# Chapter 3

# Space and Infinity

Intuitively, space is the formal condition of existence; to exist is to be in space. Motion in space has always presented apparently insurmountable paradoxes, because of its intimate association with the concept of infinity and with the ideal of geometry. Geometry assumes that space is infinitely divisible. If space is infinitely divisible, this leads to the conclusion that motion is an illusion. Conversely, experience leads to the inescapable conclusion that motion is real. From an empirical perspective, motion is real, and space cannot be infinitely divisible.

Space is invisible and undetectable, but its physical reality is apparent in its association with matter. Relatively speaking, space can be treated as a property of matter which moves with it. The universe cannot contain an infinite quantity of matter, since this would cause it to collapse into a single geometric point under the force of gravity. Since space is associated with matter, its quantity must also be limited.

Space is a subabsolute reality bestowed by one of the Seven Absolutes of Infinity – the Isle of Paradise. Underlying space is the reality of absolute extension, which is infinitely divisible. Space can be treated as a property of matter. In an analogous manner, absolute extension can be treated as a property of Paradise, which is the origin of the reality of space. The (pre)reality of absolute extension is equivalent to an inertial frame anchored to absolutely stationary Paradise. Absolute gravity holds all of physical creation in revolution in the universal inertial frame defined by Paradise. Inertia is a property of energy that is ultimately derived from the Unqualified Absolute.

## 1. The Paradox of Infinitesimal Motion

Space is that reality within which material things exist. Up until the last century, space was assumed to be perfectly described by the ideal space of Euclidean geometry. This space consists of an infinite number of dimensionless points. Each point is just a location without extension. A straight line is made up of an infinite number of points. An infinite number of straight lines constitute a plane. An infinite number of planes form a volume. Euclidean space is static, absolute, and infinite, because every form within it is potentially divisible into an infinite number of immovable geometric points. In the ideal, distance is the quantity of extension between two locations in absolute Euclidean space. This same pattern applies to the ideal of absolute time. Time consists of an infinite number of instants, and duration is the quantity of time between two absolute instants.

This ideal concept of space and time was challenged very early on by the pre-Socratic philosopher Zeno of Elea (5th century BC). His various well-known paradoxes all demonstrate a central point: If space and time are infinitely divisible, motion is logically impossible; a process with an infinite number of sequential steps can never be completed in less than an infinite duration. His reasoning is straightforward. If an object is to move from point A to point B, it must first traverse half the distance between them to reach a point C. Next it must travel half the distance between point C and B to arrive at a point D, and so on. If the distance between points A and B equals one unit of distance, this process of repeated subdivision can be represented by a geometric series with an infinite number of terms.

$$\sum_{n=1}^{\infty} \frac{1}{2^n} = \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \cdots$$

Since space is infinitely divisible, there is no end to this geometric series representing never-ending subdivision. The process has an infinite number of steps, and it is impossible to reach the endpoint B. Motion must be an illusion.

This conclusion appears logically inescapable, but the fact of motion is undeniable in experience. A solution that is commonly offered to resolve this paradox is to analyze this geometric series using the concept of the limit in calculus. As the power $n$ approaches infinity, the fraction $1/2^n$ approaches zero. When $n$ reaches some very large but finite number $k$, the value of $1/2^k$ is

effectively indistinguishable from zero. The $k^{th}$ term is still a discrete finite number but it is extremely small. The nature of the geometric function is such that the sum of all terms beyond any given term in the series is always less than the value of this given term. The sum of all terms beyond the first term is less than $1/2$. The sum of all terms beyond a term raised to the $k^{th}$ power is less than the extremely small value of this $k^{th}$ term. From this relationship between the terms in the series, calculus finds that the finite limit of this function is the quantity of one. The sum of the infinite series approaches but does not exactly equal a value of one as the number of terms approaches infinity. The same holds for the process of subdividing time. As a practical matter, there does not appear to be any paradox.

Calculus accurately describes motion in space over time, and its calculations are empirically verifiable. However, it does so by proceeding in the direction of infinity without ever getting any closer to it. Zeno's paradox arises from the impossibility of completing an infinite number of sequential steps. Calculus accepts the premise of the infinite divisibility of space and time. But it avoids the paradox by focusing on the final possible sum of the process instead of the process itself. In effect, it finds a finite limit by disregarding the sum of the infinite number of terms beyond some $k^{th}$ term, since they insignificantly alter the final sum of the whole series. It is undeniably true that it never requires more than a finite duration to move from point A to point B. But the paradox has not been resolved, since there is an infinite series beginning with the $k^{th}$ term. This infinite series can never be completed, since it is impossible to reach infinity.

Zeno's logic appears to be flawless, and the reasoning behind the theory of limits appears to be impeccable. Both are grounded in the premise that space is infinitely divisible. However, the empirical success of calculus suggests that space is not an infinitely divisible continuum of quantity. A finite limit can be found by using a very long but finite series of steps instead of an infinite series; that is, the difference between the sums of the finite and infinite series is arbitrarily small. This leads to the practical hypothesis that physical motion in space is not divisible into an infinite number of geometric points. If the mathematical abstraction of an arbitrarily small quantity corresponds to an objectively real physical limitation in the divisibility of space, then Zeno's paradox does not occur.

The formal mathematical definition of a continuum is a set of elements in which there is always a third element between any two elements. If the reality of space does not correspond to a continuum, there is not always a third location between any two locations. Space would then consist of ultimately indivisible

units. There are not an infinite number of steps in the process of spatial subdivision, as Zeno supposes. Motion is not a perfectly continuous transition from one point-instant in spacetime to the next. It is a discontinuous transition from one indivisible unit of spacetime to the next. This practical hypothesis can resolve the paradox. But it fails to explain why there should be any limitation to the divisibility of spatial distance.

