The objective world simply is; it does not happen.

Herman Weyl

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If we accept multiple universes then we no longer need worry about what really happened in the past, because every possible past is equally real. Therefore, to avoid... insanity, we can, with clear consciences, arbitrarily define reality as that branch of the past that agrees with our memories.

Joseph Gerver

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What has been will be again, what has been done will be done again; there is nothing new under the sun. Is there anything of which one can say, "Look! This is something new?" It was here already, long ago; it was here before our time.

King Solomon

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But according to conventional physics, we inhabit a universe where time and space are frozen into a single unchanging space-time. All the events that have happened or will ever happen are marked by points in this "block" of space-time, like bubbles suspended in ice. Past and future have the same footing, and there's no flow.

Stephen Battersby

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I have realized that the past and future are real illusions, that they exist in the present, which is what there is and all there is.

Alan Watts

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Why is [the now] the most precious thing? Firstly, because it is the *only* thing. It's all there is. The eternal present is the space within which your whole life unfolds, the factor that remains constant. Life is now. There was never a time when your life was not now, nor will there ever be. Secondly, the Now is the only point that can take you beyond the limited confines of your mind. It is your only point of access to the timeless and formless realm of Being.

Eckhart Tolle

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“You have the sight now Neo, you are looking at the world without time.”

The Oracle in *The Matrix*

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The ultimate stuff of the universe is mind stuff.

Sir Arthur Eddington
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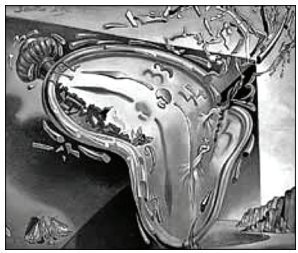
Time has no independent existence apart from the order of events by which we measure it.

Albert Einstein



Chapter One

Time is Imaginary

The People of Timelessness

Surprising as it may be to most non-scientists and even to some scientists, Albert Einstein concluded in his later years that the past, present, and future all exist simultaneously. In 1952, in his book *Relativity*, in discussing Minkowski's Space World interpretation of his theory of relativity, Einstein writes:

> Since there exists in this four dimensional structure [space-time] no longer any sections which represent "now" objectively, the concepts of happening and becoming are indeed not completely suspended, but yet complicated. It appears therefore more natural to think of physical reality as a four dimensional existence, instead of, as hitherto, the evolution of a three dimensional existence.

Einstein's belief in an undivided solid reality was clear to him, so much so that he completely rejected the separation we experience as the moment of now. He believed there is no true division between past and future. His most descriptive testimony to this faith came when his lifelong friend Besso died. Einstein wrote a letter to Besso's family, saying that although Besso had preceded him in death it was of no consequence, "...for us physicists believe the separation between past, present, and future is only an illusion, although a convincing one."

Most everyone knows that Einstein proved that time is relative, not absolute as Newton claimed. With the proper technology, such as a very fast spaceship, one person is able to experience several days while another person simultaneously experiences only a few hours or minutes. The same two people can meet up again, one having experienced days or even years while the other has only experienced minutes. The person in the spaceship only needs to travel near to the speed of light. The faster they travel, the slower their time will pass relative to someone planted firmly on the Earth. If they were able to travel at the speed of light, their time would cease completely and they would only exist trapped in timelessness. Einstein could hardly believe there were physicists who didn't believe in timelessness, and yet the wisdom of Einstein's convictions had very little impact on cosmology or science in general. The majority of physicists have been slow to give up the ordinary assumptions we make about time.

