

The Two Dimensions of Time

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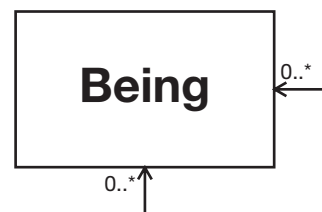
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One of the greatest difficulties we have in understanding humanity's place in the overall scheme of things is our conception of time. What we tend to do is look at our lives from the perspective of the lifespan of our bodies, which the psalmist depicted as 'threescore years and ten' in the King James translation of the Bible. So we have great difficulty in understanding that evolution is currently passing through the most momentous turning point in its fourteen billion-year history. Yet such an understanding is absolutely essential if we are to put the great psychospiritual, ecological, and economic crisis we all face today into its fullest perspective, by standing outside ourselves. The purpose of this essay is thus to shed some light on this critical life and death subject, summarizing detailed expositions in various chapters of my book *Wholeness: The Union of All Opposites* and more extensive essays, such as 'Mapping the Universe'.

We can most easily begin by noting that mathematicians, computer programmers, and information systems architects in business treat time in exactly the same way as space, mass, and any other quantitative variable. For instance, the equation $s = vt$ has exactly the same form as $V = iR$, $F = ma$, and $c = q * p$. These equations show the relationships between distance, velocity, and time, between volts, amps, and ohms as units in electricity, between force, mass, and acceleration—Isaac Newton's famous equation—and between cost, quantity, and price, which we use every time we buy a few kilograms of potatoes in our local shop. Einstein's famous equation $E = mc^2$ is a slightly more complicated illustration of this basic principle.

The relational model of data, introduced by Ted Codd of IBM in 1970, takes this egalitarian approach to variables even further by regarding all domains of values—whether quantitative or qualitative—in exactly the same manner. For instance, addresses, colours of paint, sexes of employees, songs, photos, videos, and programs are treated in essentially the same way as weights, distances, periods, and dates: as data types.

Integral Relational Logic (IRL), the commonsensical science of thought that we all use everyday to form concepts and organize our ideas, takes this egalitarian approach to its utmost level of abstraction. As a generalization of the superclass **Object** in object-oriented programming and modelling techniques, **Being** is the superclass for all concepts in the Unified Relationships Theory (URT), the ontological basis for Aristotle's *Metaphysics*. Using the notation of the Unified Modeling Language, we can thus draw a complete model of the Totality of Existence, viewed as Consciousness, showing that all beings in the Universe, including the mapmaker, are related to all other beings in zero to many different ways, some of which can be categorized and some of which defy classification and must remain a mystery.



The next great difficulty we have in understanding time is the accumulative nature of evolution, expressed in mathematics as exponential growth. As the physicist Albert A. Bartlett has said, "The greatest shortcoming of the human race is our inability to understand the exponential function." Numbers can grow at amazing rates when raised to various powers. For instance, if 2 is raised to the power of just 64, the result is 18,446,744,073,709,551,616, about 18 quintillion. And this number is tiny compared to a googolplex, which is 10^{googol} , where a googol is 10^{100} . We can create some even bigger finite numbers quite easily. For instance, we can raise a googolplex to the power of a googolplex just three times, like this, a number that is quite beyond our imagination:

$$\text{googolplex}^{\text{googolplex}^{\text{googolplex}^{\text{googolplex}}}}$$

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Yet, no matter how often we raise numbers by various powers, if this process terminates in finite time, the resulting number is minuscule compared to infinity. Rather surprisingly, in the late 1800s, Georg Cantor showed that the number of rational numbers between just 0 and 1 can be mapped in a one-to-one correspondence to the infinity of the integers. He called this countable infinity \aleph_0 . Cantor then showed that \aleph_0 is not the only infinite cardinal through the notion of power set: the set of all subsets of a set. For instance, the power set of {a b c} has eight members (2^3): {{a b c} {a b} {b c} {c a} {a} {b} {c} {}}. The formula for the number of elements in a power set also applies to sets with an infinite number of members. For instance $\aleph_1 = 2^{\aleph_0}$, which is an uncountable level of infinity. In general, $\aleph_{n+1} = 2^{\aleph_n}$. So we could denote the ‘largest’ infinity as \aleph_∞ , where ∞ is \aleph_∞ , defined recursively *ad infinitum*! But if people egoically believe that a separate, immortal soul either reincarnates indefinitely or has everlasting life, which infinity are they referring too?

