation coefficient. He has several reasons, the most important is that the tzolkin cycle of 260 days in the Tzolkin calendar is not synchronized with the Long Count. As there are exactly 7,200 tzolkins in the Long Count, it should be possible to synchronize the Long Count with the Tzolkin calendar. However, the first day of the Long Count is generally regarded to be 4 Ahau, the 160th day in the Tzolkin, and the last day is 3 Cauac. Whereas, the first and last days in the Tzolkin calendar are 1 Imix and 13 Ahau.

As the Long Count cycle begins at 0 and the tzolkin at 1, we either need to go forwards 101 days or backwards 159 days, plus a multiple of 260 to synchronize the two calendars. In fact, Carl Johan has chosen to go back 419 days (159 + 260), regarding 11th August 3114 BCE as the first day of the Long Count, which is 1 Imix in the Tzolkin calendar. The last day in the Long Count is then 28th October 2011.[66] But why not choose 14th July 2012 or 31st March 2013 as the last day of the Long Count? Both these dates are closer to 20th December 2012 than Carl Johan's proposed date.

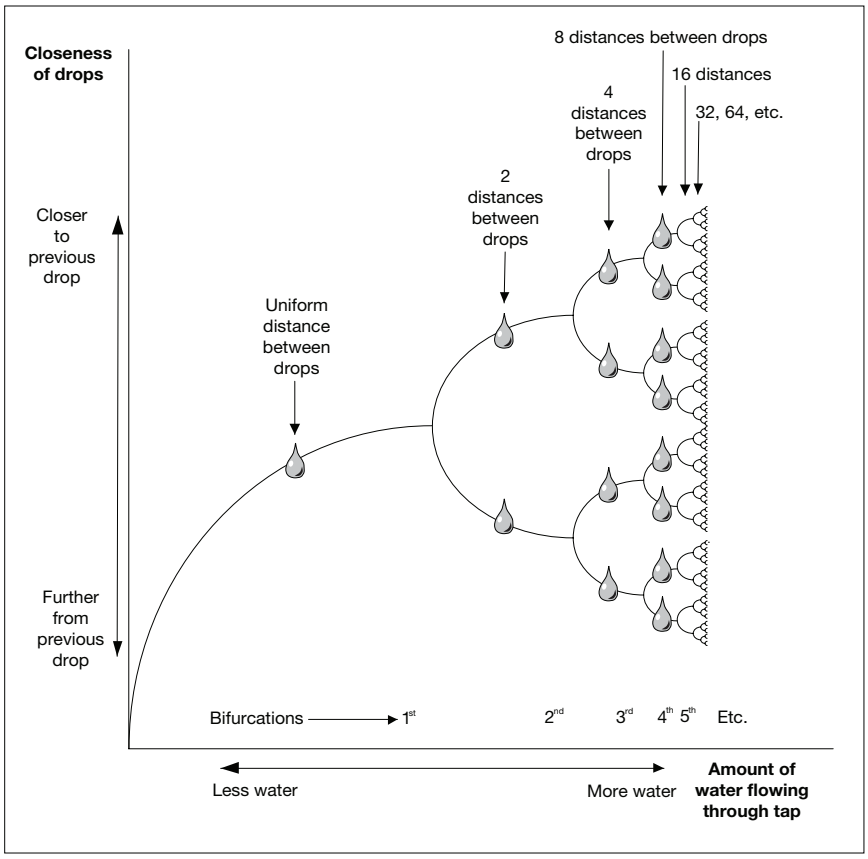
What this means is that in Carl Johan's model, he is using the GMT correlation coefficient of 584,283 to map the Gregorian calendar to the Tzolkin calendar still used in the highlands of Guatemala.[67] But he is effectively using a correlation coefficient of 583,864 to map the Gregorian calendar to the Long Count, which then becomes synchronized with the Tzolkin calendar. He has done this despite the fact that the Tzolkin date on the Creation stele on page 11 is given as 4 Ahau. So it seems that the Mayans themselves did not synchronize the Long Count and Tzolkin calendars. Curious.

A systems perspective

Towards the end of the 1990s, Carl Johan Calleman gave a talk on his evolutionary model to students at the Holma College of Holistic Studies in southern Sweden, where Nick Hoggard noticed a glaring omission in the model: the so-called origin of life on Earth was not included as a major turning point. Nick realized that such a momentous event in evolutionary history could be included by considering $\sqrt{20}$ rather than 20 as the evolutionary diminishing factor. Now $\sqrt{20}$ is 4.472, which is reasonably close to 4.669, the first Feigenbaum constant in chaos theory, a mathematical constant (δ) like π and *e*.[68] This constant expresses the limiting ratio of each bifurcation interval to the next in a bifurcation diagram,[69] which is closely related to the Mandelbrot set, the boundary of which forms a fractal,[70] an example of self-similarity, similar to the holographic map of the Universe outlined in section 'The role of information systems architect' on page 23.

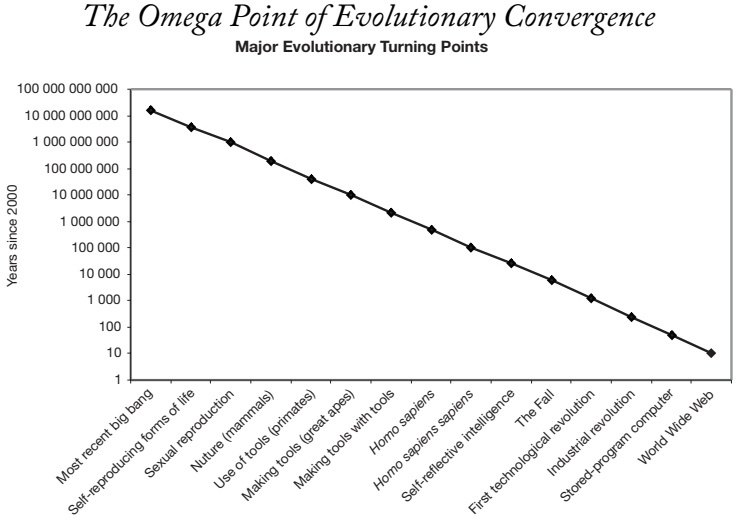
Nick therefore realized that he could use systems theory to develop a comprehensive model of evolutionary history. He wasn't the first to have this idea. In *The Phenomenon of Science: A Cybernetic Approach to Human Evolution* published in 1977, Valentin Turchin, a Russian physicist, computer scientist, and dissident, used cybernetics to model the way that evolutionary structures are becoming ever more complex in their organization.[71] I first read this book in 1980, but it did not really provide me with the sound exponential model that I was seeking. Nick provided me with such a model in 2000, when I heard him give a talk in south-east Sweden at the continental meeting of the British Scientific and Medical Network.

Here is a little of what I learned from Nick, now working as a software developer. A simple example of bifurcation is a dripping tap. When it is first turned on, the drips are equally spaced: drip-drip-drip. But as more water flows, the drips form pairs, with a larger distance between the pairs than within the pairs: drip-drip--drip-drip--drip-drip. This is the first bifurcation. Then, as the tap is opened up, the number of different distances between the drops doubles: drip-drip--drip-drip---drip-drip--drip-drip----drip-drip--drip-drip. At each bifurcation, the number of different distances doubles each time, illustrated in this diagram, reproduced from Nick's unpublished book *SuperEvolution*, where a bifurcation ratio of 2 is used rather then 4.669 to make the diagram clearer.



Here, we once again have an infinite geometric series, with r = 4.669, whose finite sum is 1.273, when a = 1. In the case of the dripping tap, the end of the dripping marks this finite limit, when the tap is turned full on, flowing continuously. This point is aptly called the accumulation point, as all the water in the tap accumulates into a steady flow. As evolution is an accumulative process, we can similarly view the whole of evolution as a series of bifurcations, corresponding to major evolutionary turning points. The diagram on the next page illustrates this mapping. A simple calculation shows that evolution's accumulation point was reached around 2004. Even though the calculation is accurate to the yoctosecond, this is of spurious accuracy because of the fuzziness of the mappings.

The Omega Point of Evolutionary Convergence



We can therefore see that all the accumulative evolutionary processes of the past fourteen billion years or so have reached the evolutionary accumulation point at a singularity in time. There are no longer any major turning points that can be discerned. Evolution is now flowing continuously, like a tap that is turned full on, the most fundamental change in the entire history of evolution.

Timewave Zero

Let us now look at another way of showing how all evolutionary processes in the Universe are leading to a singularity of time, a model that I have recently discovered from Peter Russell,[72] and which is gaining popularity on the Web. In 1971, 24-year-old Terence McKenna and his 20-year-old brother Dennis travelled to Amazonian Columbia to study ethnobotany, the way that various plants are used by shamans to induce psychedelic transformations in consciousness, *psychedelic* deriving from Greek *psyche* 'soul, mind' and *dēlos* 'clear, visible', from PIE base **dyeu-* 'to shine', also root of *divine* and *jovial*.

The McKennas were drawn to the Amazon because they had read a report that said, "shamans, under the influence of potent monoamine oxidase-inhibiting, harmine- and tryptamine-containing *Banisteriopsis* infusions, are said to produce a fluorescent violet substance by means of which they accomplish their magic." Dennis, in particular, who was later to receive a doctorate in psycho-pharmacology, speculated that such substances could transform genetic archetypes through changes in the waveform hologrammatic configuration of ESR (electron spin resonance). Such a macro-molecule "would be a superconductive holographic information storage system, containing all genetically and experientially coded information within its waveform pattern. It would respond to thought, which would be an interference pattern set up by resonating tryptamine-RNA complexes."

To test his hypothesis, on 4th March 1971, at a tiny mission settlement at La Chorrera, Dennis and Terence embarked on an experiment, which turned out to be life-changing. They ingested some mushrooms (*Stropharia cubensis*), whose major psychoactive constituent is psilocybin, and drank a beverage of *ayahuasca*, from the leafy, woody plant *Banisteriopsis caapi* containing harmine and tryptamine.[73] The effect was mind-shattering, which you can read about in Terence's book *True Hallucinations*, from 1993, and the brothers' book *The Invisible Landscape*, first published in 1975, but republished in 1994 with more mathematical information about the singularity in time that was revealed to Terence, in particular, which is the primary focus of this essay.

In essence, it seems that Terence, who Jay Stevens describes as a 'quicksilver poet-philosopher', almost immediately opened up to the entire Cosmos, seeing time as a series of hierarchical timewaves, resonating with each other within greater and lesser timespans, somewhat like fractals, with their property of self-

similarity. Within a month of this life-changing experience, as he returned to Berkeley, Terence came "to realize that the internal logic of the timewaves strongly implied a termination of normal time and an end to ordinary history".[74]

But how could Terence make sense of this vision? He and Dennis had been educated in the USA, within the delusional worldview of Western civilization. However, they were also well aware of the great movement towards a fundamental paradigm shift in science, one that embraces Eastern mysticism and ancient wisdom, going far further than the scientific revolution of the sixteenth and seventeenth centuries. Following this emerging zeitgeist, Terence turned to *I Ching* '*Book of Changes*', in which to describe his vision.

