Chapter 2

Time and Eternity

The arrow of time moves in the direction of evolutionary progress. For us, time must have a beginning for the same reason that there must be a First Cause. Eternity encompasses the infinity of time and is without beginning or end. These two conceptions are intuitively associated in spiritual philosophy by the concepts of eternal existence and temporal causality. But philosophy sees only paradoxes whenever it tries to reconcile motion in time with existence in eternity.

A subjective aspect to the experience of time has long been recognized. The perception of time in the world involves the superimposition of an inner recognition of sequence upon the outer physical perception of form and content. This subjective bias can be overcome in natural philosophy by measuring duration in relation to dependable cyclical motions, such as the swing of a pendulum. Shortly after the turn of the previous century, special relativity discovered that duration varies with relative velocity. This led to the conclusion that there is no single time in which everything in the universe simultaneously exists. The concept of existence in the universe became fragmented into innumerable overlapping spacetime frames. Existence became a relativized and solipsistic concept without any meaning apart from some specific observer.

Quantum theory developed in parallel with relativity theory, although it is a fundamentally different form of physics. One of the more recent discoveries of quantum theory experiments is nonlocality; instantaneous physical interactions occurring between widely separated phenomena. Nonlocality is impossible under relativity theory, which is grounded on the premise that all physical interactions are strictly limited by the velocity of light. Towards the end of the previous century conclusive proof of nonlocality began to appear. Relativity theory describes causal interactions on the finite level. Quantum theory describes causal interactions on the ultimate level of transcended time and space. The concept of causality changes from the finite to the transcendental level of existence and is different still on the existential level.

Mankind is in the throes of an unprecedented paradigm shift in metaphysical thought. "Revelation authoritatively clarifies the muddle of reason-developed metaphysics…" **103:6.8** Science has advanced from the simple concept of absolute time to a beginning recognition of the difference between finite and transcendental time. Beyond the ultimate level of reality lie existential eternity and the absolute foundations of reality.

1. The Concept of Time

Eternity is the origin and destiny of time. The arrow of time is conceived of as a succession of moments between this origin and destiny. The more the arrow of time is analyzed, the more puzzling the reality of the present moment becomes. In his *Confessions* St. Augustine writes, "How can the past and future be, when the past no longer is, and the future is not yet? As for the present, if it were always present and never moved on to become the past, it would not be time, but eternity." The duration of the present moment can be progressively shortened until nothing more than an absolute instant separates the no-longer-existing past from the not-yet-existing future. Time is often thought of as consisting of instants, but an absolute instant is not a unit of time, since it has no duration. It is near the limit of divisibility represented by an absolute instant that reason finds itself lost in paradox and confusion.

Any portion of the arrow of time, no matter how short, contains an infinite number of absolute instants, each of which has no duration. If the motion of time consists of an infinite number of instants of no duration succeeding one another, and there is no duration between these instants, then time itself has no duration. The sum of an unlimited number of zeroes is zero, so duration must be an illusion. The idea that time and change are illusions traces back at least as far as the pre-Socratic philosophers. From a logical perspective it can be argued that there is only a single eternal *now* in which all things exist without change. From an experiential perspective it can be asserted that duration is undeniable and all things change over time. Since change is self-evident, time cannot consist of an infinite number of instants, and there is no eternal *now.*

An example of this distinction between an infinitely divisible temporal sequence and a finite quantitative duration is found in the difference between

mathematical thought and application. Mathematics uses the concept of infinitely recurring processes in many of its proofs. Since these recurring processes are intellectual abstractions, no finite duration is required to reach an infinite number of iterations and prove the validity of some theorem. Mathematics is subjectively real to the intellect, but it is not a concrete reality in finite time and space. It is impossible to repeat a physically real process requiring some finite duration an infinite number of times in less than an infinite duration. Nevertheless, mathematics is successfully applied to material things and relationships which are constrained by finite quantitative duration. Science uses the infinite repetition of nontime sequences existing only in the intellect to describe temporal physical events.

The relationship between mathematics and the world discloses an ontological difference between intellect and matter, between the transcendental and the temporal. Following the thought of the Pythagoreans, Plato argued that the perfect forms and concepts of geometry are immaterial archetypal realities which are different in their being from the physical realities we perceive with our physical senses. We "see" the perfect form of a circle when we perceive a round thing in the world, but we know that the form and the thing are two fundamentally different realities. This overlaying of archetypal geometric forms upon physical perception is self-evidently true in the perception of three-dimensional objects. The perception of depth in the field of vision is always a stereoscopic illusion created by the superimposition of an archetypal form upon the raw data of physical perception.

When NASA published its famous "Blue Marble" picture of the earth in 1972, no one saw a flat bluish disk drawn on a black surface. Everyone sees a three-dimensional sphere in a volume of space. There is an intuitive and automatic superimposition of an archetypal three-dimensional sphere upon the two-dimensional image of the earth. This superimposition becomes self-evident when we attempt to see the earth as a two-dimensional disk on a plane, which is possible with some effort of the imagination. This ability to intentionally alter depth perception is proof that space is a synthesis of three-dimensional archetypal forms existing in mind with the raw two-dimensional data brought into awareness by the mechanics of physical perception.

Fig. 1: **The Blue Marble (1972)**

Credit: NASA Goddard Space Flight Center image by Reto Stockli
http://visibleearth.nasa.gov/

"You do, after all, perceive time by analysis and space by synthesis. You co-ordinate and associate these two dissimilar conceptions by the integrating insight of personality." **118:3.1** The perception of spatial depth is always a stereoscopic synthesis of three-dimensional mindal forms and two-dimensional physical perceptions. Space is the most objective of all things, but all we ever physically see is a two-dimensional area, a field of perception. The reality of depth is always added to the area of physical perception by an imaginative function of consciousness. In psychological terms, the perception of the outer world of objective space always requires a subjective projection of the intuition of three-dimensionality onto two-dimensional perceptions. The apparent form of objective space originates in subjective mind.

