# Our Evolutionary Inheritance

To see humanity's place in the overall scheme of things, we need to widen the horizon of our vision to encompass the Totality of Existence, far beyond the egoic and anthropocentric views that we tend to take of our lives today.

For this to happen, we need to let go of all attachments to whatever groups we feel that we belong to, including our nationality, religion, occupation or profession, political party or economic ideology, and colour of skin. We even need to be free of our identity as human beings in female or male form.

In this respect, it is better to see ourselves as intelligent, extraterrestrial beings visiting this planet. For such hypothetical beings would know nothing of Siddhartha Gautama, Lao Tzu, or Jesus of Nazareth; of Plato, Aristotle, or Euclid; of Isaac Newton, Albert Einstein, or David Bohm; of Karl Marx, Charles Darwin, or Sigmund Freud; or of the many other luminaries who have formed our understanding of ourselves and the world we live in. Of course, such a visitor to this planet would need to be free of its own specific inheritance, but I trust that you understand the point I am making.

## Transcending time

To fully understand our evolutionary inheritance, we need to go far beyond human history. We need to view time from the beginning to the end, for one of the greatest inhibitors to understanding what is happening to the human race at the present time is how we

measure time. By taking an egocentric or anthropocentric view of time, what we tend to do is to measure time using the duration of our lives as a unit of measure.

From this perspective, we can perhaps understand what a few hundred years is, or even a few thousand. But when we go beyond this, what is a million or a billion years in our experience? These time periods feel like Eternity, quite beyond our experience.

Yet these numbers are really quite tiny. If we measure time in yoctoseconds or septillionths of a second ($10^{-24}$)—the shortest unit of temporal measure that I am aware of—the time since the most recent big bang is of the order of $10^{41}$ yoctoseconds, if my calculation is correct.

Even this number is quite minuscule. As far as I am aware, the largest number that has been given a name is the googolplex, which is $10^{\text{googol}}$. A googol, in turn, is $10^{100}$. Edward Kasner tells us in *Mathematics and the Imagination* that these names were created by his nine-year-old nephew, who was asked to think up a name for a very big number. As some know, Google, the popular Web search engine, is named after this latter number, and its headquarters is called, naturally enough, Googolplex.

Yet a googolplex is still a finite number, and there is an infinite number of finite numbers larger than this one. Indeed, there is even an infinite number of *prime* numbers, as Euclid proved in a theorem that many of us learned at school. Furthermore, mathematicians have discovered that there is not just one infinite cardinal, but an infinite number of them. And curiously mathematicians have taken the trouble to prove that it does not matter which infinite cardinal enumerates the infinities.

So when people seek eternal life after death, do they mean living for an infinite duration, and, if so, which infinity are they referring to? For me, these notions arise out of a fundamental misunderstanding of the nature of Reality, a misunderstanding that arises when the mind, influenced by the fear of death, tries to make sense of our experiences from an anthropocentric perspective.

The key point here is that there really is no limit to the ways in which we can structure time or any other quantitative or qualitative measure. This analytical activity is just a game, the play of the Divine, called *lila* or *leela* in the East. While games can be fun, and, in this case, give us more and more specialized knowledge, they cannot lead to the ineffable Truth, to the Divine.

But when we take a Cosmic view of the Universe, we see that Eternity is not infinite or endless time. Eternity does not have duration; it is timeless. Similarly, Now is not zero time; it too is timeless. And it is from the eternal Now that we need to view the Totality of Existence if we are to understand what it truly means to be a human being.

Such a notion is becoming well familiar to many in the West, as the titles of these books affirm: *Freedom Has No History*, by Andrew Cohen, *Freedom from the Known* and *The Future is Now*, by J. Krishnamurti, and *The Power of Now*, by Eckhart Tolle, which has sold several hundred thousand copies.

## Exponential time

This leads to a second key point, about the accelerating rate of change we are experiencing today. Evolutionary change progresses at an exponential rate. It was David Attenborough's enthralling television series *Life on Earth*, broadcast in 1979, which graphically brought the exponential rate of evolutionary change to my attention. It is now some 3.5 billion years since the first self-reproducing forms of life appeared on this planet. So if we consider 10 million years to be a day, we can map the whole of evolution on this planet to the days of the year.

This model was made very real to me when I took my children to the Natural History Museum in London in the early 1980s, when they were about eleven and eight years of age. The first two exhibits we saw there were a fossilized tree trunk, some 300 million years old, in the grounds, and a dinosaur skeleton, in the entrance hall.

Using Attenborough's model, if we are now at midnight on 31st December, these two exhibits were alive at the beginning of December and during the week before Christmas. Human beings evolved in the early evening, the early farming communities began to settle about one and half minutes ago, and nearly all the knowledge that we have discovered about ourselves and the world we live in has been learnt in the past minute. The computer age began about half a second ago, if we discount Charles Babbage's Analytical Engine, designed in the middle of the nineteenth century, but never built.