Richard Wilhelm, the interpreter of a classical translation of the *Book of Changes*, describes *I Ching* as a collection of linear signs used as oracles, which traditionally confined themselves to answers 'yes' and 'no'. *I Ching* began in this way, with an unbroken line (–) denoting 'Yes' and a broken line (--) 'No'.[75] These lines also represent *yin-yang*, with yang being unbroken, depicted in traditional and simplified Chinese with these signs, respectively: 陰陽 and 阴阳. Yin and yang are often associated with female and male and with dark and light, respectively. But these opposites were far more general, corresponding to *A* and *~A*, respectively, in the Principle of Unity, defined on page 34.

However, as Wilhelm tells us, "the need for greater differentiation seems to have been felt at an early date, and the single lines were combined in pairs," the lower line being more significant:

Greater yang Lesser yang Lesser yin Greater yin

Seeking even greater differentiation, a third line was added to form trigrams, which "were conceived as images of all that happens in heaven and on earth. … The eight trigrams are symbols standing for transitional states … [they] therefore are not representations of things as such but of their tendencies in movement." The trigrams were given various names and characteristics, as in this table.

Sign	Name				Characteristic	Image	Family relationship
☰	Ch'ien	quán	乾	the Creative	strong	heaven	father
☷	K'un	kūn	坤	the Receptive	devoted, yielding	earth	mother
☳	Chên	zhèn	震	the Arousing	inciting movement	thunder	first son
☵	K'an	kǎn	坎	the Abysmal	dangerous	water	second son
☶	Kên	gèn	艮	Keeping still	resting	mountain	third son
☴	Sun	xùn	巽	the Gentle	penetrating	wind, wood	first daughter
☲	Li	li	離	the Clinging	light-giving	fire	second daughter
☱	Tui	duì	兌	the Joyous	joyful	lake	third daughter

However, the Chinese did not stop there. To achieve still greater multiplicity, they combined the trigrams to form 64 (2^6) hexagrams. As Hellmut Wilhelm, Richard's son, tells us, "The system of existence and events underlying the *Book of Changes* lays claim to completeness. The book attempts a correlation of situations in life in all strata, personal and collective, and in all dimensions. An added

feature of the system are the trends of development latent within the various situations and their reciprocal relations."[76]

It was this sense of wholeness that drew Terence McKenna to *I Ching* in which to express his psychedelic vision. As he said, "The *I Ching* is a mathematical divinatory tool of great age whose probable origin is the mountainous heart of Asia—the home of classical shamanism and Taoist magic". So as "divination is the especial prerogative of the shaman, whatever the cultural context … the unconscious contents which our experiment made accessible were constellated around the *I Ching* because it is particularly concerned with the dynamic relationships and transformations that archetypes undergo."[77]

But what sequence of hexagrams should McKenna use for his fractal view of time, terminating at a singularity? As there are 64 different hexagrams, there are 64! different ways of arranging them in a sequence, which is 1.27×10^{89}:

126,886,932,185,884,164,103,433,389,335,161,480,802,865,516,174,545,192,198,801,894,375,214,704,230,400,000,000,000,000

Perhaps the most obvious way of ordering the hexagrams in this digital age is from 0 to 63 (000000 to 111111 in binary notation), 0 being yang, the unbroken line. This is the sequence that Shao Yung studied in the eleventh century, during the Sung (Song) dynasty. Shao Yung is regarded as the founder of the idealistic school,[78] focused much more on iconographic and cosmological concepts than on traditional literalistic and moralistic concepts, followed by his contemporaries.[79] It was this sequence, laid out in an 8 x 8 table, that Leibniz studied, establishing amazing parallelisms between Eastern and Western thought.[80]

However, this arrangement overlooks the reciprocal nature of the hexagrams, which can be arranged in pairs in two ways: (1) in complementary pairs, like ䷀ and ䷁ and (2) in inverted pairs, like ䷂ and ䷃. In the first of these, all six lines change in every pair, whereas in this example of inverted pairs, only two lines change. There is thus greater variety in the second arrangement and therefore more information. However, this arrangement does not work in eight cases, when the hexagram is palindromic, the same when inverted, like ䷗, when its complement is used: ䷽. Nevertheless, there are still $2^{32} \times 32!$ possible arrangements of these inverted pairs, or 1.13×10^{45}, about one quintillion cubed, a quindecillion:

1,130,138,339,199,322,632,554,990,773,529,330,319,360,000,000

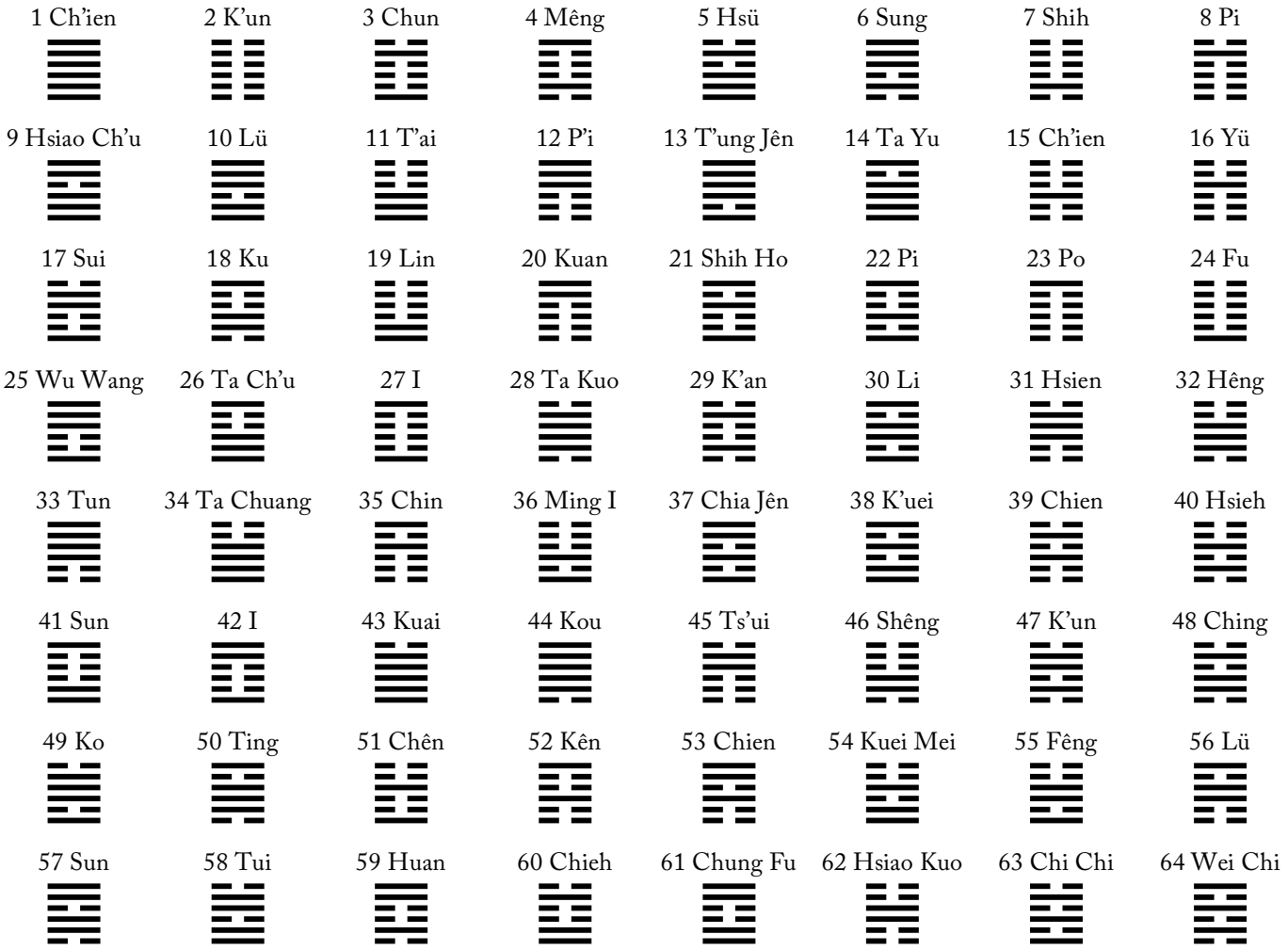
So around 1000 BCE, when the *I Ching* came into wide use, the Chinese had many arrangements of the pairs to choose from. The oldest of these is known as the King Wen sequence, listed on page 18, also the series of transitions that Richard Wilhelm presented in his translation of *I Ching*. But why this sequence? What is special about it? How could this particular sequence of universal categories or archetypes shed light on one's fate? Well, McKenna discovered three interesting properties:

1. There are no transitions with a value 5.
2. A transition value of 1 is only used when the alternative would violate rule 1.
3. There is a ratio of three to one in the even and odd transitions.[81]

Nevertheless, McKenna discovered that these properties are very far from random. He generated 1.2 million random inverted pairs on a computer and found that only 805 had these three properties, 0.07%, or 1 in 1,769 Wen-like sequences. So he was quite content to use the King Wen sequence of transitions for his studies into novelty theory in fractal time, listed in this table of first-order differences.[82]

6	2	4	4	4	3	2	4
2	4	6	2	2	4	2	2
6	3	4	3	2	2	2	3
4	2	6	2	6	3	2	3
4	4	4	2	4	6	4	3
2	4	2	3	4	3	2	3
4	4	4	1	6	2	2	3
4	3	2	1	6	3	6	3

McKenna also noticed that not only are there 64 hexagrams in the *I Ching*, there are also 384 (6 × 64) lines. Now, according to Joseph Needham, from an examination of oracle bones dating to the thirteenth

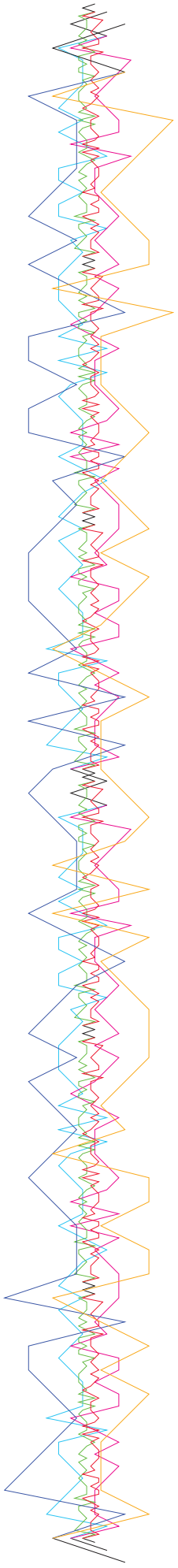


century BCE, the Chinese knew that the length of a lunation is 29.53 days, compared to 29.530588, as is known today. So the ancients knew that thirteen of these lunations are 383.89 days (13 × 29.53), a pretty accurate correspondence on which to base a calendar.[83]

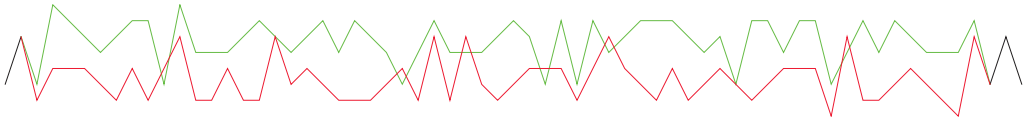
Knowing the Chinese love of cycles, hierarchies, and resonances, McKenna then surmised that what can be done with the *yao* (lines) could also be done with the entire set of *yao*. So he hypothesized a set of resonances based on 384 × 64 days, 384 × 64 × 64 days, and so on. Not only this, he saw time in shorter and shorter durations as well as longer and longer ones. So using 6 days as the base, he found 26 levels and durations of temporal hierarchy of the form 6×64^{i} days, where i ranges from 7 to -18 or of the order of 10^{18} to 10^{-27} when measured in seconds. In physical temporal terms, these range from five times longer than the time since the most recent big bang to the range of Planck's constant.[84]

With these premises, McKenna now needed to express his resonating novelty theory in mathematical terms. In essence, he saw time "as the ebb and flow of two opposed qualities; novelty and habit, or density of connectedness versus disorder". So even though he believed in the absolute truth of the second law of thermodynamics, he saw that in localized areas entropy could decrease through *concrescence* 'growing together', a recent instance being the appearance of language.[85]

However, it was not until 1986 that McKenna began working with Peter Meyer to develop software that could translate the former's mathematical intuitions into C and thus define the core algorithm in Timewave theory. So, even though McKenna had other programming assistants, listed in full in Meyer's documentation, it was not until then that McKenna's rather obscure vision of resonant timewaves could be expressed in a fractal function.[86]



Nevertheless, the first step is quite simple. McKenna drew a graph of the 64 hexagrammatic transitions or first-order differences in the table on page 17, shown below in red. He then rotated this graph 180° and cycled it by one position, so that three lines matched at the ends, shown in green. He called these three levels of closure, marked in black, the key to calculating his way of viewing a singularity in time.