The realization that the perception of space requires a subjective projection has led some idealists to conclude that the objective world of space is an illusion or that it can never be known. Immanuel Kant hypothesized the existence of the inaccessible noumenal (objective) world as the cause behind the phenomenal

(subjective) world of perceptions. Space is a subjective intuition of mind and cannot be proven to correspond to objective reality. However, such a distinction requires the assumption that the subjective intuition of spatial volume does correspond to the inaccessible noumenal world in some manner. If there is no correspondence at all, then experience of the objective world is a complete delusion, and philosophy falls into the abyss of absolute solipsism. The idea of an inaccessible and unknowable objective reality is part of a very deep metaphysical current running beneath much of continental philosophy. It finds clear expression more than a century later in the anti-realist Copenhagen interpretation of quantum mechanics, which asserts that objective reality is fundamentally inaccessible (noumenal) on the scale of atoms and below.

Putting that issue aside for the moment, there is a self-evident ontological difference between the awareness of geometric forms and mathematics, which are mindal realities, and the perception of physical realities by the senses. The changelessness of these forms and relations can be interpreted as being reflective of eternal realities, which is the meaning Platonists ascribe to them, even today. But these archetypal ideals do not prove the objective existence of either eternity or infinity. The finite intellect can believe in the eternal and the infinite based upon apparently invariable things, meanings, and values found in personal experience, but it is impossible to conclusively prove the truth of such beliefs with either reason or logic. Mathematicians tend to believe in the possibility of infinity, while physicists tend not to. The historical persistence of the various philosophical attitudes of materialism, skepticism, and idealism is conclusive proof of the finite limits of the human intellect. The intellect can never reason its way to final truth and must ultimately depend upon belief and insight to establish the foundations of reasoning. This limitation of human reason discloses the domain in which the freewill choice of the individual is supreme.

Philosophy discovered and described axiomatic laws of logic and reason long ago. Causality is an axiom of reason which is universally accepted as true. The truly *a priori* nature of causality became particularly apparent during the development of quantum mechanics. Some physicists, such as Einstein, never believed that the acausal relationships of quantum mechanics are real instead of apparent. Einstein believed that the statistical relationships discovered by quantum mechanics were probabilities associated with a large number of discrete causal interactions. Today most physicists agree with Niels Bohr, who believed these acausal probabilistic relationships are real and not apparent; the causality of classical physics does not apply to phenomena on the quantum scale. Einstein's belief led him to conclude that quantum scale particles, such as

electrons, must be classically real objects. Bohr's belief led him to conclude that there are no particles in the classical sense on the quantum scale. Ultimately the Einstein-Bohr debate, which preoccupied a generation of physicists, reduces to a difference of beliefs.

The emergence of such radically different beliefs in the supposedly objective discipline of science arose out of the discovery that there is a deep metaphysical difference between temporal sequence and finite duration. Prior to the turn of the last century, qualitative sequence and quantitative duration were always assumed to have a fixed relationship in the objective world. Christian metaphysics has always believed that God creates a linear sequence of temporal events with a beginning and an end. Newton formalizes this concept in his *Principia* with the idea of absolute time: Time is an independent and objective reality in which sequence and duration are everywhere constant and the same. Newton's absolute time and space are the metaphysical foundations of classical physics.

New knowledge about the realities of time and space was discovered toward the end of the 19th century. Experiments demonstrated that relative motion between an observer and a light source does not alter the measured velocity of light: Every observer is stationary relative to this velocity, which is the absolute limit of motion. This finding creates a paradox for Newtonian physics, which sees no theoretical upper limit to velocity. In classical physics, if an astronaut shines a flashlight in the direction of his spaceship's motion, the photons of light should have a velocity equal to the ship's velocity plus the velocity of light. Experiments conclusively prove that photons always have exactly the velocity of light, regardless of the motion of an observer. Einstein realized that this paradox can only be resolved if time for a relatively moving light source passes at a different rate than it does for a stationary observer.

Einstein's 1905 theory of special relativity describes a variable relationship between qualitative sequence and quantitative duration, where Newton assumed an absolutely constant one: Duration varies with relative velocity, but temporal sequence does not. Qualitative sequence and quantitative duration are fundamentally different realities. We can measure the change in an object's spatial position over duration and calculate its velocity. In the absolute time of Newtonian physics, exactly the same quantity of time passes for both a stationary observer and a moving object whose velocity is measured. Relativity demonstrates that the quantity of time for a moving object slows down compared to time measured by an observer. The greater the relative velocity is, the smaller the quantity of time which passes in the reality frame of the moving

object, as measured by the observer. Time "dilates" in a moving frame of reference.

A predictable natural process requires a certain duration in the observer's frame of reference. This same process takes more time to complete in the frame of a moving body, as measured in observer-time, because time dilates. A radioactive substance emits ionizing particles at a predictable rate in the observer's frame. If this radioactive material is given a relative velocity, the stationary observer will count a smaller number of ionizing particles emitted by it per unit of observer-time. The observer measures a decrease in the rate of radioactive decay, because time in the moving frame slows down relative to observer-time. If this radioactive object has a relative velocity very close to the velocity of light, the observer will detect almost no ionizing particles coming from it, because time in the object's frame appears to have virtually stopped. This relationship between duration and relative velocity holds for all temporal processes. If a living plant is placed in a sphere which is then given almost the velocity of light, the plant will live for a virtual eternity of observer-time.

The sequential order of physical events and the duration between them are two different realities. The duration of a natural process varies depending upon who observes the process, but the sequence of events constituting the process remains the same in all frames. Atomic clocks employ the very consistent vibrations of the cesium atom (10.23 million vibrations per second) to measure the passage of time. Because of their high degree of accuracy, cesium atomic clocks are used aboard Global Positioning System (GPS) satellites. Both special and general relativistic effects cause a cesium atom aboard a GPS satellite to vibrate at a slightly faster rate, compared to its rate of vibration as measured on the earth's surface. Specifically, the frequency of cesium atom vibrations increases by 0.00465 cycles per second within the spacetime frame of a typical GPS satellite, when measured from the surface of the earth. [1] Measured from within the reality frame of the GPS satellite, however, no change in the duration of each vibration is observable. For an observer inside the satellite, the frequency of vibration remains unchanged from the time before the satellite is launched until the time after it has settled into its orbit at about 16,000 km/h.