The two most highly recognized physicists since Einstein made similar conclusions and even made dramatic advances toward a timeless perspective of the

universe, yet they also were unable to change the temporal mentality ingrained in the mainstream of physics and society. Einstein was followed in history by the colorful and brilliant Richard Feynman. Feynman developed the most effective and explanatory interpretation of quantum mechanics that had yet been developed, known today as *Sum over Histories.*

Just as Einstein's own Relativity Theory led Einstein to reject time, Feynman's *Sum over Histories* theory led him to describe time simply as a direction in space. Feynman's theory states that the probability of an event is determined by summing together all the possible histories of that event. For example, for a particle moving from point A to B we imagine the particle traveling every possible path, curved paths, oscillating paths, squiggly paths, even backward in time and forward in time paths. When summed the vast majority of all these directions add up to zero, and all that remains is the comparably few paths that abide by the laws and forces of nature. Sum over histories indicates the direction of our ordinary clock time is simply a path in space which is more probable than the more exotic directions time might have taken otherwise.

Other worlds are just other directions in space, some less probable, some equally as probable as the one direction we experience. Feynman's summing of all possible histories could be described as the first timeless description of a multitude of space-time worlds all existing simultaneously. In a recent paper entitled *Cosmology From the Top Down*, Professor Stephen Hawking of Cambridge writes; "Some people make a great mystery of the multi universe, or the Many-Worlds interpretation of quantum theory, but to me, these are just different expressions of the Feynman path integral."

Hawking, the most popular physicist since Einstein, who has battled against what is known as Lou Gehrig's disease for some thirty years, has expanded upon both Einstein's and Feynman's theories supporting timelessness. Hawking demystified the black hole, and wrote books so enjoyable that he has managed to educate billions of people about modern physics and cosmology. From his wheelchair, presently unable to communicate without his computer, Hawking still actively lectures while he professionally holds Newton's chair as Lucasian professor of mathematics at Cambridge University in England. As if such miracles were commonplace, Hawking has introduced what could be said to be the scientific theory of forever.

Hawking and James Hartle developed the *No Boundary Proposal*, a theory which extends other theories such as *Sum Over Histories*. The no boundary proposal is a model of the early universe during the big bang which includes a second reference of time, called *Imaginary Time* which has no beginning or end. In this mode of time we could in fact reach back and touch the original conditions of the early universe, because they still exist in a common time to all moments. Hawking explains that what we think of as real time has a beginning

at the Big Bang, some ten to twenty billion years ago, but in imaginary time the universe simply exists.

People often think from the tag imaginary that this other mode of time isn't real. Quite the contrary, clock time could be said to be imaginary compared to this ultimate mode of time, since in imaginary time our clock time is totally indistinguishable from directions in space. In his most popular book *A Brief History of Time* Hawking writes:

> Quantum theory introduces a new idea, that of imaginary time. Imaginary time may sound like science fiction, and it has been brought into Doctor Who [an English Star Trek]. But never the less, it is a genuine scientific concept. One can picture it in the following way. One can think of ordinary, real, time as a horizontal line. On the left, one has the past, and on the right, the future. But there's another kind of time in the vertical direction. This is called imaginary time, because it is not the kind of time we normally experience. But in a sense, it is just as real, as what we call real time.

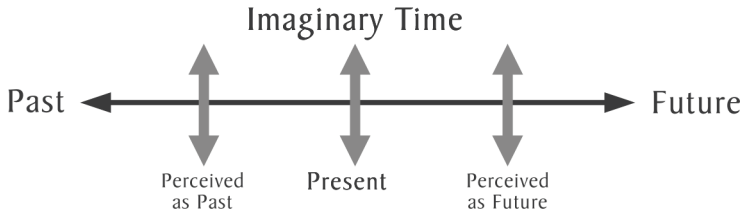


Figure I.I: All moments share an Imaginary Time reference which has no beginning or end.

The simple lines in this image above effectively portray imaginary time occurring at right angles to our ordinary sense of time. Of course since the moments of past, present, and future all exist simultaneously in this other mode of time, the duration of each moment of time would seem to be ceaseless and eternal. The existence of the universe in imaginary time doesn't have a past or a future, instead all times exist in one enormous moment of now. Hawking writes:

> One could say: "The boundary condition of the universe is that it has no boundary." The universe would be completely self-contained and not affected by anything outside itself. It would neither be created nor destroyed. It would just BE.