As McKenna considered that trigrams and hexagrams should be treated in exactly the same way as lines, he next expanded this pair of waves, shown on the left. He called this the 'eschaton', from Greek *eskhatos* 'last', also the root of *eschatology*. However, he defined *eschaton* as 'a universal and fractal morphogenetic field', a quantized wave-particle of time.[87] The eschaton is formed by linearly arranging six versions of the basic wave, two versions of the wave expanded three times, representing trigrams, and one version expanded six times, representing the hexagram as whole.

He next found the differences between the distances and slopes of each of the three pairs of waves, the slopes being the second order of differences between the transitions, which could be either positive or negative depending on the direction of the skew. The documentation on Peter Meyer's C program that performs these calculations doesn't make the underlying semantics crystal clear. So I've written a Python program to illustrate what is a rather inelegant algorithm, listed on the next page.

Sometime before Meyer's program became available, Matthew Watkins discovered McKenna's transformation of the hexagrammatic transitions and developed a single formula for what he called a 'piecewise linear function', which he described as worryingly arbitrary and mathematically clumsy, lacking a sound foundation. He was particularly critical of the sign reversal in the first 32 slope differences, known as the 'mysterious half twist', which he said invalidated the entire enterprise.[88]

However, we need to remember that McKenna was not trying to prove anything mathematically, following Euclid's linear method of proof, based on assumed axioms. Rather, he was expressing in mathematical terms the harmony of the Universe that had been revealed to him during his psychedelic trip, rather like the way that Mozart composed symphonies. Timewave Zero is a divine revelation, just as this essay is.

All the differences in the distances and slopes between the wave function and its inverse are then totalled to produce 384 data points for the timewave fractal transform:

0	0	0	2	7	4	3	2	6	8	13	5	26	25	24	15	13	16	14	19	17	24	20	25
63	60	56	55	47	53	36	38	39	43	39	35	22	24	22	21	29	30	27	26	26	21	23	19
57	62	61	55	57	57	35	50	40	29	28	26	50	51	52	61	60	60	42	42	43	43	42	41
45	41	46	23	35	34	21	21	19	51	40	49	29	29	31	40	36	33	29	26	30	16	18	14
66	64	64	56	53	57	49	51	47	44	46	47	56	51	53	25	37	30	31	28	30	36	35	32
28	32	27	32	34	35	52	49	48	51	51	53	40	43	42	26	30	28	55	41	53	52	51	47
61	64	65	39	41	41	22	21	23	43	41	38	24	22	24	14	17	19	52	50	47	42	40	42
26	27	27	34	38	33	44	44	42	41	40	37	33	31	26	44	34	38	46	44	44	36	37	34
36	36	36	38	43	38	27	26	30	32	37	29	50	49	48	29	37	36	10	19	17	24	20	25
53	52	50	53	57	55	34	44	45	13	9	5	34	26	32	31	41	42	31	32	30	21	19	23
43	36	31	47	45	43	47	62	52	41	36	38	46	47	40	43	42	42	36	38	43	53	52	53
47	49	48	47	41	44	15	11	19	51	40	49	23	23	25	34	30	27	7	4	4	32	22	32
68	70	66	68	79	71	43	45	41	38	40	41	24	25	23	35	33	38	43	50	48	18	17	26
34	38	33	38	40	41	34	31	30	33	33	35	28	23	22	26	30	26	75	77	71	62	63	63
37	40	41	49	47	51	32	37	33	49	47	44	32	38	28	38	39	37	22	20	17	44	50	40
32	33	33	40	44	39	32	32	40	39	34	41	33	33	32	32	38	36	22	20	20	12	13	10

```
import copy

# list of first-order differences between hexagrams in King Wen I Ching series
diff = [6, 2, 4, 4, 4, 3, 2, 4,
        2, 4, 6, 2, 2, 4, 2, 2,
        6, 3, 4, 3, 2, 2, 2, 3,
        4, 2, 6, 2, 6, 3, 2, 3,
        4, 4, 4, 2, 4, 6, 4, 3,
        2, 4, 2, 3, 4, 3, 2, 3,
        4, 4, 4, 1, 6, 2, 2, 3,
        4, 3, 2, 1, 6, 3, 6, 3]

# rotate differences 180 degrees and offset by one position
rdiff = copy.deepcopy(diff)
rdiff.reverse()
rdiff.append(rdiff[0])
rdiff.pop(0)

# add 64th difference to start
diff65 = diff
diff65.insert(0,diff[63])
rdiff65 = rdiff
rdiff65.append(rdiff[0])

# align rotated differences with differences for closure
for i in range(65):
    rdiff65[i] = 9 - rdiff65[i]

# find the distances between the two waves
distance = []
for i in range(65):
    distance.append(rdiff65[i]-diff65[i])
distance.pop(0)

# find slopes of two waves (second order of differences)
slope=[]; rslope=[]
for i in range(64):
    slope.append(diff65[i]-diff65[i+1])
    rslope.append(rdiff65[i]-rdiff65[i+1])

# find differences between the two slopes
slopeDiff = []
for i in range(32):
    slopeDiff.append(rslope[i]-slope[i])
for i in range(32,64):
    slopeDiff.append(slope[i]-rslope[i])

# align slopes with distances
slopeDiff.append(slopeDiff[0])
slopeDiff.pop(0)

# calculate the 384 data points for the fractal transform
distLine = []; slopeLine = []
distTrigram = []; slopeTrigram = []
distHexagram = []; slopeHexagram = []
distSum = []; slopeSum = []
dataSet = []

for i in range(384):
    distLine.append(distance[i%64])
    slopeLine.append(slopeDiff[i%64])
    distTrigram.append(3*distLine[int(i/3)])
    slopeTrigram.append(3*slopeLine[int(i/3)])
    distHexagram.append(6*distLine[int(i/6)])
    slopeHexagram.append(6*slopeLine[int(i/6)])
    distSum.append(distLine[i] + distTrigram[i] + distHexagram[i])
    slopeSum.append(slopeLine[i] + slopeTrigram[i] + slopeHexagram[i])
    dataSet.append(abs(distSum[i]) + abs(slopeSum[i]))

dataSet.reverse()
```

Now this list of 384 data points is both finite and discrete. So to turn it into an infinite continuous function, Meyer created a linear interpolation of these 384 values, repeated to infinity. The algorithm is given here as a Python expression, because it is clearer that way, `ds` being short for `dataSet`.

$$v(x) = \texttt{ds[int(x)\%384] + (x - int(x)) * (ds[int(x+1)\%384] - ds[int(x)\%384])}$$

Now came the master-stroke. Meyer was able to express McKenna's vision of resonant, harmonic time terminating at the end of time in a fractal transform of the function $v(x)$.[89] He first generated a general function, showing that it exists provided that two conditions are met:

1. $v(x)$ is finite for all x.
2. $v(x)$ is zero for all x less than a finite number.

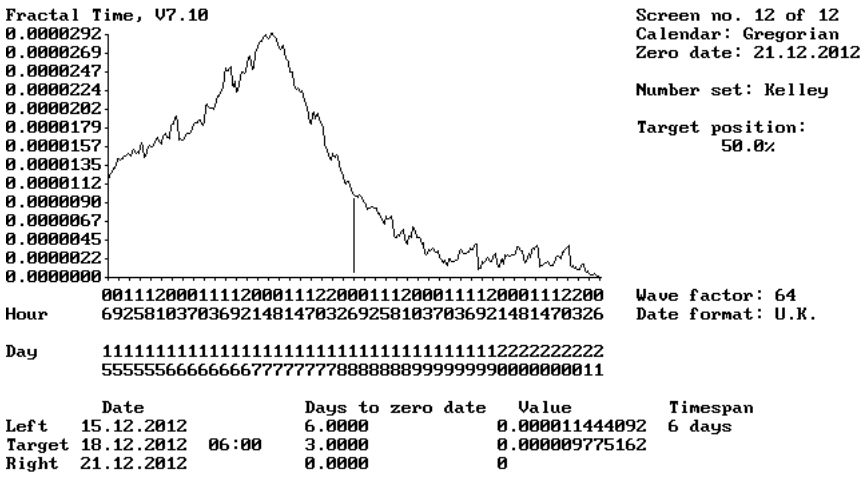
The interpolated data points generated from the *I Ching* hexagrammatic King Wen transitions fit these conditions. So Meyer was able to define a specific fractal transform for Timewave Zero:

$$f(x) = \sum_{i=-\infty}^{\infty} \frac{v(x * 64^i)}{64^i}$$

He proved that this infinite series sums to a finite limit. The first condition is needed for zero and positive values of i. This series terminates like the formula on page 3, where $a = 79$, the maximum of the generated data set, and $r = 64$. For negative values of i, the second condition ensures that there are just a finite number of finite terms to be summed, for when i is absolutely greater than some finite number, the term is zero. Also $f(x) = 0$ when $x = 0$, denoting maximum novelty at zero time. $f(x)$ also has the desired resonant properties because Meyer also proved this simple relationship:

$$f\left(x * 64^j\right) = 64^j * f(x)$$

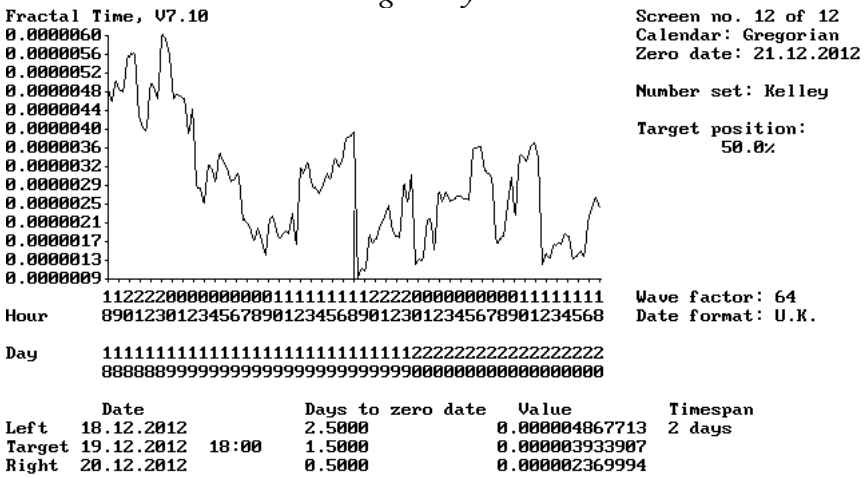
This was key. For instance, here is a plot of $f(x)$ for the six days before the zero date, amazingly generated using a 1990s DOS program under Mac OS X,[90] the days corresponding to lines in the *I Ching* hexagrams:



This wave is exactly the same as for 384 days (6 × 64), for 67 years (6 × 64 × 64), for 4306 years (6 × 64 × 64 × 64), and so on. The timewave does not need to end at the zero date. To illustrate the fractal nature of the fractal transform, we can zoom into just a part of the wave, like in a Mandelbrot set. For instance, the timewave on the next page covers forty-eight hours from 18:00 on 18th December 2012 to 18:00 on 20th December 2012. It similarly covers 128 days from 14th July to 19th November 2012, days starting at 6:00 in the morning, and 8,192 days from 8th December 1984 to 14th May 2007.