Duration is measured by the cycles of atomic vibration, and time passes more quickly on the GPS satellite, when compared to the passage of time on the surface of the earth. Failure to account for relativistic effects would lead to significant errors in calculating positions on the surface of the earth. This relativistic effect is mostly caused by the gravitational acceleration holding the GPS satellite in orbit. As gravitational acceleration decreases, the relative unit of

duration becomes shorter (the frequency of vibration increases), and the rate at which time passes speeds up. As measured by an earth observer, all physical processes aboard the GPS satellite require slightly less time to complete. For example, the rate of radioactive decay increases, and the lifetime of a plant is shorter. When these processes are observed from within the satellite itself, no change in the rate of time is detected. This change in the rate of time in different reality frames does not violate physical law. The quantity of time between events changes, but the causal sequence of events remains unchanged.

Prior to this discovery, it was always assumed to be self-evident that motion occurs within a universal time and space. The discovery of relativity fundamentally shifts the metaphysical grounds of being and existence. Time and space are *local* realities determined by motion relative to an observer's frame of reference, and the observer's frame is always stationary with respect to the velocity of light. Einstein's critical insight is that the velocity of light is exactly the same for every observer and is, therefore, the absolute limit of linear motion. Time and space are demoted from universal to local realities, and the velocity of light becomes the metaphysical foundation of existence and motion.

The venerable and intuitive grounding of existence in the universal realities of time and space is no longer possible. Things are present in time and space, but they do not "exist" in the classical sense. Rather, time and space are local qualifications of reality, which "exists" relative to the universal constant of the velocity of light. The only thing which might still be said to objectively exist as a continuous and constant reality is light. In relativity, the metaphysical distinction between existence and non-existence is considered one which has no practical or empirical meaning.

The realization that the classical concept of existence is effectively nullified by relativity devastated philosophy. Philosophy has always investigated the larger questions about life and the universe based upon overarching ontological categories, such as time and space, material and spiritual, thought and action, man and God. The discovery of relativity intrinsically undercuts all of these categorical distinctions between different types of existence. It shatters the coherent whole of a single cosmos into a confusing kaleidoscope of innumerable overlapping, coexistent local spacetimes. The scope of 20th century philosophy was suddenly constrained to arcane issues of logical and linguistic analysis, which only other academics might find interesting. The metaphysical distinctions upon which the whole philosophic endeavor has always been grounded are now believed to be illusions arising from faulty logic or linguistic bias. The ancient

philosophical quest to discover the objective truth has been replaced with an obsessive fixation on the relativity of absolutely everything, including the truth.

2. Simultaneity of Existence

Relativity discovers that duration is a *local* phenomenon, not a *global* one. The ontological relationship between time and motion is inverted. Time is not the objective universal reality in which all things move; the reality of motion determines duration. Motion relative to the velocity of light is the objective universal relationship which determines the variable quantity of time. Duration is defined in each local frame by the invariant velocity of light. The motion of an object relative to the local "light-frame" of an observer results in the emergence of another local "light-frame" in which duration within the moving frame of the object is also defined by the velocity of light. Revelation confirms this derivation of time from motion: "Time comes by virtue of motion …. From a practical viewpoint, motion is essential to time…" **12:5.1** The Perfector of Wisdom is referring here to motion relative to absolutely stationary Paradise, but this relationship also applies to relative motion.

Relativity theorists do not recognize the possibility of an absolutely stationary location, such as the Isle of Paradise. Instead, the velocity of a photon of light is the absolute limit of linear motion relative to an observer, so every observer is absolutely stationary with respect to photons of light. All local frames are, therefore, exactly equivalent. There is no preferred local frame. The duration and distance in one particular local frame are not "more real" than the duration and distance in any other local light-frame.

Relativity's discovery of local time undermines the intuitive concept of existence. Everything might be said to exist relative to a specific local spacetime frame, but there are as many local spacetime frames in the universe as there are possible locations of observation. The relativity (variability) of duration means that a temporal sequence of events for one observer cannot be physically synchronized with the same sequence as seen by another observer who is moving with respect to the first. The predictable occurrence of a future event in one local time may have already occurred in a different local time. The completion of one cycle of vibration for a cesium atom in a GPS satellite occurs

before its predicted completion on the earth's surface. The existence of other things in the universe at this instant of time only has a relative meaning which is anchored to and dependent upon a specific local observer-time.

Relativity subjectivizes the concept of existence to the point where it loses all objective meaning. It becomes impossible to know if any object actually exists at the time it is observed. To avoid the philosophical dead end of subjective idealism, which fundamentally undercuts the whole scientific premise of investigating the objective world, relativity hypothesizes a spacetime continuum, a universal light-frame which exists independently of any specific local light-frame.

Duration in a local frame is a derivative of its motion relative to the absolutely limiting velocity of light. Light defines the absolute frame in which all possible motion occurs. Duration can be treated as motion in space relative to this universal light-frame. Relativity transforms subjective duration into objective distance by multiplying the velocity of light c by the local duration t: ct. The addition of this spatialized-time to the three dimensions of space creates a four-dimensional space-like continuum. Time is represented by geometric "world lines" which link spacetime events together in a timeless sequential order. The past, present, and future of local observer-times become discrete world lines in the unimaginable abstraction of the spacetime continuum.

Causation is represented by an intersection of world lines, not by one event "existing" prior to a second event. The transformation of duration into distance removes subjective duration, leaving only a nontemporal structural sequence of objective spacetime events. Essentially, the spacetime continuum is a conjecture about the eternal nature of (noumenal) reality underlying the (phenomenal) perception of local duration and distance. This concept is fully deterministic. In the spacetime continuum all physical events already exist in the nontemporal four-dimensional arrangement of world lines, which span all past, present, and future time. World lines in the spacetime continuum exist independently of the subjective perception of duration and distance. In a strict sense only spacetime events on world lines exist simultaneously, because no objective (noumenal) duration separates one spacetime event from another. Subjective (phenomenal) duration is an illusion. However, these world lines are fundamentally inaccessible.