Peter Russell provides a similar metaphor in *The White Hole in Time* and its sequel *Waking up in Time*. He uses the 108 floors of the 400-metre-high former World Trade Center in New York as a measuring stick for evolution since the formation of the Earth some 4.6 billion years ago.

Using this metaphor, the first living cells appeared on the twenty-fifth floor, "photosynthesis evolved around the fiftieth floor, and bacteria that breathed oxygen came another ten floors later—more than halfway up." Dinosaurs reached floors 104 to 107 and mammals arrived on the top floor. And the time since the first scientific revolution is less than the thickness of the layer of paint on the ceiling of the top floor.

In *The Awakening Earth* and its sequel *The Global Brain Awakens*, Peter extends his view of evolution still further back. To get a complete picture, we need to look at evolution as starting from the most recent big bang, some fourteen billion years ago.

So we need to be free of the idea that evolution is only a biological process, driven by random mutations in the DNA molecule. Evolution began long before the formation of the Earth, and did not end with the formation of *Homo sapiens sapiens*. For the past several thousands of years, evolution has been more focused on human learning, on our mental development. Pierre Teilhard de Chardin called this process 'noögenesis', from the Greek word *nous*, meaning 'mind', a word we use in English to mean simply 'common sense'.

So the accelerating pace of change in society today is just the latest manifestation of the exponential nature of evolutionary change. And we human beings are the product of all these billions of years of evolution. If this had not happened, none of us would be where we are today.

But why is it that evolution progresses at exponential rates? Well, this is because evolution is an accumulative process, each level building on what has preceded it. Evolution progresses by a process of differentiation and integration, of divergence and convergence, leading to the growth of structures of ever-increasing complexity.

In *The Phenomenon of Man*, Teilhard called this phenomenon the 'law of complexity-consciousness': the greater the complexity, the greater the consciousness. Each new level of complexity builds on the structures that have previously evolved through the new relationships that are created between the earlier forms and structures. Each new level is thus greater than the sum of its preceding parts through the synergy that is created by these relationships.

So, just as there are clearly distinguishable levels in human phylogeny and ontogeny, as Ken Wilber describes in *Up from Eden* and *The Atman Project*, respectively, there are also major turning points in evolution, when viewed as a whole. And because the rate of evolutionary change is exponential, the time periods between these major turning points become shorter and shorter, eventually diminishing to zero.

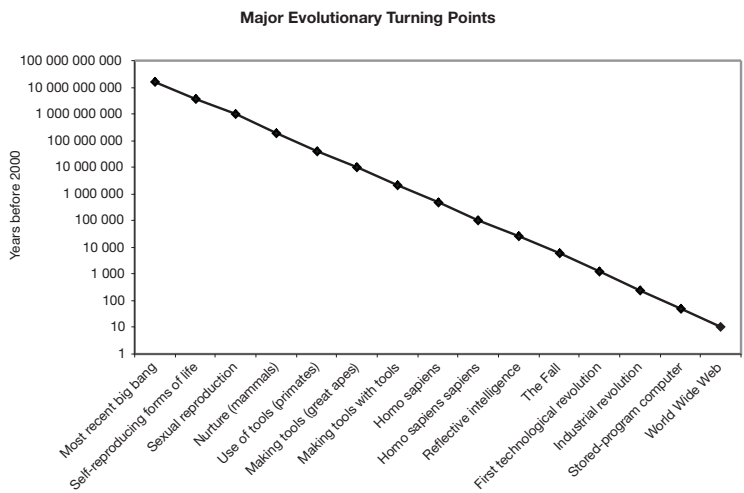
Now if we take an infinite number of these rapidly diminishing time periods and add them together, the result is not infinity; it is a finite number. For instance, the sum of this series is not infinity, but two:

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

To see how this relates to evolution, we can look at evolution as a progression of so-called self-organizing systems. This is what Nick Hoggard did in an unpublished book called *SuperEvolution*,

written when he was a student at Holma College of Holistic Studies in Sweden. This book was, in turn, inspired by the studies of the Mayan calendar by Carl Johan Calleman of Dalarna University, also in Sweden.

What Nick has observed in his book is that the time periods between the major turning points in evolution are diminishing by a factor that is very close to the Feigenbaum constant in complexity theory (4.669). Each of these significant turning points has introduced a new, faster way of generating evolutionary structures, an effect we see in the S-shape of the growth or learning curve. So we can see a series of events, starting with the most recent big bang and then progressing through the birth of self-reproducing forms of life and sexual reproduction, to the birth of the noösphere, the industrial revolution, and the invention of the programmable computer, as this diagram shows.




It might seem strange to include the invention of the computer and the introduction of the World Wide Web in the same diagram as the most recent big bang and the emergence of the first self-reproducing forms of life. However, as the time periods between the major turning points become shorter and shorter, the events that

mark them diminish in significance. This leads us to see that eventually nothing in the relativistic world of form has any substance; it is all just a great illusion, as Vijai Shankar goes to great pains to tell us in *The Illusions of Life*.