With Meyer's *Fractal Time* software, McKenna was able to study many periods of time, noting resonances in historical events between periods differing in length by a factor of 64. Such mappings are similar to Carl Johan Calleman's mappings to the Mayan calendar on page 12, using a factor of 20. It was these mappings that led McKenna to 2012 as the singularity in time that his vision foretold. At first, he thought that November 2012 provided the best mapping to historical events.[91] But then he discovered the projected end of the Mayan Great Count and so was happy to jump onto this bandwagon.

The Singularity in Time



However, from what I have seen of the correlations between the timewave function and historical events, these are subject to much interpretation and debate. There is even much debate about McKenna's original vision for generating the data points, from which Royce Kelley and Leon Taylor developed the original algorithm in the early 1970s. For apparently, this algorithm did not exactly match McKenna's psychedelic vision. Then there is the Watkins algorithm, without the 'half-twist'. The mathematician John Sheliak has developed yet a third algorithm, quite different from the other two.[92] Furthermore, the equally ancient Huang Ti sequence of the hexagrams has a closure of 9, compared with 3 in the King Wen sequence, generating quite different timewaves.[93]

So, rather than exploring the historical resonances that McKenna studied further, it is far more relevant to note that at his singularity in time, novelty and concrescence are zero. This might seem strange, but it is easier to plot increasing novelty diminishing on a graph. There is a facility in the *Fractal Time* software to show novelty tending towards infinity, more meaningful, but not so easy to display on a finite computer display.

So what does it mean to say that novelty is now reaching its evolutionary maximum? Well, this essentially means that there are no longer any inhibitors to creativity, no paradigms or dogmatic religious, scientific, or economic worldviews preventing evolution flowing with its full power. As we saw on page 15, in systems theory terms, this is like turning a tap full on so that it flows profusely at evolution's accumulation point, the most momentous event in fourteen billion years of evolution. Furthermore, as concrescence also reaches a maximum at this point, all the divergent streams of evolution, which have led to our fragmented minds and schizoid society, converge in Wholeness at the beginning and end of time in the Eternal Now.

But what does it *feel* like to pass through this Singularity in time? In *The Voice of Experience*, R. D. Laing pointed out in this critique of objective science, "Experience is not an objective fact. A scientific fact need not be experienced." Furthermore, "A fact makes no difference to me personally unless I realize it. … It is very much easier to realize something one experiences personally than something one does not, perhaps cannot, experience at all."[94] So if we have never had a psychedelic experience that opens consciousness to Consciousness itself, how can we possibly know what this means? Well, when Richard Alpert, who became Ram Dass, gave a large dose of LSD to his guru in India, it had absolutely no effect.

There is thus a mystical approach to opening up to the Divine, as many spiritual teachers are showing today. One of these is Rupert Spira, a teacher of Nonduality, who says in *The Transparency of Things: Contemplating the Nature of Experience*, "If we explore Consciousness we find that it has no objective qualities. And yet it is what we most intimately know ourselves to be. … There is no adequate name for

that into which the mind dissolves. We are taken to the utmost simplicity of direct experience." However, "this does not invalidate the use of the mind to explore the nature of Consciousness and Reality."[95]

However, how can we do this? For some 25,000 years, we human beings have struggled to understand the Divine, which we experience as Presence, from the Latin *præsentia*, participle of *præesse* 'to be before', from *præ* 'before' and *esse* 'to be'. The Latin origin of *presence* literally means 'before being' or 'prior to existence'. So to fully understand what it means to pass through the Singularity in time, we need both experience and a coherent, self-reflective worldview that can make sense of our experiences. Let us therefore explore this union of rationality and mysticism in the next two sections.

The role of information systems architect

In the preface to *The Phenomenon of Man*, Julian Huxley wrote, "in modern scientific man, evolution [is] at last becoming conscious of itself," a phrase that delighted Pierre Teilhard de Chardin.[96] In a sense this is true, for evolution has produced scientists, most notably Charles Darwin, who have developed a coherent theory of how we human beings have evolved from the other animals. But does this mean that scientists have become conscious of the way that evolution is unfolding within themselves?

Indeed not. As Teilhard said, "Even though the first evolutionists were such materialists, the idea never occurred to them that their scholarly intelligence itself had anything to do with evolution."[97] In a similar fashion, R. D. Laing said, "It is ironical that such [objective] scientists cannot see the way that they see with their way of seeing."[98] So what does it actually mean for evolution to become conscious of itself in modern scientific man and woman?

Well, we can most easily understand this from the job of information systems architect in business. Such designers are the master builders, for *architect* derives from Greek *arkhitektōn* 'builder, architect, engineer', from *arkhe* 'beginning, origin; leadership, power, rule', from *arkhos* 'leader, ruler', from *arkhein* 'to begin, rule, command', and *tektōn* 'builder', from PIE base **teks* 'to weave, fabricate', also root of *context* through Latin *texere* 'to weave' and *technology* through Greek *tekhnē* 'art, craft, skill'. So information systems architects are not only master builders, they are also evolutionary pioneers.

Specifically, this job has been evolving since the beginning of the Computer Age in the middle of the twentieth century, when the first stored-program computers were built at the Universities of Manchester and Cambridge in England. For computers are machines unlike any other tools that we have invented over the millennia to undertake tasks that our bodies and minds are unable to perform unaided. Unlike such tools as wheeled chariots, steam engines, telephones, and aeroplanes, which extend our *physical* abilities, computers are tools of thought that extend our *mental* facilities, sometimes even replacing them. So we clearly cannot understand what we have invented through the physical sciences. To understand ourselves, and hence computers, we need psychology, the science of consciousness in Carl Jung's terms.[99]

However, IS architects are not specialists, like psychologists. They are generalists working with specialists in user departments, rather like the way my local doctor calls herself a 'specialist in general medicine', working with specialists in hospitals. The difference between specialists and generalists can be simply seen through this statement: specialists are people who know more and more about less and less until they know everything about nothing, while generalists are those who know less and less about more and more until they know nothing about everything. It is this latter approach that we need if we are to pass through the Singularity in time that Teilhard prophesied. For, as J. Krishnamurti said, "Can any specialist experience life as a whole? Only when he ceases to be a specialist."[100]

Information systems architects are rather like philosophers, 'lovers of wisdom', in Pythagoras' original meaning of the term. Plato considered philosophers to be the best people to govern his vision of an ideal state,[101] for to Plato, knowing the immense power of abstract thought, a philosopher is "the man who is ready to taste every branch of learning, is glad to learn and never satisfied."[102] Philosophers also "have the capacity to grasp the eternal and immutable". In contrast, those who are not philosophers "are lost in multiplicity and change", and so are not qualified to be in charge of a state.[103] Furthermore, philosophers "will be self-controlled and not grasping about money. Other people are more likely to worry about the things which make men so eager to get and spend money".[104] So a society ruled by financiers, economists, and accountants is also not viable.

Today, like architects who design buildings, IS architects begin by developing blueprints of the systems they wish to build, using a technique called Model Business Architecture (MBA), so obscure that even Wikipedia doesn't have an article on this term. Yet, using such modelling methods, IS architects develop integrated enterprise models of most of the processes taking place in businesses, such as manufacturing, ordering, invoicing, and distribution. However, as they are primarily concerned in modelling all cognitive processes, whether these are performed by human beings or computers, their modelling methods apply equally in universities and academia, as centres of education.

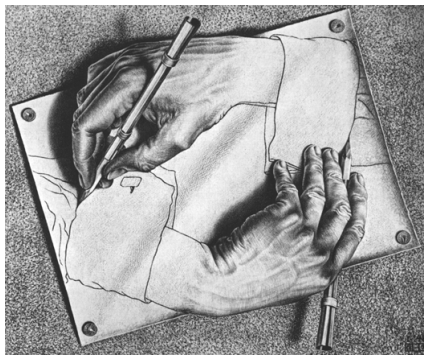
These modelling methods could thus form the basis for a complete model of the psychodynamics of society, for what Erich Fromm called a new science of humanity,[105] necessary if we are to heal our grievously sick society, the causes of which he studied over four decades from the 1940s to 70s. And this can happen only if we are healed of schizophrenia, from Greek *skhizo-* 'split', from *skhizein* 'to split', from PIE base **skei-* 'to cut, split', also root of *science*, and *phren* 'soul, mind, heart; sense, understanding, reason', from PIE base **g*^{w}*hren-* 'to think'. To do this, we need to include the model-building process itself in the model being developed, which IS architects, lacking self-reflection, usually omit from their models.

This is unfortunate, because it is self-reflection that distinguishes human beings from the other animals and machines, like computers. As a consequence, we are managing our business affairs blindfold, with little understanding of what we are doing. As scientists and technologists are today pushing the pace of evolutionary change at unprecedented rates of evolution, this is like driving faster and faster along the highway with our eyes closed, not very sensible. It is probable that the world, as a whole, will only wake up when the global economy collapses like a house of cards in a singularity in time. But will this lead us to *the* Singularity, to evolution's glorious culmination, its Omega Point?