In relativity theory simultaneity of existence cannot be established on the empirical level of observable phenomena. Demonstrating simultaneity of existence at two different locations requires the transmission of some physical

signal back and forth between them. Since the velocity of light is the fastest possible means of physical communication and distance is measured by the velocity of light, it is impossible to empirically establish simultaneity of existence between any two locations. This impossibility is referred to as the relativity of simultaneity. The reasoning behind this conclusion appears to be flawless. It is, nonetheless, incorrect.

Newton's law of gravitation requires the force of gravity to act instantaneously over any distance, and this necessarily requires simultaneity of existence. Instantaneous action is only possible between two things which exist in the very same instant. Relativity denies the validity of Newton's idea of instantaneous gravitational interaction on at least two grounds. It requires simultaneity of existence, which cannot be logically justified. It also requires a physical motion which exceeds the velocity of light, which is impossible. Einstein's general theory of relativity proposes that gravitational interactions are limited by the velocity of light and are therefore not instantaneous, as Newton supposed. Nevertheless, the idea of instantaneous interactions reappears during the development of quantum mechanics in the 1920s. Einstein rejected this aspect of quantum theory, since instantaneous interactions are impossible from his perspective of physical realism. But the astonishingly successful predictions of quantum mechanics clearly implied the existence of instantaneous interactions and simultaneity of existence.

In 1935, in collaboration with Boris Podolsky and Nathan Rosen, Einstein presented a thought experiment designed to refute the whole idea of instantaneous interactions, which are central to quantum mechanics. This is known as the EPR paradox (Einstein-Podolsky-Rosen). In the early 1950s the American physicist David Bohm offered a detailed hypothesis describing how the facts of quantum mechanics can be consistently interpreted in terms of instantaneous interactions between objectively real quantum particles. Bohm's hypothesis was universally ignored until 1964, when the Irish physicist John Stewart Bell became intrigued by his work. Bell investigated the possibility of determining whether or not instantaneous interactions could be empirically tested. He developed a mathematical formalism with which the EPR paradox could be decisively resolved. Bell's theorem sets up the formal conditions under which the premise of instantaneous interactions between quantum particles can be either verified or refuted.

Bell was a theoretical physicist, and it took almost a decade to persuade an experimental physicist to undertake an empirical test of his theorem. The first test of the EPR paradox using Bell's theorem was performed in 1972 and

instantaneous interactions were tentatively confirmed to occur between different quantum events. Since the early 1980s dozens of tests using Bell's theorem have been carried out. They all conclude that instantaneous interactions occur on the quantum level as predicted by quantum mechanics. This instantaneous interaction is referred to as nonlocality or nonlocal interaction. Despite Einstein's stature, his belief that nonlocality is impossible has been conclusively refuted.

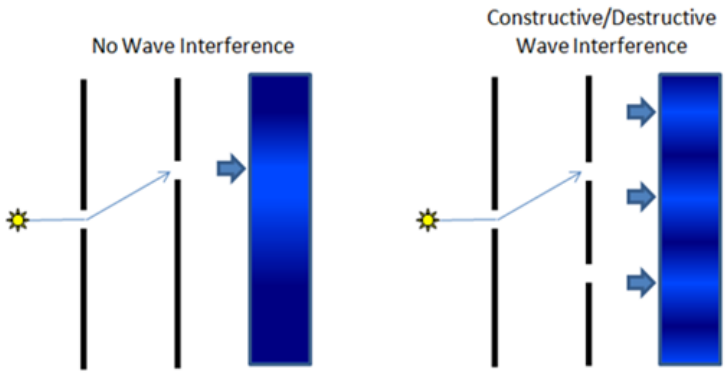
The discovery of nonlocality has profound implications. Relativistic physics still concludes that instantaneous interactions are impossible based upon extensive empirical evidence. Quantum physics concludes that instantaneous interactions occur based upon extensive empirical evidence and the additional evidence of Bell theorem experiments. Relativity refutes simultaneity of existence on the evidence. Quantum physics confirms simultaneity of existence on the evidence. It is now generally recognized that physical interactions above and below the quantum scale are not restricted in the same ways. Relativity of simultaneity is no longer consistent with all of the scientific evidence, since there is a very large body of evidence which directly contradicts this conclusion. Relativistic physics is deterministic in its complete conformance to the law of causality. Quantum physics is not constrained by the classical law of causality in the same ways. It describes verifiable statistical relationships which ignore the classical concept of causality, and yet it still makes astonishingly accurate predictions about the probability of occurrence of specific quantum events.

Interactions on the quantum scale do not necessarily involve a transfer of energy, such as occurs in the classical concept of causality. In classical physics, the transfer of energy from one body to another by contact is the actuality of the cause and effect relationship. This transfer of energy, more than anything else, is what separates the objective theories of science from subjective superstitions and magical thinking. Without an actual transfer of energy from a cause to an effect, there is no causal relationship in the classical sense. With the notable exception of instantaneous Newtonian gravitation, the whole of classical mechanics is built upon this understanding. The law of conservation of energy, which lies at the very root of classical physics, is a direct consequence of this concept of physical causality. Energy is never created, just transformed from one state to another. Since quantum mechanics is only concerned with the statistical probabilities of final outcomes, it ignores this concept of causality. The law of conservation of energy can be violated for short periods of time, such as occurs in quantum tunneling, when a particle temporarily "borrows" enough energy to pass through a barrier which should prevent this under the laws of classical physics.

Where classical and relativistic physics investigate reality on the observable scale, quantum physics appears to be investigating unobservable relationships on the transcendental level of reality, that level which mediates between the absolute and finite levels. "No matter in what part of the master universe, whenever time and space are transcended, such an absonite phenomenon is an act of the Ultimacy of Deity." [0:1.12] In this revealed concept frame, nonlocality appears to be an absonite and ultimate phenomenon.

On the finite level of relativity a sequence of events occurs in a local spacetime in conformance with classical causality. On the absonite level, a whole set of time-space conditions determines the probability of a final quantum outcome independently of classical causality. This idea of a "whole set of time-space events" implies that everything in an experimental environment interacts instantaneously and continuously with everything else. At any given instant the whole environment is described by a quantum state. The quantum state of an experimental environment changes over time according to the wave equations of quantum mechanics. This evolution of quantum states leads to a statistically probable outcome. In orthodox quantum theory these states and wave functions do not describe or model actual physical reality. The current interpretation is that these wave functions are mathematical abstractions which do not correspond to any "deeper" physical objective reality.