According to Hawking the universe doesn't have a boundary point where it suddenly begins existing. The first moment isn't any different than the second in respect to existence. Both moments exist forever in imaginary time. It takes very little reasoning to figure out that if the universe exists in an unseen way without beginning or end, at right angles to regular time, then that reference to time is simply more elementary and even more real than ordinary clock time. The term imaginary applies more accurately to our time.

Hawking himself writes:

> This might suggest that the so-called imaginary time is really the real time, and that what we call real time is just a figment of our imaginations. In real time, the universe has a beginning and an end at singularities that form a boundary to space-time and at which the laws of science break down. But in imaginary time, there are no singularities or boundaries. So maybe what we call imaginary time is really more basic, and what we call real is just an idea that we invent to help us describe what we think the universe is like.

Using the no boundary proposal, we can imagine the whole of time by imaginatively placing oneself inside a giant hollow globe. If we look up we see the North Pole from the inside. Within this globe of time, looking up is looking into the past, but not as if it no longer exists, instead one can actually touch the past since it is a place existing permanently. The North Pole, the beginning of time, is just a single position upon the rounded surface like the first page of a book. Looking down one even sees the future. And in this globe, looking down we see the South Pole, the end of what we call time.

If the universe exists in another time reference where conditions are permanent or static, suddenly it doesn't matter that we humans so convincingly observe a beginning to time, since the imaginary time reference applies regardless of our sense of where we are in time. The universe could be said to exist before our clock time began, and after our clock time ends. The past and future exist now. Obviously, imaginary time relates directly to existence. Imaginary time relates to the whole, to all that can be imagined. It also easily relates to numbers and ideas and the concepts we think with, which we already sense exist forever.

The only reason this can be so disorienting at first is because we are splitting time into two separate dimensions. We are splitting in two the more common meaning of the word time. Here one time dimension is related purely to the existence of each moment, so it is the omni-directional time we exist within. The other time dimension, the time we measure with clocks, is here limited to being change which is necessarily a construction of many moments in the first dimension bound together in some way that creates a second time dimension. Each moment is necessarily a time frame, which is a sort of fixed pattern of matter and space. Somehow those frames or spaces are fused together, creating a false sense that existence is changing and transforming, when change is actually observed only by whatever moves from one time frame to another.

Another English theoretical physicist, Julian Barbour, believes that time simply doesn't exist. Barbour, an independent theoretician not affiliated with any University, is never the less highly respected in the upper physics community.

And Barbour has extensively explored the concept of timelessness and the illusion of motion, and is perhaps the first person since Ludwig Boltzmann to set his focus directly on modeling the timeless world of all possible states. Barbour's version of timelessness, Platonia, named in respect of Plato's allegory of the cave which describes a world of illusion, theorizes that the set of all possible nows can be reduced to the patterns created by all the possible triangular positions of only three particles. In an interview with John Brockman, Barbour describes his version of the wedge model and shows his passion for describing timelessness:

> What really intrigues me is that the totality of all possible Nows of any definite kind has a very special structure. You can think of it as a landscape, or country. Each point in the country is a Now. I call it Platonia, because it is timeless and created by perfect mathematical rules.

I so strongly agree with and respect how Barbour has introduced to science the base assumption that what exists in timelessness is describable and it is shaping the world we experience. Barbour is convinced that there is a distinct shape to a timeless realm of all possibilities which is exclusively responsible for guiding the path of time and fashioning the physical universe we experience. Such a view is presently uncommon but it can be appreciated as the only possible explanation. When a respected scientist clearly emphasizes a perspective as Barbour has done it opens the doors for others.

Another popular physicist, the string theorist Brian Greene, author of the book and PBS television series *The Elegant Universe*, has stated the following in his most recent book *The Fabric of the Cosmos*. "Just as we envision all of space as really being out there, as really existing, we should also envision all of time as really being out there, as really existing too." It appears we have finally reached a new era of taking the idea of timelessness seriously. This means however that we have to begin to look at the universe differently. We have to learn to think differently and ask different questions. The most important question is a big one. How can a universe simply exist?