Well, to answer this question, we can use the role of the information systems architect to help us. If IS designers are to develop comprehensive models of business enterprises, they need to include their own thought processes in the semantic models being developed. In other words, both the map and the mapmaking process need to be included in the territory being mapped. This is a major departure from Alfred Korzybski's famous assertion, "A map *is not* the territory it represents, but, if correct, it has a *similar structure* to the territory, which accounts for its usefulness."[106]

For as an increasing number of people know today, our minds create our reality; there is no objective reality separate from a knowing being. Johannes Kepler was well aware of this fact when researching and writing *The New Astronomy* during the first five years of the 1600s. In Part I of this work, he carefully examined the three competing models of the solar system—Ptolemaic, Copernican, and Brahean—well aware that the geocentric and heliocentric models and Tycho's compromise between the two were just mental images of what is thought of as reality.[107]

Furthermore, as Erich Fromm pointed out, "The emergence of man can be defined as occurring at the point in the process of evolution where instinctive adaptation has reached its minimum."[108] So if we are to intelligently adapt to the unprecedented rate of evolutionary change we are experiencing in our environment today, we need to use our intuitive and rational minds to do so. For our minds not only determine how we see ourselves in the world, they also govern our behaviour.



What this means, of course, is that we need to follow the motto that Plato tells us was inscribed by seven wise men on the temple of Apollo at Delphi: "Know thyself."[109] Such knowledge is developed through self-inquiry, rather like a television camera filming itself filming, illustrated by M. C. Escher's lithograph 'Drawing Hands'.[110] In a similar manner, the pre-eminent Christian mystic said, "The eye with which I see God is the same as that with which he sees me."[111]

Such a self-reflective approach to scientific research is also needed to reconcile the incompatibilities between quantum and relativity theories, thereby healing the fragmented mind in Wholeness, as David Bohm discovered. As he said:

> Actually, the fragmentation involved in a self-world view is not only in the content of thought, but in the general activity of the person who is 'doing the thinking', and thus, it is as much in the process of thinking as it is in the content. Indeed, content and process are not two separately existent things, but rather, they are two aspects or views of one whole movement. Thus fragmentary content and fragmentary process have to come to an end *together*.[112]

But could a computer develop such self-knowledge without the assistance of a human programmer? We can begin to answer this question with A Programming Language (APL), initially developed by Kenneth Iverson at Harvard University in the late 1950s as a concise mathematical notation to assist students in analysing various topics in data processing.[113] APL became IBM's principal management information tool in the 1970s, after Iverson joined IBM.

Now, while APL is a function-based language, like many others, unusually it also has system functions—$\square CF$ and $\square FX$—which convert functions to strings and back again.[114] In other words, an APL function can dynamically create a new function, execute it, and then destroy it. This is like a computer programming itself, which we can consider thinking. But could a machine think, as Alan Turing, the founder of the theory of automation, believed? As he said in an article in 1950, "I believe that at the end of the century the use of words and general educated opinion will have altered so much that one will be able to speak of machines thinking without expecting to be contradicted."[115] Yet this has not happened, for reasons that Ada Lovelace, who amended Charles Babbage's computer program designed for his Analytical Engine,[116] the first program to be published, well knew.

In 1843, Ada, the daughter of the poet Lord Byron and Anne Isabella Byron, a mathematician, wrote an insightful memoir on Babbage's Analytical Engine,[117] which Turing quoted in his article.[118] Ada, one of my favourite persons of all time, wrote:

> The Analytical Engine has no pretensions to *originate* anything. It can do whatever *we know how to order it* to perform. It can *follow* analysis; but it has no power of *anticipating* any analytical relations or truths. Its province is to assist us in making *available* what we are already acquainted with.[119]

Ignoring Lady Lovelace's objection to his hypothesis, Turing proposed an 'imitation game', now known as the 'Turing test', to prove his assertion. As a computer is a universal machine, capable of anything that a programmer could devise, the test consists of an interrogator asking questions of a hidden human being and computer.

The purpose of the test is for the questioner to determine from the answers which of the participants in the game is a human being and a machine.[120]

Rather than using such an indirect method to determine whether human beings are machines and nothing but machines, let us take a more direct approach in one of two ways. The first asks the question, "Could a computer program itself without human involvement?" The answer to this question is rather technical, involving a broad analysis of the structure of computer languages and their environment, described in full in Chapter 6, 'The Limits of Technology' in my as-yet unpublished book *Wholeness: The Union of All Opposites*.

So let us use self-inquiry to show that the Singularity in time that humanity is currently rapidly passing through is mystical and not technological, as Vernor Vinge and Ray Kurzweil believe. We can do this by adapting the mathematical method of *reductio ad absurdum*. As George Pólya pointed out, "*reductio ad absurdum* shows the falsity of an assumption by deriving from it a manifest absurdity."[121] So let us assume that human beings are machines and nothing but machines, like computers, and see where this leads us.

In other words, we set up a thought experiment in which we imagine that we are a computer that switches itself off and on again so that it doesn't even have a bootstrap program to load the operating system, so named because switching on a computer is rather like pulling oneself up by one's bootstraps. The mind has then become a *tabula rasa* 'blank slate', a notion that has been proposed by a number of philosophers through the ages, particularly John Locke, who asserted that there are no innate principles in the mind, not even Aristotle's Law of Contradiction, which many believe to be a universal truth.[122]

Such an experiment in learning is rather like taking LSD, as Ralph Metzner describes on page 5, for we are then completely free of our mechanistic personal, cultural, and collective conditioning. This is also rather like a volcanic earthquake erupting in the depths of the Ocean of Consciousness, creating a tsunami in which everything is destroyed, as in Aceh province in Sumatra in December 2004. Using another metaphor, this is like demolishing the Tower of Babel that represents the entire world of learning and starting afresh at the very beginning.

From this *tabula rasa*, all we have available to us now is our inner guru, which the *Guru Sutra* tells us means 'dispeller of darkness',[123] without any external authority telling us how or what to learn, fantastically liberating! We can also call our inner guru the Logos, the immanent rational intelligence governing the Cosmos, in Heraclitus' terms. For as Dennis McKenna said, quoting Henry Munn's article 'The Mushrooms of Language', when Muzatecs ate mushrooms, they say that these speak, rather like Heraclitus, who said, "It is not I who speak; it is the Logos."[124] It is in this delightful way, without taking any psychotropic drugs, that we can reach what Terence McKenna calls a singularity of time, when novelty and concrescence reach a maximum and creativity can emerge without any inhibitions, as we see on page 22.

Now it would be incredibly stupid if this experiment in learning puts us back into the strait jackets that the cultures we are born into incarcerate us, like mind-forged manacles in William Blake's poem 'London'. To avoid this problem, we need to remember that before the computer can begin to program itself, an information systems architect needs to develop a blueprint of the system that is to be produced. The system that we are going to design is the Cosmos, viewed as information system, from the Greek

kosmos 'order', which Pythagoras or his disciples called world or universe, 'from its perfect order and arrangement'.[125]

This might sound grandiose and crazy, for how can anyone possibly design the Universe? Well, we should remember that the Universe doesn't exist 'out there'. What we call the Universe is a construct of the mind. So by developing a blueprint for the Cosmos, the convergent powers of evolution can heal our fragmented, schizoid minds in Wholeness. This creative process is like a big bang taking place in the Cosmic Psyche, bringing all our thoughts into universal order, using David Bohm's very general way of perceiving order: "*to give attention to similar differences and different similarities*", a notion of order that the artist Charles Biedeman gave him.[126] In other words, we carefully examine the differences and the similarities in the data patterns of our experience, putting our interpretations into various sets as appropriate, treating all patterns in exactly the same way, including mass, space, and time, which physicists, mathematicians, and programmers represent in their functions just like any other quantitative variable.

To give some structure to this natural way of organizing our thoughts, we can turn to the semantic modelling methods that IS architects use to build the Internet, specifically the relational model of data, introduced by Ted Codd of IBM in 1970, and the Unified Modeling Language (UML), developed in the 1990s by Grady Booch, Ivar Jacobson, and James R. Rumbaugh when working for Rational Software, now a subsidiary of IBM. For these modelling methods are so abstract and general, they are transcultural and transdisciplinary, applicable in all possible universes. No constraints on our learning are imposed by these universal modelling methods, which a hypothetical superintelligent extraterrestrial being would recognize.

The blueprint that arises from this thought experiment is called Integral Relational Logic (IRL), an egalitarian, commonsensical science of thought and consciousness that we all use everyday to form concepts and organize our ideas. Because IRL has evolved from the relational model of data, it is nonaxiomatic and nonlinear. For as Ted Codd pointed out in his seminal paper, the structure of enterprise databases, and hence the territory they map, is inherently noninferential.[127] Furthermore, because IRL is both arboreal and reticulated, it can accept self-contradictions, unlike linear deductive logic and mathematical proof. This is absolutely essential. For as the Universe is inherently paradoxical, any system of thought that does not recognize this fundamental fact of existence must be delusional.

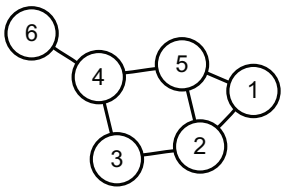
But what sort of animal is IRL? Well, this is not easy to say. Because it has emerged directly from the Divine, Cosmic matrix that we all share, without reference to the past, other than to meaningless ontological structures that exist prior to interpretation by a knowing being, it cannot be understood in reference to any previous system of thought. Indeed, because IRL is all-inclusive, any attempt to compare it with any other cosmology is a violation of Wholeness, which is beyond compare.

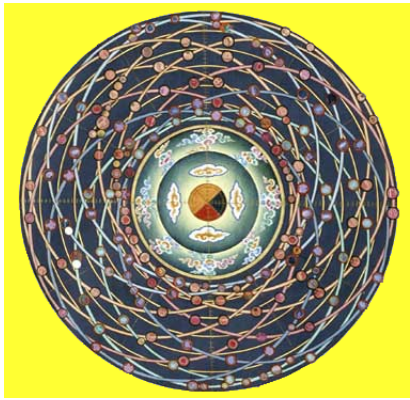
Nevertheless, as there is a global movement towards the convergence of science and ancient wisdom, it is possible to relate IRL to other attempts to realize Descartes' dream, described on page 2. For instance, IRL is an example of what Ken Wilber calls an 'Integral Operating System', or IOS,[128] "a neutral framework" that "can be used to bring more clarity, care, and comprehensiveness to virtually any situation".[129] Ken's basic IOS is called AQAL, short for "all quadrants, all levels", which is short for "all quadrants, all levels, all lines, all states, all types".[130] However, IRL is more like a virtual machine operating system, such as IBM's VM, which can run many different operating systems, as I first saw in the early 1970s, than Microsoft's Windows or Apple's Mac OS X.

Using more familiar examples, IRL is a little like Apple's Boot Camp, which runs both Lion and Windows 7 on my MacBook Pro, but not simultaneously. To run Windows and Mac OS X simultaneously, we need an emulator, like Parallels Desktop, which can run many different versions of Windows and Linux, IBM's OS/2 Warp, and even Lion itself under Lion in Version 7. So in theory, Parallels Desktop could run Parallels Desktop, just as IRL includes itself within itself.