Fig. 2: **1-Slit and 2-Slit Experiments**



The setup for one type of quantum experiment establishes a number of possible paths which a photon must traverse between a point of emission and a point of detection. After emission and prior to detection, the location of the photon is unknowable in a profound sense. Orthodox quantum theory assumes that the photon is not a discrete particle (or wave) between the times of emission and detection. The path finally taken appears to depend upon instantaneous relationships between all possible paths. Specifically, all of the possible paths

which are not taken are just as significant to the final outcome as the one path which is.

In the 1-slit experiment above, one photon is emitted at a time, and the interval between emissions is long enough for each photon to be detected by the photographic plate before the next one is emitted. The photon follows the one possible path through the slits in the first and second screen. Over time most of the photons strike the plate directly behind the slit in the second screen. This spike in intensity (number of detected photons) drops off rapidly to either side. The photon appears to act like a classical particle in this version of the 1-slit experiment. Energy is transferred from an electron to an emitted photon, which travels some distance along a path, and then the photon transfers its energy to an electron on the photographic plate, which is the detection event.

If this same experiment is performed where the second screen has two slits instead of one, multiple peaks and valleys of intensity are detected. These can only be explained by constructive and destructive interference arising from wave fronts emanating from both of the slits in the second screen. Only one photon is in flight at any given time, so a wave arising at one of the slits in the second screen is understandable. What is perplexing is that a wave front also propagates from the second slit, the one through which the photon does not pass. If the photon is a particle, it can only pass through one of the two slits, so there is no apparent cause for wave fronts arising at the other slit. Increasing the time between photon emissions does not alter these results. Wave interference from both slits in the second screen occurs for every single isolated photon. The photon acts like a wave front in the 2-slit experiment, propagating along all possible paths until the waves finally "collapse" at the plate in the detection of constructive and destructive interference patterns.

Nonlocality and general quantum behavior clearly transcend the relativistic limits of time and space. This transcendence of time validates and verifies simultaneity of existence. The relativity of simultaneity is apparent. Quantum phenomena conclusively demonstrate the simultaneity of existence.

3. Transcendental Causation

Causation is the cosmic insight at the root of reason and scientific thought. In classical and relativistic physics causation is a before-after sequence of events in which energy is transferred from a cause to an effect. Recurring before-after sequences may imply the possibility of physical causation, but only a measurable transfer of energy from cause to effect scientifically confirms causation. Quantum mechanics has a truly remarkable record of successfully predicting the probable outcomes of events on the quantum scale. This may imply causation, but quantum mechanics makes no such assumption. There is a beginning quantum state of events and a final state of events, and quantum mechanics simply gives the statistical probabilities of particular outcomes. There is no attribution of a classical cause for any particular quantum outcome. Quantum mechanics is acausal in the classical sense.

Quantum mechanics assumes that instantaneous and continuous interactions exist between the elements in an experimental setup. There is no temporal before-after sequence between the initial and final quantum states in a quantum experiment, since instantaneous interactions require no duration. This is almost universally interpreted to mean that there are no classical particles or waves on the quantum level. Quantum mechanics is a recipe that works, but there is no classical physical model which explains why or how it works. An alternative to this interpretation is to hypothesize the absence of duration in causation on the quantum level, a sort of atemporal causation. Such a hypothesis is not without precedent. The concept of gravitational force in classical physics is just this sort of hypothesis.

The force of gravity is the inferred cause which holds material spheres together and keeps satellites in their orbits. Newton's mathematical description of linear gravity is accurate to a relatively high degree, and this accuracy requires that gravitational force act instantaneously and continuously. If there was any significant delay in the propagation of gravitational force, it would be impossible for a satellite to remain in a stable elliptical orbit about a primary. Since stable orbits are observed, the force of gravity must propagate instantaneously. Newton fully recognized that this instantaneous action-at-a-distance contradicts the concept of causation upon which the rest of his mechanics is built. Instantaneous interaction does not allow any duration for gravitational force to be transmitted between a primary and a satellite. Because there is no duration, it is impossible

for anything to mediate the transmission of this force, to carry it between a primary and a satellite.

It is consistently but erroneously asserted that Newton was embarrassed and dissatisfied with this instantaneous action-at-a-distance. His well-known statement that he "feigns no hypothesis" for how gravity works is often cited as evidence of his deep uncertainty about this theory. Another often cited passage occurs in a 1692 letter to Richard Bentley, in which Newton writes: "That one body may act upon another at a distance through a vacuum without the mediation of anything else, by and through which their action and force may be conveyed from one another, is to me so great an absurdity that, I believe, no man who has in philosophic matters a competent faculty of thinking could ever fall into it." This is routinely misconstrued as evidence of his belief that there must be a medium which transmits gravitational force. In the rest of his physics a material force can only be transmitted by the medium of mechanical contact, such as occurs when one object strikes another.

In fact, Newton is making exactly the opposite point here. It is absurd to think that one body can *mechanically* convey force to another without physical contact. His universal theory of gravitation accurately describes and predicts the stable orbits of the planets, and this theory necessarily requires the force of gravity to act instantaneously over great distances. It is, therefore, absurd to believe that the force of gravity is mechanically transmitted by any sort of medium. The point Newton conveys here is that gravity must necessarily be a *non-mechanical force* which is transmitted instantaneously.

Newton was a theist who believed that God creates, controls, and upholds the universe. In Newton's natural philosophy the physical order and structure of the universe can only be explained by a physics which recognizes both mindless mechanical forces and purposeful metaphysical forces under the intelligent control of God. In his physics gravity is a *metaphysical force* which acts instantaneously between concentrations of matter. According to Alexandre Koyrè, the well-respected philosopher of science, for Newton gravity "was a proof of the insufficiency of pure mechanism, a demonstration of the existence of higher, non-mechanical powers, the manifestation of God's presence and action in the world." [2] Because the force of gravity acts instantaneously over large distances, it can only be a direct manifestation of God's presence and direct action in the material universe. Newton interprets his universal law of gravitation as material proof of the existence of the God of Christianity, who acts in the historical world of time and space to control and uphold the universe.