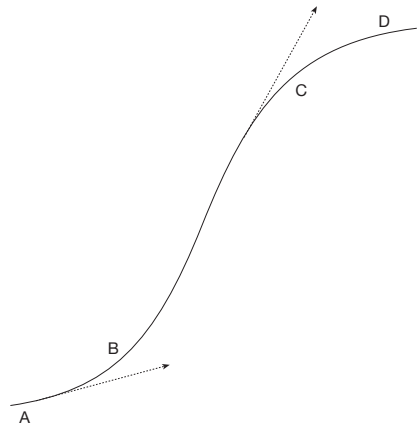
Now, in complexity theory, the series of discrete terms in systems development, called bifurcation points, has a finite limit, at what is called the point of accumulation. After this, systems are no longer periodic but display chaotic characteristics. For example, as a dripping tap is turned on, the periods between the drops go through a series of bifurcations before the falling water becomes a continuous flow, which is regarded as chaotic by systems theorists.

Applying these general characteristics of developmental systems to evolution as a whole, we can calculate that the exponential series of major evolutionary turning points converged on 5th July 2000, give or take a few weeks, the accuracy depending on the assumptions we make about the precise dating of the last few turning points. As we have now passed the evolutionary point of accumulation, there are no more discernible patterns in evolution. Evolution is now flowing in a continuous stream.

Yet we are not changing; we are still prisoners of the past. So there is no generally accepted science of change and consciousness, and little understanding of where we human beings have come from and where we are all heading in such a frantic rush. We are still holding on to fixed scientific, religious, and economic beliefs that are utterly inappropriate for the computer age we live in today.

## The growth curve

This brings us to another significant point about evolutionary change. Evolution has not progressed at a steady rate through its history. There have been times when change was very rapid, and other periods of comparatively little change. Niles Eldredge and the late Stephen Jay Gould called this stop-start process 'punctuated equilibrium', which is illustrated most simply by the S-shape of the growth curve, also known as the learning or logistic curve.




As we can see, the growth curve has three distinct phases. In the first phase, growth is very slow and apparently non-existent until at point B there is a sharp turn that can be most unexpected. This can be simply illustrated with a child learning to ride a bicycle. Characteristically, the child will take some time when little progress seems to be made and she will need much support to prevent her from falling off the bicycle. Then eventually she will manage to coordinate the skills of balancing, steering, and pedalling, and suddenly she is away. Learning can then develop very rapidly as the child develops her skills so that she can go farther and faster. It is not long before she cries, "Look, Dad, no hands!"

We can call point B the coordination point of the learning curve. However, there is a limit, either because of the technology of the cycle or because the child grows tired and learning tails off. The logistic curve in economics has similar characteristics. Once a new product catches on it becomes in fashion, and more and more people go out and buy one. But this cannot go on forever. Eventually, the market becomes saturated, and product sales settle down or even fall. We can call point C, when the rate of growth reaches a limit, the saturation point.

A major problem with this curve is that few recognize its vital turning points. There is a tendency to extrapolate the curve so that when on AB, the assumption is that growth will develop slowly. "I'll never manage this!" is a familiar cry. And when growth is very fast, people often think that it will continue indefinitely. That seems to be the attitude of business people and politicians pursuing a policy of unlimited economic growth. They think that existing ways can

continue indefinitely. They could not be more wrong, as the bursting of the dot-com bubble at the beginning of this century showed.

We can most simply illustrate this situation with Moore's law. In 1965, Gordon Moore, cofounder of Intel Corporation, predicted that the number of transistors on a semiconductor would double roughly every eighteen months to two years, as would overall chip performance. So for the past forty years or so we have seen the exponential growth of the price/performance of computers.

But this process has a limit, which is likely to be reached within ten years, as many are now forecasting. As Moore told a meeting of the world's top chip designers and engineers on 10th February 2003, "No exponential is forever." But he then went on to say, "Your job is to delay forever." This is a statement that defies the fundamental laws of the Universe.

Whether quantum computers, molecular electronics, nanotechnology, or other exotic technologies will one day replace conventional silicon chips is utterly irrelevant. For even though the Qbits of quantum computers reflect the universal principle that Wholeness is the union of all opposites, it is the software in computers, not the hardware, that determines how they function, just as it is our minds, not our brains, that largely affect our behaviour. So if we continue to put the focus of our attention on the building of machines that extend the capabilities of the human mind, instead of looking inwards so that we can transcend the mind, thus revealing our true mystical nature, we shall inevitably drive our species to the brink of extinction.

For the basic fact is that there are no more major discoveries to be made in computer science. The infrastructure of the discipline, and hence of the information technology industry, is now well established. Of course, there is no limit to the refinements that can still be made, such as the multitude of gadgets that are leading to what is called 'the digital lifestyle'. But these are mere details, of little relevance to the big picture. Computer science as a whole is reaching the saturation point of the learning curve. We

are approaching the limits of information technology, which will show that it is false to assume that technological development can continue to drive economic growth indefinitely.

It is thus imperative that we change the focus of our attention away from technological development and towards our inner human development. For it is only by awakening our intelligence that we can possibly live with full consciousness in love, peace, and harmony with each other, our environment, and the Divine.