Two calendars in human history have attempted to encapsulate the vastness of time, in contrast to Archbishop Ussher’s view about 1650 that the first day of Creation began at nightfall preceding Sunday 23rd October 4004 BC in the proleptic Julian calendar. The first is the Hindu calendar, where Brahma is deemed to live 100 Brahma-years, to denote the creation and death of the universe, each Brahma-year consisting of 360 Brahma-days and nights or 720 *kalpas*. In turn, a *kalpa* is 1000 *mahayugas*, each lasting 12,000 divine years or 4,320,000 earth years. And each *mahayuga* consists of four *yugas* diminishing arithmetically, in the ratio of 4:3:2:1. So in the Hindu calendar, the life and death cycle of the Universe is 311 trillion years, where a trillion is 10^{12} . Even if we measure time in terms of yoctoseconds, the shortest period that scientists have named, the Hindu calendar lasts just 10^{46} yoctoseconds, 10 billionths of the square root of a googol.

The other notable calendar is the Mayan, which is uniquely exponential, consisting of a sequence of 13 cycles, each sequence diminishing in length geometrically by a factor of 20. Carl Johan Calleman of Dalarna University in Sweden tells us that the Mayans thought that the Universe was created about 27 octillion years ago (10^{27}), fourteen orders of magnitude greater than the Hindu calendar, whose total age of the Universe is the square root of the Mayan view, which is thus 10 billionths of a googol yoctoseconds in length. However, the longest cycle that has been given a name is the hablatun, which began about 16.4 billion years ago, reasonably close to current estimates of the most recent big bang. Carl Johan then mapped the diminishing cycles in the Mayan calendar to other major evolutionary turning points.

However, Nick Hoggard, formerly of Holma College of Holistic Studies in Sweden, noticed that a factor of 20 is too large to catch many significant evolutionary turning points, not the least the emergence of self-reproducing forms of life on Earth about 3.5 million years ago. But if we use the first Feigenbaum constant in chaos theory—a mathematical constant (δ) like π and e whose value is 4.669—we can interpolate other key evolutionary turning points. For the square of 4.669 is about 21.8, reasonably close to 20 in the Mayan calendar, which explains why this exponential calendar is so useful in understanding the accelerating pace of evolutionary change.

However, this mapping cannot continue indefinitely because an infinite geometric series of diminishing terms has a finite limit. For instance, the sum of this series is 2:

$$1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \dots$$

We can see what this means in evolutionary terms by viewing the whole of evolution as a series of bifurcations in systems theory, rather like the way drops in a dripping tap get closer and closer together as the tap is turned on. Eventually, when the tap is turned full on, the water flows continuously, at what systems theorists call the accumulation point. As a simple calculation using the Feigenbaum constant shows, the evolutionary accumulation point occurred around 2004, slightly different from most mappings of the Mayan to the Gregorian calendar, which indicate that the end of the Mayan calendar will be reached around 2012. So whether we look at evolution through scientific or New Age eyes, the picture that emerges is essentially the same: the evolutionary tap is

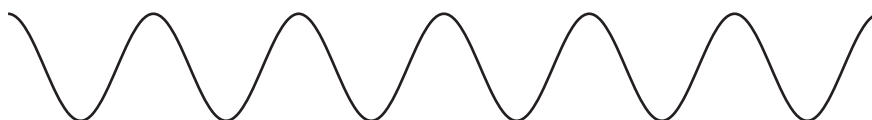
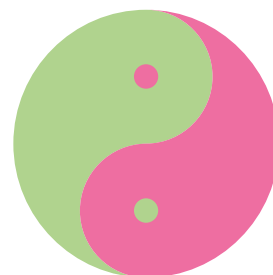
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now turned full on, a situation that requires us human beings to make unprecedented changes to the way we live our lives, as we are led into a mystical, eschatological epoch at the end of time.

If we are to overcome our fear of death and realize our fullest potential as Divine, Cosmic human beings before *Homo sapiens sapiens* inevitably becomes extinct, the most significant change we need to make is to live our lives primarily in the vertical dimension of time, rather than the horizontal dimension, which is where machines, like computers function.

Traditionally, there have been two basic ways of looking at the horizontal dimension of time: cyclic and linear. The cyclic view of time predominated in all cultures during the Great Mother Goddess epoch between about 25,000 and 5,000 years ago, because our forebears tended to look at time from direct human experience, most notably in the cycles of day and night, the phases of the moon, women's menstrual cycles, and the four seasons in the year.

In the East, such a cyclic view prevails, encapsulated in this classic *T'ai-chi-t'u* symbol, or 'Diagram of the Supreme Ultimate', a natural expression of the Principle of Unity, the lynchpin of IRL and the Universe. The dots in each section indicate the potential of Yin or Yang to become primary when Yang or Yin is predominant. In Taoist philosophy, this cyclic process can continue indefinitely, in infinite time. We can simply illustrate that this cyclic view of time is actually linear with the mathematical sinusoidal curve, which has no limit in either direction:



The cyclic view of time has led to the belief in the continuous reincarnation of an immortal soul in Eastern religions. Surprisingly Buddhists subscribe to this belief even though Ultimate Reality in Buddhism is *Shunyata* 'Emptiness', realized when the delusional sense of a separate self disappears completely as *Anatman*, the union of *Brahman* and *Atman* in Hinduism. At the dawn of recorded history about 5,000 years ago in the Middle East, a directly linear view of time began to emerge, with a beginning and end. This view has led the monotheistic religions to believe in everlasting life after death. But as we have seen from the mathematics of infinity, such beliefs are irrational.