This concept of gravity as a metaphysical force was very hotly contested by the followers of René Descartes. The Cartesian school, which included deists, agnostics and atheists, fully accepted Newton's discovery of the reality of gravity and his mathematical description of it. But they believed that the transmission of gravitational force must be some form of mechanical force transmitted by contact. His proposal that gravitational force acts without mechanical contact is contrary to the whole scientific enterprise. They accused Newton of introducing supernatural forces and occult causes into natural philosophy. Descartes absolutely separates the material from the spiritual. There is no room for the infinite God anywhere within the finite material domain of space in his philosophy. God may or may not have created the material universe, depending upon whether one is a deist or an atheist. But once the universe was created, Descartes forcefully argues that it must then progress in a purely mechanistic and mindless manner without any sort of metaphysical intervention.

Newton's mathematical physics completely dominated science by the end of the 17th century. He was deeply religious in a very private way, and his physics reflects his faith in the upholding and overcontrol of the universe by God. Despite his preeminent stature, the thrust of science has consistently moved in the decidedly mechanistic and materialistic direction so forcefully advocated by the Cartesian school. Descartes' arguments for the necessity of a complete separation of the spiritual and material worlds in the pursuit of scientific understanding were finally persuasive. Although Descartes was also religious, his thought firmly established the trend toward a purely mechanistic physics, in which the world is governed solely by mindless laws.

Despite the overwhelming predominance of this secular approach toward scientific investigation, Newton's law of universal gravitation still requires that this force act instantaneously over arbitrarily large distances. Einstein attempted to overcome the instantaneous nature of gravity with a mechanistic hypothesis of gravitational waves. These waves supposedly arise from the conversion of a body's mass into gravitational energy. This gravitational energy is emitted as waves and propagates at the velocity of light. These gravitational waves cause space to curve in such a way that the stable orbit of a satellite is actually the path of least inertial resistance through the space around a primary. In Einstein's conception the physical reality of space is the mechanism which mediates contact between separate aggregations of matter. Gravity is a pseudo force which only appears to act instantaneously, when it is actually the consequence of gravitational energy propagating at the velocity of light and altering the metric of spacetime. To paraphrase the American physicist John Wheeler, matter tells

space how to curve and space tells matter how to move. However, almost a century on, no confirmation of these waves of gravitational energy has been found. The question of whether gravity is a mechanical or metaphysical force remains unresolved.

This concept of gravity as a metaphysical force is confirmed by revelation. The absolute gravity of the Isle of Paradise is referred to as an "absolute presence circuit" which is "independent of time and space." **12:3.6** Absolute gravity acts instantaneously. Linear gravity "is an interactive phenomenon which can be computed only by knowing the actual Paradise gravity." **12:3.8** Although a derivative of absolute gravity, linear gravity also appears to act instantaneously, since its action cannot be delayed. "Space is nonresponsive to gravity, but it acts as an equilibrant on gravity…. space can actually neutralize such gravity action even though it cannot delay it." **11:8.3** The instantaneous forces of absolute and linear gravity cause energy particles to be deflected from their otherwise uniform linear motion.

> Energy, whether as light or in other forms, in its flight through space moves straight forward. The actual particles of material existence traverse space like a fusillade. They go in a straight and unbroken line or procession except as they are acted on by superior forces, and except as they ever obey the linear-gravity pull inherent in material mass and the circular-gravity presence of the Isle of Paradise. **41:5.6**

The flight of photons is deflected by the force of gravity, which is something general relativity predicted. Sir Arthur Eddington experimentally confirmed this deflection of light in 1919 during a solar eclipse. If a photon's flight is deflected by the instantaneous force of gravity, its path can also be altered by other instantaneous forces as it passes through a slit in a screen, for instance. However, quantum physicists firmly believe there are no particles or waves before a detection event, so they do not accept this description of a photon being deflected. Quantum mechanics is bracketed by the finite events of emission and detection. These two events can be partially explained in terms of classical causation. Heat can excite an electron, raising its energy level to a higher orbital state. The electron then falls back to a lower orbital state, emitting energy. The emitted energy is then captured by another electron and detected. There is nothing which can be known about this transferred energy between the times of emission and detection.

In 1952 the American physicist David Bohm offered an unorthodox interpretation of quantum mechanics which incorporates ordinary quantum particles, like photons, which are objectively real between the times of emission

and detection. Bohm demonstrates that this does not alter the mathematics or predictions of quantum mechanics. It does, however, replace the assumption of randomness with a causal understanding of what happens to an individual photon between emission and detection. If Bohm is right, then nonlocality demonstrates the existence of instantaneous interactions between quantum particles. This instantaneous interaction would be a metaphysical cause. Revelation states that quantum particles proceed in straight lines unless deflected by superior forces. It follows that a superior instantaneous force(s) is the transcendental cause for the (apparently random) motion of individual quantum particles. The most pervasive instantaneous force, according to revelation, is cosmic force.

Bohm's interpretation has been almost universally ignored, with the very notable exception of John Stuart Bell. It is not entirely clear what sort of physical reality Bohm thought these instantaneous quantum waves might have. However, an instantaneous force is consistent with the physical nature and attributes of quantum waves. "Space is not empty; the spheres of all space whirl and plunge on through a vast ocean of outspread force-energy; neither is the space content of an atom empty." **42:5.16** This vast ocean of force-energy is cosmic force, which is also called primordial force. Revelation describes quantum particles moving straight forward with linear momentum through this instantaneously reacting cosmic force, creating waves.

> The excitation of the content of space produces a wavelike reaction to the passage of rapidly moving particles of matter, just as the passage of a ship through water initiates waves of varying amplitude and interval. **42:5.15**

> The never-ending confusion attending the observation of the wave mechanics of quantum behavior is due to the superimposition of energy waves: Two crests can combine to make a double-height crest, while a crest and a trough may combine, thus producing mutual cancellation. **42:4.14**

These waves of cosmic force establish instantaneous causal relationships between quantum particles. Waves of cosmic force generated by the motion of a quantum particle are real and interact with the waves excited by other particles. These instantaneous interactions of transcendental causation between quantum particles and waves of cosmic force give the appearance of randomness, but there is a rational order beneath the apparently chaotic surface.