For reasons we look at on page 32, other integral operating systems, such as AQAL, cannot contain themselves within themselves. Specifically, this means that AQAL cannot include IRL in its embrace. As my American friends tell me, integral theorists tell them that anything that does not fit into AQAL must be dismissed as invalid, rather like the Aristotelians and Catholics rejecting the heliocentric view of the solar system, ironic because *catholic* derives from the Greek *katholikus* 'universal', from *kata* 'in respect of' and *ὁlos* 'whole'. So AQAL does not obey the maxim for mapmaking defined by E. F. Schumacher in *A Guide for the Perplexed*, 'Accept everything; reject nothing."[131]

We can see this most clearly from mathematical mapmaking, whose foundations were laid down in 1736, when the Swiss mathematician Leonhard Euler was asked if it were possible to take a walk in Königsberg, the capital of East Prussia, in such a way as to cross every bridge in it once and only once and return to the starting point.[132] Euler's solution to this problem evolved into the abstract notion of mathematical graph, illustrated here, consisting of nodes and the relationships between them. In turn, this has evolved into dataflow programming languages,[133] such as the Arena Data Flow Language (ADFL), designed by my former colleague Jonas Lantz, an information systems architect employed by Front Capital Systems in Sweden—a subsidiary of Sungard in the USA—to automate the buying and selling of financial products, without human intervention.





In human terms, nodes in such graphs contain other graphs at deeper levels, in what we can call self-similarity, a property of fractals, without their mathematical complications. We can thus see that the underlying structure of the Universe is an infinitely dimensional network of hierarchical relationships, called the 'Web of Life' by holistic systems theorists.[134] Furthermore, as every node contains an image of the entire Universe within it, our blueprint of the Cosmos is holographic, not unlike the jewel net of Indra in the Chinese form of Buddhism called Hua-yen 'Flower Ornament'. As Francis H. Cook tells us, the Avatamasaka Sutra says,

> Far away in the heavenly abode of the great god Indra, there is a wonderful net which has been hung by some cunning artificer in such a manner that it stretches out indefinitely in all directions. In accordance with the extravagant tastes of the deities, the artificer has hung a single glittering jewel in each 'eye' of the net, and since the net is infinite in dimension, the jewels are infinite in number. There hang the jewels, glittering like stars of the first magnitude, a wonderful sight to behold. If we now arbitrarily select one of these jewels for inspection and look closely at it, we will discover that in its polished surface there are reflected *all* the other jewels in the net, infinite in number. Not only that, but each of the jewels reflected in this one jewel is also reflecting all the other jewels, so that there is an infinite reflecting process occurring.[135]

Hua-yen Buddhism is particularly relevant here because the Hua-yen school sought to take many different strands of Buddhist thought and bring them together in the form of a grand syncretism. "Hua-yen thinkers saw their task as that of being able to see the interrelationships between different schools of Buddhist thought and reassembling them to form their real work." Hua-yen thus came to serve as the

philosophical basis for the other schools of Buddhism, more concerned with practice and realization. As D. T. Suzuki remarked, "Hua-yen is the philosophy of Zen, and Zen is the practice of Hua-yen."[136]

Hua-yen Buddhism thus has a similar relationship to Zen as IRL has to science and business. For the worldview revealed by IRL is essentially the same as that described by Fa-tsang (643–712), the third of five patriarchs in the school and its principal architect. He taught "that to exist in any sense at all means to exist in dependence on the other, which is infinite in number." For Hua-yen conceives of experience primarily in terms of *relationships* between what people normally think as distinct, separate *entities*.[137]

How then can we use Integral Relational Logic to bring order to our lives and hence heal our grievously sick society? Well, it is really very simple. Apart from the mathematical graph, the other principal way of organizing our ideas is in the form of tables, which in the relational model of data evolved from the mathematical theory of relations and first-order predicate logic. The most familiar illustration of such a table is a telephone directory, such as this example:

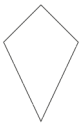
Class name	*Telephone subscriber*		
Attribute name	*Name*	*Address*	*Telephone number*
Attribute values	Anne Potter	72 Grove Road	624-4582
	Fred Tanner	4 Meadow Walk	982-3356
	John Cooper	31 Beech Boulevard	104-3911
	Elizabeth Smith	7 Chestnut Avenue	310-4574
	Jackie Butler	25 Orchard Way	955-4395
	Richard Fisher	67 Willow Crescent	109-2661
	Jenny Walker	22 Heather Drive	893-2748

Here, each row is an instance of a class, corresponding to Plato's particulars and universals, which he called eternal Forms or Ideas.[138] The particulars can also be called entities, with one or more attributes, corresponding to Aristotle's distinction between subject and predicate.[139] Possible attribute values for a particular column are called 'domains of values', which act as dimensions in IRL, which are unlimited. So IRL is not limited to 11-dimensional space-time. Indeed, mathematicians can handle an infinite number of spatial dimensions, such as regular polytopes, as generalizations of the five Platonic polyhedra.[140] It is therefore not surprising that string theory has been dismissed "as a theoretical cul-de-sac that has wasted the academic lives of hundreds of the world's cleverest men and women."[141]

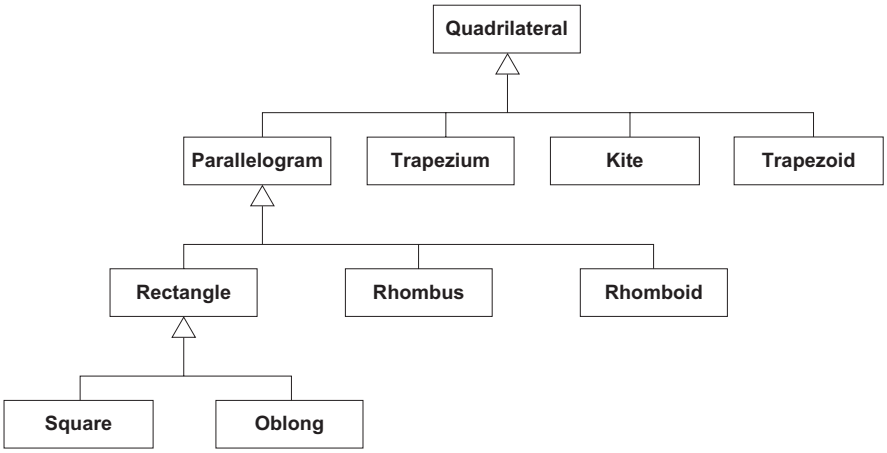
The class and attribute names in italics in the above table are metadata, knowledge or information about knowledge or information, which can be represented in relations, just like data itself, neatly overcoming the problem of infinite regress. For instance, in DB2, IBM's principal relational database management system, this metadata is stored in two tables called SYSTABLES and SYSCOLUMNS in the Catalog, which can be queried just like any other relations.[142] In a similar fashion, MySQL stores metadata in the information schema, also called a data dictionary or system catalog.[143]

In IRL, data about data is really interpreted knowledge about knowledge, which forms the epistemological level of the foundations of all knowledge. For epistemology is the study or science of knowledge, from Greek *epistēmē* 'knowledge' and *-logia*, as a Greek suffix meaning "either '(one) who speaks (in a certain way)', or '(one) who treats of (a certain subject)'," as the OED tells us, related to *logos*.

The table and graph on the next page illustrate the relationship between the tabular and graphical ways of organizing our ideas. The diagram depicts some of the information in the table, called a class model in the UML, showing a generalization structure as levels of conceptual abstraction; **Quadrilateral**, **Parallelogram**, and **Rectangle** being abstract classes having no direct instances of their own.

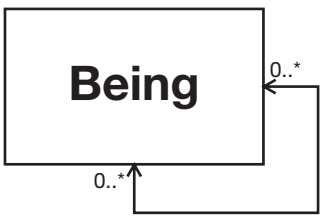
Class name	*Quadrilateral*				
Attribute name	*Name*	*Shape*	**Defining attributes**		
			Parallel sides	*Equality of adjacent sides*	*Angle*
Attribute values	square		opposite pairs	equal	right
	oblong		opposite pairs	unequal	right
	rhombus		opposite pairs	equal	oblique
	rhomboid		opposite pairs	unequal	oblique
	trapezium*		only two		
	kite		none	two pairs equal	
	trapezoid*		none		

* These are British terms, using the words *trapezium* and *trapezoid* in the original meanings given by Proclus in the fifth century. In the late eighteenth century, the meanings of these two words were confusingly transposed, and they still are in the USA. In American English, a trapezium is a trapezoid and a trapezium.



This process of conceptual generalization can be continued to the utmost level of abstraction with Aristotle's ontological concept of being. For as he said,

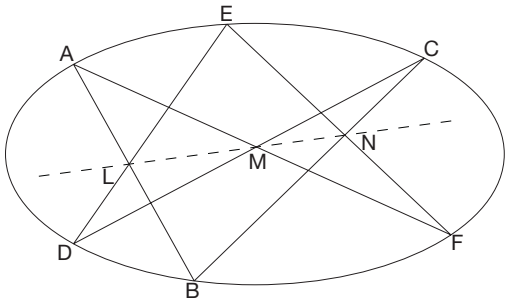
> There is a science which studies Being *qua* Being, and the properties inherent in it in virtue of its own nature. This science is not the same as any of the so-called particular sciences, for none of the others contemplates Being generally *qua* Being; they divide off some portion of it and study the attribute of this portion, as do for example the mathematical sciences.[144]

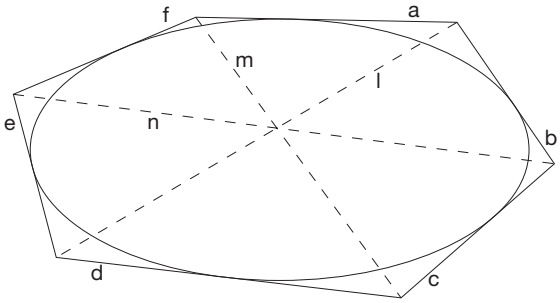


We can thus represent Indra's net in a single box using the notation of the UML, showing that all beings in the Universe are related to all other beings in zero to many ways, some of which can be categorized and some of which defy classification and must remain a mystery. We can thus see that the underlying structure of the Universe consists of an infinitely dimensional network of meaningful hierarchical relationships.