This horizontal dimension of time also holds sway in science, not the least since the emergence of the Cartesian-Newtonian mechanistic paradigm. As a result, there is a widespread belief that every effect has a preceding cause. For instance, David Bohm wrote in the opening paragraph of *Causality and Chance in Modern Physics*, "In nature nothing remains constant. Everything is in a perpetual state of transformation, motion, and change. However, we discover that nothing simply surges up out of nothing without having antecedents that existed before. ... Everything comes from other things and gives rise to other things."

Viewing change in the Universe as a long chain of causes and effects led Aristotle to postulate the existence of an Unmoved Mover, which set the Universe in motion. Thomas Aquinas then took this notion as the basis for his five proofs for the existence of God. However, such a chain of events is unsustainable following the discoveries of quantum physics in the last century. For this has the properties of noncontinuity, noncausality, and nonlocality, in contrast to the properties of continuity, causality, and locality in relativity theory. To reconcile these incompatibilities, David Bohm showed that we need to heal the fragmented, specialist mind, looking beneath the surface of things, at what he called the holomovement, an undivided flowing movement, on which physical forms and structures are nothing more than waves and ripples on the surface, inseparable from what we can call a river of life. However, despite saying that quantum physics should really be called quantum nonmechanics rather than quantum mechanics, as is customary, Bohm still maintained an essentially horizontal dimension of time in his path-breaking theory of the implicate order.

We can see that such a worldview is not maintainable when we look at the essential characteristic of machines, illustrated in the diagram on the next page.

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In mathematics, a process is generally called a function, receiving parameters as input, outputting the result, such as calculating the sine of an angle. Although the term *function* is also used in computer science, we can perhaps better call this mechanical process a program, of which there are two principal types: generated programs, like Word, Photoshop, Firefox, and UNIX, and program generators, like Fortran, Lisp, APL, C, Python, Haskell, Mathematica, and Smalltalk. And in business, processes are generally called procedures, such as ordering, manufacturing, and invoicing. The International Organization for Standardization has established a method for auditing organizations' quality management systems called ISO 9000, whose basic criterion is that enterprises should define and follow "a set of procedures that cover all key processes in the business".

Mechanical processes are so widespread in society that it is perhaps not surprising that many still believe that we human beings are machines, and nothing but machines, leading to the belief that the global economy is also a machine and needs to be managed as such. But what are the consequences of this dehumanizing worldview? Well, in designing machines, engineers are particularly concerned with the efficiency and effectiveness of their designs, producing the desired effects with the optimum amount of energy. In the workplace, the success of the business machine is primarily measured, not in terms of joules, but in terms of the bottom line: in the profitability of the company and the dividends paid to shareholders. In other words, the primary goal of business corporations is to generate the maximum amount of money at a minimum cost, in financial terms. We live in a grievously sick society where ecological, psychological, and spiritual matters are of secondary concern, if they are a concern at all.

We can most simply see that we urgently need to make a radical change to the mechanistic work ethic when we look at the way that program generators function. In this case, they take as input a string of characters, producing an executable statement, function, or complete program as output. We can thus see a long chain of programs through time, each of which has generated another program, such as compilers and interpreters. But where did the first program come from? Did an unmoved mover appear at the end of the 1940s to create the first stored-program computer?

Of course not, for nothing radically new can ever appear through such a mechanical process operating in the horizontal dimension of time. The only way that we can explain how computer programs become manifest is by recognizing the vertical dimension of time in the Eternal Now, a notion made famous by Eckhart Tolle's best-selling *The Power of Now*. Computer programming, like any other creative process, emerges through the power of Life, arising from our Divine Source, like a fountain. So computers cannot program themselves without human intervention, for human beings are Divine, never separate from the Supreme Being for an instant.

We can best see this by extending the notion of the holomovement into a vast Ocean of Consciousness, which ultimately is a seamless continuum, with no divisions or borders anywhere. This formless, timeless Whole is the Immortal Ground of Being, out of which all forms, structures, and relationships emerge and to which they return when they die in an evolutionary/involutionary process. So to what extent people can sense this Divine, Cosmic view of time and the Universe is dependent on the way that human ontogeny unfolds and enfolds in relationship to human phylogeny. In particular, to see the Big Picture with self-reflective Intelligence, we need to map all processes in both dimensions of time, including the mapmaking process itself, beginning and ending in Oneness and Wholeness. But that is a life-and-death story for another time.