A wholly mechanistic universe is no longer a tenable hypothesis. Nonlocality empirically proves the existence of instantaneous interactions beyond any reasonable doubt, and such interactions are impossible under any purely mechanistic theory. The work of David Bohm demonstrates that these

interactions can be rationally explained by an instantaneously acting force. Gravity is an instantaneous force which acts at a distance. Instantaneous interactions are irreconcilable with purely mechanistic hypotheses.

4. Levels of Reality

A Melchizedek tells us that there are three levels to universe reality. "The universe in which we now live may be thought of as existing on finite, transcendental, and absolute levels. This is the cosmic stage on which is enacted the endless drama of personality performance and energy metamorphosis." **105:7.15** There are four levels, if the original existential level of the I AM is included. Causation differs on the existential, absolute, transcendental, and finite levels.

Existential Causation: This occurs on the existential and eternal level of reality. The prime example is the I AM self-differentiating as the Seven Absolutes of Infinity, which constitute the absolute existential foundations of reality. On this level causation is not sequential. There is a causal relationship between the I AM and the Seven Absolutes, but the first does not exist prior to second. All events in existential eternity are simultaneously present in the everlasting *now*. Nevertheless, there are ontological relationships and absolute associations on this level which the authors describe in terms of finite causation "in order to reach the level of the finite mind." **0:3.20**

Absolute Causation: This appears to involve causal interactions between the Absolutes, as well as causes originating in the Absolutes and acting upon ultimate realities. The Paradise Trinity is the absolute cause of destiny in the Deity Absolute. The Deity Absolute is then the absolute cause of the "activation of static potentials" in the Unqualified Absolute. "The purely static potentials inherent in the Unqualified Absolute are reactive to those causations of the Deity Absolute which are produced by the actions of the Paradise Trinity." **118:4.3** Space potency emerges within the domain of the Unqualified Absolute as a result of an absolute cause originating in the Deity Absolute, which occurs in response to an absolute cause originating with the Paradise Trinity.

The Seven Absolutes have fifteen threefold associations in the Triunities, through which the Universal Father exercises "immediate and personal control

over the master functions of infinity." 104:3.18 The Triunities are the origins of absolute causes which affect the transcendental level of ultimate reality, which in turn is causative with respect to the finite level of supreme time-space reality. Where the existential level is perfectly changeless, the absolute level is functionally associated with the transcendental and finite levels of reality. Change occurs on all of these levels. Evolutionary changes in the finite universe must be associated with changes on the absolute level. Functional unity requires some sort of causal connection between the absolute level and the ultimate level, which then necessitates some sort of causal relationship between the ultimate and supreme levels. Change appears first on the absolute level in the Triunities, which are absolute and eternal associations that exist independently of time and space. There is change on the absolute level, but this change occurs without reference to location in space or motion in time. It is qualitative change. The infinite will of the Universal Father is the existential cause, directly or indirectly, of qualitative changes in the Triunities. These qualitative changes in the Triunities then become absolute causes initiating transcendental changes on the ultimate level.

Transcendental Causation: This occurs on the level of ultimate reality, which is superfinite but subabsolute. The quantity of time is ignored, but there appears to be a before-after sequence to events. The motion arising from changes in location appears to affect transcendental transactions. Transcendental causation is typically described by the word eventuation. "*Eventuation of universe capacities.* This involves the transformation of undifferentiated potentials into segregated and defined plans. This is the act of the Ultimacy of Deity and of the manifold agencies of the transcendental level. Such acts are in perfect anticipation of the future needs of the entire master universe." 118:4.6 The transformation of space potency within the Unqualified Absolute into cosmic force by the presence of Primary Eventuated Master Force Organizers is an example of transcendental causation. Cosmic force pervades the universe as a transcendental reality. The first finite particles responsive to absolute gravity are ultimatons, which are transcendentally evolved from cosmic force by the Associate Master Force Organizers after the work of the primary order is completed. Ultimatons are transcendental particles which interact with cosmic force; they exhibit "mutual resistance to cosmic force." 42:6.4 There is an instantaneous interaction between ultimatons and cosmic force, resulting in the appearance of transcendental waves of cosmic force. These wave phenomena appear to be mathematically described by the wave functions of quantum mechanics. All electronic (baryonic) matter is made up of ultimatons. The probabilities of quantum mechanics are describing,

at least in part, phenomena arising from transcendental causation occurring between waves of cosmic force and individual quantum particles.

> From the creature standpoint, that which is transcendental would appear to have eventuated as a consequence of the finite; from the eternity viewpoint, in anticipation of the finite. **105:7.1**

A photon's emission and detection can be measured on the finite level, and the observed outcome appears to be a statistical consequence arising from the whole experimental setup between emission and detection. With regard to quantum level phenomena, transcendental transactions appear to be limited to the duration between emission and detection. From the viewpoint of the everlasting *now,* the transcendental outcome at detection eventuates before the finite event of emission; the end is apparent before the beginning. From our finite viewpoint transcendentals are both causal and consummational.

> While we present this narrative as a sequence and portray the historic appearance of the finite as a direct derivative of the absolute, it should be borne in mind that transcendentals both preceded and succeeded all that is finite. Transcendental ultimates are, in relation to the finite, both causal and consummational. **105:5.3**

The finite emission of a photon and its subsequent detection appears to be a sequential part of a transcendental transaction which precedes the emission and succeeds the detection. "*Transcendentals.* This superfinite level (antecedently) follows finite progression. It implies the prefinite genesis of finite beginnings and the postfinite significance of all apparent finite endings or destinies." **106:0.5** Transcendental causation appears to involve a sequence of events in which the duration between finite events is ignored.

Finite causation requires both sequence and duration and occurs in co-extensive local spacetime frames, each of which is defined by the limiting velocity of light. Transcendental causation involves sequence but not finite duration; it requires motion but transcends time and space. Finite and transcendental causation share the attributes of sequence and motion. The finite level is characterized by *evolution.* The transcendental level is characterized by *eventuation.* Absolute causation involves qualitative change and occurs without direct relationship to duration, motion, or distance. Transcendental and absolute causation share the attribute of qualitative change. Existential causation arises from the personal will of the First Source and Center and initiates change – the Universal Father is the First and Uncaused Cause. The four levels of reality are functionally unified by four different types of causation and events succeed one another with purpose and meaning on each level and on all levels as a whole.