Now, whenever we form a concept, we also form its opposite, like black and white, male and female, and so on. Mathematics also has many such dualities. For instance, Blaise Pascal discovered in 1639, when he was sixteen years old, that if six points are placed on a conic section and joined as in the left-hand-side

diagram below, then their points of intersection, *LMN*, are collinear. Because straight lines remain straight lines in conical projections, this property applies not only to the ellipse, as in the diagram, but also to the parabola and even hyperbola, consisting of two disconnected open curves. As such a property is not intuitively obvious, it is not surprising that Pascal called the six points *ABCDEF* his Mystic Hexagram.[145]

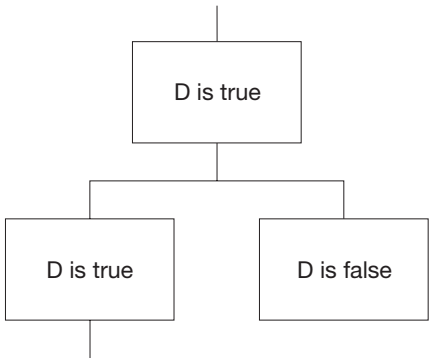




Nearly two hundred years later, in 1810, Charles Julien Brianchon proved a related theorem, illustrated on the right. If six lines are drawn tangentially to a conic section to form a hexagon, as *abcedf*, then the lines joining opposite vertices, *lmn*, intersect at a single point.[146] The relationship between these two theorems can best be seen from an observation made by Florimond de Beaune, a friend and student of René Descartes in the seventeenth century: a curve may be regarded both as the path of a moving point and as the envelope of a moving line.[147]

Pascal and Brianchon's theorems are examples of what is called the Principle of Duality in projective geometry. Whatever theorem can be proved about points and lines has a dual or reciprocal theorem about lines and points, where lines and points are interchanged, a fact that fascinated me as a mathematics undergraduate in the early 1960s. Of course, the Principle of Duality applies not only in two dimensions. For instance, the tetrahedron is self-dual and the small stellated dodecahedron, discovered by Johannes Kepler in 1619 in *The Harmony of the Universe*,[148] and the great dodecahedron, discovered by Louis Poinsot in 1810, are duals of each other.[149]

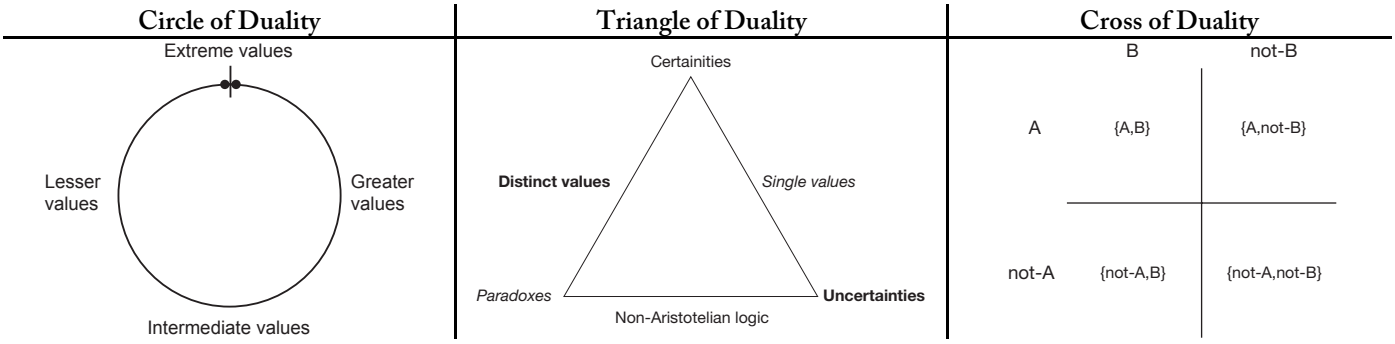
We can thus see that in our graphical node-arc way of building an all-inclusive picture of the Universe, relationships are beings and beings relationships; there is no distinction between them. In general, this means that the geometric Principle of Duality is a special case of what is called the Principle of Duality in IRL. We can thus state the proposition, D: "A complete conceptual model of the Universe consists entirely of dual sets." But is D true? Well, sometimes yes and sometimes not. For instance, a collection of entities without a common attribute do not form a set, which we usually call miscellaneous, called the axiom of choice in mathematics.[150] But now something quite incredible happens!



Those occasions when D is false are the opposite of those occasions when D is true, confirming that D is true. In the terms of Hegel's dialectical logic, if 'D is true' is the thesis and 'D is false' is the antithesis, then 'D is true' is the synthesis. There is thus a primary-secondary relationship between the truth and falsity of the Principle of Duality, illustrated in this diagram. So it is impossible to deny the truth of the Principle of Duality, for any denial confirms its veracity. D is thus an instance of a class in IRL with general attributes *A* and ~*A*, called a paradox or self-contradiction.

The Principle of Duality lies in the ontological level of IRL, beneath the epistemological level, because it describes what we can say about all beings prior to interpretation, from the Greek *ont-* 'being', present

participle of *einai* 'to be'. There are three other significant ways in which opposites relate to each other, depicted as the circle, triangle, and cross of duality, shown here.



The circle of duality enables us to model all shades of grey, not only black or white situations at the extremes of a range of values. An example of this model is political systems, with totalitarian regimes at the extremes, the left and right being communism and fascism, respectively. Opposite to these poles, which join at the top, is liberalism, from the Latin *liber* 'free', anathema to the Republican Party and Bible Belt in so-called free America. In between, we have socialism and conservatism, on the left and right, respectively. This is a model of political systems taught to me in a general studies lesson at school as a sixteen-year-old by an active member of the British Liberal party, as it was then, who also happened to be a cleric.

The triangle of unity encapsulates the three different ways that opposites can relate to each other: certainties (either-or), uncertainties (neither-nor), and paradoxes (both-and), the last of these being the most fundamental, encapsulated in the Principle of Duality.

The cross of duality enables us to model two or more pairs of opposites in two or more dimensions. Carl Jung's theory of psychological types is a three-dimensional example, the three dimensions being rational (thinking and feeling), irrational (intuition and sensation), and relating (extrovert and introvert).[151] Ken Wilber's four-quadrants model is a two-dimensional example, the dimensions being interior and exterior and individual and social. The exterior quadrants are labelled 'It', while the individual and social interior quadrants are called 'I' and 'We', respectively.[152] We can thus see that what Ken Wilber calls an integral operating system on page 27 is just a small part of Integral Relational Logic, not all-inclusive at all.

IRL thus overcomes a major objection to the idea that we could ever develop a comprehensive map of the Totality of Existence, expressed by Christian de Quincey in 2001, then the managing editor of the *Noetic Sciences Review*, the journal of the Institute of Noetic Sciences. In a critical appreciation of Ken Wilber's *Collected Works*, he says that the genuine theory of everything is impossible:

> Because you cannot create a model or a map that contains itself. Where, for example, would the four-quadrants model fit into the four-quadrants model? Mathematical and logical proofs developed by Bertrand Russell and Kurt Gödel—along the lines that no set of all sets can itself be a set of the same logical category, type, or level—invalidates the claim. Both Alfred Korzybski and Gregory Bateson immortalized this dilemma with the phrase "the map is not the territory." In this case (Wilber's TOE), not only the map, but more crucially, the consciousness that created the map, cannot be found in its own creation. To attempt to make room for it would involve us (and Wilber) in a logical infinite regress. This meta-critique applies to any TOE, of course, not just Wilber's.[153]

In a similar fashion, in *A Theory of Everything: An Integral Vision for Business, Politics, Science, and Spirituality*, Wilber says this:

> This book is a brief overview of a Theory of Everything. All such attempts, of course, are marked by the many ways in which they fail. The many ways in which they fall short, make unwarranted generalizations, drive specialists insane, and generally fail to achieve their stated aim of holistic embrace. It's not just that the task is beyond any one human mind; it's that the task is inherently undoable: knowledge expands faster than ways to categorize it. The holistic quest is an

> ever-receding dream, a horizon that constantly retreats as we approach it, a pot of gold at the end of the rainbow that we will never reach.[154]

Ken then goes on to ask, "So why even attempt the impossible?" To which he replies, "Because, I believe, a little bit of wholeness is better than none at all, and an integral vision offers considerably more wholeness than the slice-and-dice alternatives." Ken seems to be saying here that Wholeness is like an asymptote in mathematics, which can be approached but never reached in finite time. This is not true in my experience, as we can see by taking the reasoning of IRL to the utmost possibilities of consciousness.

So far, IRL has just been looking at structures in the relativistic world of form. But if it is to be complete, it must also include its opposite: the Formless Absolute. Now, while the Absolute is inaccessible to our five physical senses of sight, hearing, taste, smell, and touch, we can nevertheless feel its Presence, literally 'before being' or 'prior to existence'. Using a term from the data processing industry, we can also call the Absolute prior to interpretation the Datum of the Universe, from the Latin 'that which is given', from *dare* 'to give, to cause', cognate with *donor*, *endow*, *date*, and *add*, among several others. So in conformity with the egalitarianism of IRL, we must form the concept of the Absolute in exactly the same way as we form concepts in the relativistic world of form; by carefully observing the similarities and differences in the data patterns of our experience.

To do this, in conformity with the Principle of Duality, we need to look at the Absolute in terms of two pairs of opposites: conceptually and experientially and as both a unity and an aggregate, a two-dimensional example of the Cross of Duality, which cannot be avoided, even when we look at Ultimate Reality. Viewing the Absolute conceptually as a unity, we can see that it differs from all its parts, for all these parts are limited in some way. In contrast, the Datum cannot be defined, for to do so would be to give it boundaries, to say what it is and what it is not. This is obvious from the word *define*, which comes from the Latin *dēfīnīre* 'to limit' or 'to end'. The Absolute is thus indefinable and unanalysable, qualities that are transcendent with respect to a knowing being.

On the other hand, when we view the Absolute as the Totality of Existence, we can see that the structure of all its parts is exactly the same as the structure of any of its parts, for the Universe has an underlying, unified structure, independent of and prior to interpretation by a knowing being, as we have seen. The relationships that form this web of life lie within everything there is; they are the glue that holds the entire Universe together. From this perspective, we can say that the Absolute possesses the property of immanence with respect to all beings in the relativistic world of form, with meaningful relationships being the motive power of the Universe.

If we now feel into the Absolute experientially, through meditation and self-inquiry, we discover that the Essence of the Universe is Stillness or Emptiness, resulting in the exquisite sense of Nondual Love and Peace, which has no opposite. We are now in union with the Divine, in Oneness, in a state of Unity Consciousness. From this perspective, the Divine is immanent.

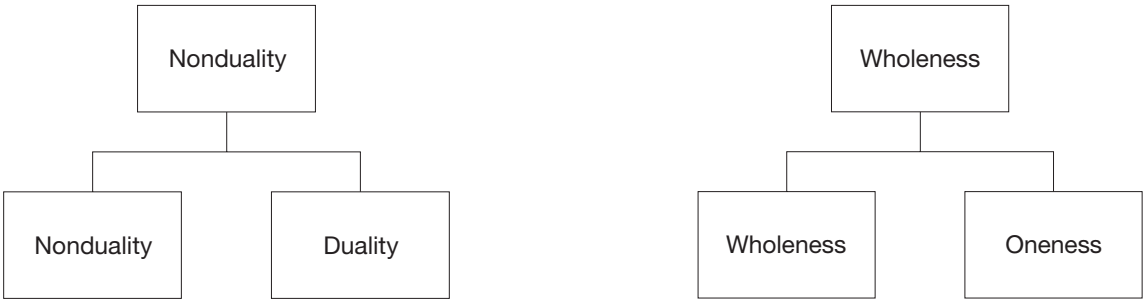
Conversely, if we feel into the Cosmos as an aggregate of all its parts, we can experience the Universe simply as a web of relationships. Then, as we sink ever deeper into ourselves, even these relationships disappear, and we are left with the magnificent feeling of translucent Wholeness, Fullness, or Cosmic Consciousness, which is transcendent with respect to any knowing being.

In summary, there are two pairs of dual ways in which we can understand and experience the Absolute, given in this table, thus establishing God as a scientific concept.

	Oneness	**Wholeness**
Conceptual	Transcendent	Immanent
Experiential	Immanent	Transcendent

Now, here we are looking at the Divine from an anthropocentric perspective. But this is too narrow a viewpoint. For even though God's eye and our own are one and the same—both called self-reflective Intelligence, as the eyesight of the radiant light of Consciousness—if we are to truly see ourselves within the overall scheme of things, we need to stand outside ourselves, like some people experience an out-of-body, near-death experience. In a similar fashion, astronauts returning from the Moon were able to take a vantage point beyond our geocentric perspective. One of these, Edgar Mitchell, was so moved by the 'sense of universal connectedness' that arose from his journey that, when he returned, he set up the Institute of Noetic Sciences to initiate research into consciousness and human potential.[155]

By thus taking a Holoramic perspective, from Greek *ὅlos* 'whole' and *ὅrāma* 'sight, view', the Principle of Duality becomes the Principle of Unity, depicted in these diagrams:



The Principle of Unity can also be expressed in just seven words—*Wholeness is the union of all opposites*—or six mathematical symbols: $W = A \cup \sim A$. This both-and, paradoxical principle, which Heraclitus, the Greek mystical philosopher of change called the 'Hidden Harmony',[156] is the fundamental design principle of the Universe, the spark that brings into existence both the Formless, Nondual Absolute and the entire relativistic world of form.

This is not just a concept. It is the direct experience of the Divine. We have therefore been led to an absurdity that the method of *reductio ad absurdum* in our experiment in learning has revealed. We human beings are not machines and nothing but machines, as many scientists believe today. Even paradoxical quantum physics is most often called quantum *mechanics*. But as Basil Hiley told us in November 2009, at a conference in London to celebrate David Bohm's legacy called 'Infinite Potential', Bohm said that quantum mechanics should really be called quantum *non*-mechanics.[157]

We have thus realized Descartes' dream, outlined on page 2. Descartes published his dream eighteen years later in 1637 as *Discourse on the Method for Rightly Directing One's Reason and Searching for Truth in the Sciences*, to give his epoch-making work its full title. As illustrations of his method, Descartes also published three essays on *Optics*, *Geometry*, and *Meteorology*, which were not intended to be separated from the *Discourse*, which he regarded as a preface. Yet, this is very much what has happened, as Paul J. Olscamp tells us, having put these disparate parts back together again.[158]

Today, Descartes' *Geometry* provides an algebraic system of coordinates for Euclidean space. In a similar fashion, IRL is a system of coordinates for all knowledge, enabling us to integrate all knowledge in all cultures and disciplines at all times, past, present, and the future, into a coherent whole. We can call this theory of everything the Unified Relationships Theory (URT), a generalization of Einstein's unified field theory, for fields are special cases of relationships and it is relationships that make the world go round.

And like Descartes' three examples of his method, IRL cannot really be understood without the URT and vice versa. Nevertheless, as we all implicitly use IRL everyday to form concepts and organize our ideas in mathematical graphs and semantic networks, the URT is, at least, intuitively understandable. That is

why this section is not the first in this extended essay. The first few sections are potentially understandable without an understanding of the role of information systems architect in business.

However, my book *Wholeness: The Union of All Opposites* corrects this imbalance. Part I describes Integral Relational Logic in some detail, while Part II contains five chapters on the Unified Relationships Theory. In the last few years, I have used IRL to write a Part III called 'Returning Home to Paradise' describing how we entered Paradise as a species some 25,000 years ago, only to be ejected in what the Jews and Christians call the 'Fall'. The last couple of chapters are intended to show how we could collectively pass through the Singularity in time into the glorious, eschatological Age of Light.

For, as IRL provides the blueprint for a radically new model of the Universe, viewed as a fully integrated information system embraced and grounded in Consciousness or Ultimate Reality, IRL could also provide the blueprint for a eutopian human society living in harmony with the fundamental laws of the Universe. In particular, we could use this universal science of consciousness to rebuild the education system on the seven pillars of wisdom and to cocreate a sharing economy recognizing that we are all one. As IRL has evolved from the semantic modelling methods that information systems architects use to design the Internet, this proposal is just a natural evolutionary development from where we are today.

Well, not quite. For to reach evolution's glorious culmination, we need to pass through an evolutionary discontinuity, completely free of our traditions and mechanistic conditioning. For such a eutopian society will have passed through *the* Singularity in time, evolution's Alpha and Omega points, which cannot be separated, existing, as they do, in the Eternal Now at the end of time.

But what does this mean to us as individuals and as a species, living for all practical purposes in the relativistic world of form? Well, this question is addressed in my proposal for Project Heraclitus, suggesting how we could synergistically accelerate the convergence of science and ancient wisdom by working harmoniously together with a common vision. To help get this project off the ground, perhaps it would also help to understand a little of what it actually feels like to pass through the Singularity in time and how such an unprecedented event in the entire history of evolution can come about within us human beings.

Living in Wholeness at the Omega Point

The easiest way of describing what it is like to live in Wholeness at the Omega Point of evolution, which is also the Alpha Point, is to use Indra's net, or more formally the concept of mathematical graph, illustrated on page 28.

We can look at any particular graph as a structure, whose nodes are forms and arcs meaningful relationships between forms. Now every form is actually a structure of forms and relationships at a deeper level of detail. So feeling into this structure in consciousness, we can penetrate through the hierarchies until the nodes become singularities, much more general than the space-time singularities in Einstein's general theory of relativity. Then relaxing into these relationships, as we might do in the swell of the Atlantic Ocean on the European seaboard, these too disappear until we become one with the entire Ocean of Consciousness.

This image is a generalization of the holomovement, with which David Bohm unified quantum and relativity theories. For, looking at reality as a process, as a flowing stream, he said, "On this stream, one may see an ever-changing pattern of vortices, ripples, waves, splashes, etc., which evidently have no independent existence as such. Rather, they are abstracted from the flowing movement, arising and vanishing in the total process of flow."[159]

In a similar fashion, all of us are both the entire Ocean as Wholeness and individual beings, as interdependent jewels in Indra's net, each reflecting, not only all other human beings, but all other beings in the Universe. For *individual* does not imply separateness, as so often regarded today. Rather, *individual* means 'indivisible', from Latin *in-* 'not' and *dīviduus* 'divisible', from *dīvidere* 'to divide'.

That's all there is to it. It is so incredibly simple, underlying all the egoic complexity that befuddles our daily lives. We can thus see and feel that Wholeness is our Authentic Self and True Nature, not particular bodies, thoughts, feelings, emotions, and souls. This understanding is the essence of *prisca sapientia* 'ancient wisdom', which Isaac Newton vainly sought for in his studies of alchemy and theology,[160] and *philosophia perennis* 'perennial or eternal wisdom', as Leibniz called "the metaphysic that recognized a divine Reality substantial to the world of things and lives and minds".[161]

This eternal ancient wisdom is simply encapsulated in the Buddhist saying "You cannot become a Buddha; you are already a Buddha," just ignorant of this realization.[162] And as Kabir the weaver beautifully expressed it in the fifteenth century, "I laugh when I hear that the fish in the water is thirsty."[163] In a similar fashion, the Sufi poet Rumi said, "Love is the sea of not-being and there intellect drowns."[164] So union with the Divine is nothing new, a realization that is beautifully encapsulated in the Sanskrit word *Satchidananda* 'the bliss of Absolute Consciousness', a compound of *sat* 'absolute, eternal, unchanging Being, Truth', *chit* 'absolute Consciousness', and *ananda* 'bliss, absolute joy'.

So while passing through the Singularity in time is unprecedented in the history of human learning, such an ontogenetic path has been followed many times before. We can use Stanislav Grof's *The Holotropic Mind* as an illustration. *Holotropic* first means 'turning towards the Whole', like *heliotropic* 'turning towards the Sun', from Greek *ὁlos* 'whole'—as we see in *holism*, evolution's convergent tendency to form wholes—and *tropē* 'turning, change'. However, the Greek verb *trepo* had two meanings, as in English: 'to change direction' (as in 'turn into a side-road') and 'to change form' (as in 'turn into a frog').[165] So *entropy* means 'in transformation' and *holotropic* can also mean 'transformation of the Whole', when frogs can turn into princes and princesses!

Now as Stan points out, we are conceived in Wholeness, as the union of female and male gametes, from Greek *gamein* 'to marry'. If we are lucky, we then spend the first nine months of our lives in oceanic ecstasy and cosmic unity before we are expelled from Paradise during the third phase of what he calls Basic Perinatal Matrices (BPM). But if something untoward happens during gestation, we can suffer the agonies of what he calls a 'bad womb', which can affect our entire lives.[166] For, as Rupert Sheldrake has pointed out, once a behaviour pattern is established, it repeats itself indefinitely through habit unless it is brought up into consciousness and dissolved.[167]

Such a journey is the stuff of myths and fairy tales in all cultures throughout human history, as Joseph Campbell brilliantly describes in his popular *The Hero with a Thousand Faces*. Campbell describes this monomyth, a synthesis of all such myths, in three stages—'Departure', 'Initiation', and 'Return'—divided into seventeen steps. Each of these stages presents seekers with immense challenges. First, they must depart from the familiar, comfortable surroundings of the sick society we all live in and undertake initiation tests, like the ordeals of fire and water that Tamino and Pamina went through in Mozart's *Magic Flute*. If they are lucky, such seekers reach the apotheosis of human endeavour at the end of the second stage, by returning to our Divine Source, illustrated in the small bell curve in the diagram on page 10.

The word *apotheosis* derives from the Greek *apotheoein* 'to deify', from *apo-* literally 'off', but with a special meaning in this context of 'change completely' and *theoein* 'make a god of', from *theos* 'god', which

surprisingly has a different PIE base from *deus* 'god' in Latin. In English, *apotheosis* has come to mean 'a glorified ideal', 'the highest point in the development of something'.

However, as Campbell points out, there is third stage in the monomyth: the return to society. As he says, "The return and reintegration with society … is indispensable to the continuous circulation of spiritual energy into the world." However, "the hero himself may find [this] the most difficult requirement of all."[168] Campbell gives three reasons for the hero's predicament:

1. The bliss of this experience may annihilate all recollection of, interest in, or hope for, the sorrows of the world; or else the problem of making known the way of illumination to people wrapped in economic problems may seem too great to solve.
2. The powers that he has unbalanced [on his journey to Freedom] may react so sharply that he will be blasted from within and without—crucified.
3. The hero may meet with such a blank misunderstanding and disregard from those he has come to help that his career will collapse.[169]

On this third point, "Even the Buddha … doubted whether the message of realization could be communicated." And on the first point, "Saints are reported to have passed away in the supernal ecstasy."[170] For these three reasons, Campbell says that the responsibility of returning to the world with the adventurer's life-transmuting trophy when the hero-quest has been accomplished has been frequently refused, by either the individual or society, or both.

So whether we are collectively destined to reach the Omega Point of evolutionary convergence by passing through the Singularity in time before *Homo sapiens sapiens* 'wise, wise human' inevitably becomes extinct remains to be seen. So to live intelligently and consciously in the Eternal Now beyond the past and the future, all we can really do as individuals, if we had a choice, which we don't, is to follow Lao Tzu's wise words in the 'Mystical Whole' in *Tao Teh Ching*:[171]

He who knows does not speak.
He who speaks does not know.
Block all the passages!
Shut all the doors!
Blunt all edges!
Untie all tangles!
Harmonize all lights!
Unite the world into one whole!
This is called the Mystical Whole,
Which you cannot court after nor shun,
Benefit nor harm, honour nor humble.
Therefore, it is the Highest of the world.

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