Above the finite level, causation is instantaneous and ignores time. The absonite level of transcended time co-exists with temporal duration on the finite level, where time is required for events. The temporal sequence of physical causation on the finite level is coordinated with transcendental eventuation on the absonite level. "It may be that on the upper limits of the finite, where time conjoins transcended time, there is some sort of blurring and blending of sequence." **117:7.6** We are told that finite time and transcended time interact in some manner. This interaction may be what permits the future Immanence of the Projected Incomplete to affect the present time-space of the Supreme in the phenomenon of Providence.

5. The Everlasting Now

> While absolute Deity is eternal in nature, the Gods are related to time as an experience in eternity. In the evolutionary universes eternity is temporal everlastingness—the everlasting *now*. **118:1.1**

Newton conceived of a universe governed by the metaphysical forces and mechanistic physical laws established by God. Over time this concept of natural philosophy has been supplanted by the concepts of mechanism, materialism, and secularism. "For three hundred years Western thinking has been progressively secularized. Religion has become more and more a nominal influence, largely a ritualistic exercise." **195:8.3** Secularism has largely succeeded in its efforts to drive the absolute, eternal and transcendental out of the arena of contemporary thought and discourse. God has been excluded from the scientific understanding of the universe.

But science is beginning to find things which transcend finite time and space. The discovery of nonlocality is every bit as significant as the discovery of relativity, if not more so. Relativity undercut Newton's assumption of absolute time and space. Nonlocality undercuts Einstein's reasoning about the relativity of simultaneity and Minkowski's theory of the absolute mechanism of the spacetime continuum. Quantum mechanics empirically proves the existence of instantaneous interactions which transcend time and space. Science is gradually advancing toward some sort of recognition of the transcendental.

We are in the midst of an unprecedented paradigm shift in metaphysical thought. To the extent that science pursues and discovers the truth about the universe, it is approaching God, who is the Final Truth. Where science cannot see, the insight of faith can discern the eternal Father in personal experience. "As a reality in human spiritual experience God is not a mystery." **1:4.7** We are told that the Universal Father chooses to send his eternal spirit to indwell, guide, and potentially become one with us. We can discern the value of the eternal, but we have no idea how it is possible for a being of time to discern the eternal.

Faith is a spiritual insight which arises from both personal choice and the activity of the eternal Adjuster. "Faith-insight, or spiritual intuition, is the endowment of the cosmic mind in association with the Thought Adjuster, which is the Father's gift to man." **101:3.2** Despite the powerlessness of the human intellect to really comprehend faith, it is possible to experience the eternal Father through faith: "The Gods are related to time as an experience in eternity." **118:1.1** The transcendental reality of faith somehow makes it possible for a child of time to personally commune with the Universal Father in eternity.

Reason is quick to point out the inexplicable and superficially irrational nature of faith. However, reason should be cautious in passing judgment, since it is grounded in the insight of causation. Causation is a cosmic insight into "the reality domain of the physical senses, the scientific realms of logical uniformity … the mathematical form of the cosmic discrimination." **16:6.6** In 1931 Kurt Godel, a contemporary and friend of Einstein's, published his incompleteness theorem. Godel's theorem proves that in every wholly consistent logical system there are true statements about the system which cannot be proven to be true within the system; that is, no logical system can be both consistent and complete.

Reason is certain that causation is an inviolable law which requires that every event must be preceded by a cause. Reason is also certain of the truth that there must be a First and Uncaused Cause. This certainty about a First Cause is taken as a true statement about the system of causality governing reason. But this statement cannot be proven to be true within the system of causality. We simply incorporate this idea of a First Cause into the system by treating it as an exception to the axiomatic law that every effect must have a preceding cause. We are compelled to recognize a First Cause as a fundamental truth which transcends the rational logic of the system. It is, in fact, a truth which is illogical under the rules governing the system. The rational system of causality is not both consistent and complete.

> Logic is valid in the material world, and mathematics is reliable when limited in its application to physical things; but neither is to be regarded as wholly dependable or infallible when applied to life problems. Life embraces phenomena which are not wholly material. **133:5.5**

Neither logic nor mathematics nor causality can get at the whole truth of what is and is not possible, provable, or true. Personal experience includes more than the material. How much of reality is reason unable to grasp or even recognize with logic, mathematics, and causation? Whenever reason goes deep enough, it inevitably encounters paradoxes and inconsistencies it can neither comprehend nor resolve.

Modern thought is the immediate inheritance of the rationalism arising out of the Enlightenment. Our culture descends from this Age of Reason, which succeeded the Age of Faith encompassing the millennium of the Middle Ages. The initial dream of rationalism was to explain everything with the power of reason. Following Kant's rigorous identification of limits to reason, the dream changed into the goal of explaining everything that is objectively observable. The discovery of phenomena, such as nonlocality, which transcend the causality of spacetime, marks the end of this dream. Reason has discovered observable phenomena which are forever beyond its full understanding, not just beyond its current knowledge. There is no longer any hope that reason might, one day, be able to explain the whole of reality using only the axiomatic rules of logic, mathematics, and causation. The dream of the Age of Reason is passing away.

Material knowledge is the province of reason. Eternal truth is the province of faith. Reason cannot attain to the certainty of eternal truth, and faith bestows no inherent knowledge about the world. "Faith has falsified its trust when it presumes to deny realities and to confer upon its devotees assumed knowledge." **101:8.3** By themselves, faith and reason do not encompass a complete perspective of reality. The insight of faith and the knowledge of reason can be associated in the higher intellect of wisdom to form a consistent and coherent understanding of the whole of reality. Reason is temporal; faith is eternal; wisdom strives for the transcendental.

> Faith most willingly carries reason along as far as reason can go and then goes on with wisdom to the full philosophic limit; and then it dares to launch out upon the limitless and never-ending universe journey in the sole company of TRUTH. **103:9.7**