## 2. Perfect and Imperfect Distance

Zeno's paradox is based on the assumption that any quantity can be perpetually subdivided into two perfectly equal halves. Calculus makes the same assumption in the geometric series representing this process. From a mathematical perspective, this assumption is not always true. Some types of quantities cannot be perfectly subdivided into two perfectly equal halves.

In number theory the continuum of quantity is the set of real numbers. There are four different types of quantities making up the real number system: natural (integer), rational, irrational, and transcendental numbers. A rational number has a quantity equal to a fraction composed of two integers, as in $p/q$. Rational numbers (all natural numbers are rational, since $p/1 = p$) have perfectly known quantities. Since rational quantities are perfectly precise, any rational number can be divided into two perfectly equal halves. Where the numerator is not evenly divisible by the denominator, a rational number has a decimal portion that either terminates in zeros after some finite number of digits ($1/16 = 0.0625000$ ...) or the decimal portion repeats the same sequence of digits indefinitely. The same number may endlessly repeat, as in $1/3 = 0.333$ .... A fixed sequence of numbers may also endlessly repeat in the decimal portion, such as occurs for $1/7 = 0.142857142857142857$ .... Rational quantities are by definition perfectly known quantities. Since they are perfectly precise quantities, it is possible to subdivide a rational number into two perfectly equal halves.

Irrational numbers do not have perfectly known quantities, because they are not equal to a fraction composed of two integers. The decimal portion of an irrational number contains a never-ending and never-repeating sequence of digits. Irrational numbers are imperfect quantities by definition. An irrational number cannot be divided into two perfectly equal halves, because the original

irrational quantity to be subdivided is not perfectly known. A transcendental number is an irrational number which is not a solution to an algebraic equation. The constants $\pi$ and $e$ are examples of transcendental numbers. Subdividing an irrational number yields two approximately equal halves.

The square root of two is thought to be the first irrational number discovered and is approximately equal to 1.41421356…. The quantity of $\sqrt{2}$ cannot be perfectly determined, because the decimal portion has an infinite number of digits and there is no pattern of digits which repeats endlessly. The symbol $\sqrt{2}$ indicates that an infinitely recurring process must be performed in order to perfectly determine the quantity. If spatial distance is measured by rational numbers, then distance is perfectly divisible by some integer, such as two. In this case there is no theoretical basis upon which the divisibility of space can be limited, leading to Zeno's paradox. If spatial distance is measured by irrational numbers, there is an inescapable degree of uncertainty in the quantification of distance. Since irrational numbers are not perfectly precise quantities, the initial uncertainty in their quantity prevents infinitely recurring subdivision. While the intermediate results of the process of subdivision approach zero, the initial uncertainty in the original distance does not decrease. There is a theoretical limit to divisibility, and Zeno's paradox is avoided.

Irrational quantity has an inherent margin of error. Repeatedly subdividing a distance quantified by an irrational number eventually gives a result which is smaller than the uncertainty associated with the original distance. After some finite number of subdivisions, it is no longer certain that there is any real distance left to be subdivided. When the intermediate result of subdivision is smaller than the margin of error inherent in the original distance, the net result at that point in the process may yield a distance of zero or even a negative distance. Either the zero endpoint is reached or it is surpassed by a negative distance. The process of subdivision ends after a finite number of operations. The paradox does not occur because irrational quantities are not infinitely divisible.

Toward the end of the 19th century, the mathematician Georg Cantor put forward his continuum hypothesis, which deals with the relative sizes of infinite sets of numbers. There is an infinite number of real numbers which constitutes a continuum. The infinite set of real numbers is larger than the separate infinite sets of rational and irrational numbers, of which it is made up. Cantor shows that the infinite set of irrational numbers is larger than the infinite set of rational numbers; that is, almost all quantities are irrational. If all physical distances correspond to irrational numbers, then the process of spatial subdivision always begins with an imperfectly known quantity, and distance is not infinitely

divisible. Irrational quantity establishes a theoretical limit to the divisibility of space. Zeno's paradox requires a process to begin with a perfectly defined rational distance between point A and point B. If this premise is granted, his conclusion necessarily follows. The empirical fact that Zeno's paradox does not occur justifies the premise that physical distance in space is only quantifiable with irrational quantities.

This identification of space and time with irrational quantities has both scientific and philosophical justification. Up until the first part of the 20th century, it was assumed that there was no theoretical limit to the accuracy with which physical quantities could be measured. The possibility of perfect or even nearly perfect physical measurement was found to be theoretically impossible with Heisenberg's discovery of the uncertainty principle in 1927. Empirically, only imperfect physical measurements with some margin of error are possible. It is an axiom of Platonism that material reality is inherently imperfect. The archetypes of perfect forms are immaterial realities which are never found in material things. No matter how close a material form approaches the ideal of a circle, it is never perfectly circular. This impossibility forever distinguishes material things from the immaterial ideals and proves their ontological difference.

The question of the divisibility of space and time is a metaphysical one which attempts to reach beyond both empirical experience and intellectual logic. In the absence of sufficient knowledge, reasoning fails to reach an indisputable conclusion because speculation is insufficiently constrained by facts. This lack of knowledge can be remedied by revelation. A Melchizedek tells us, "Revelation authoritatively clarifies the muddle of reason-developed metaphysics on an evolutionary sphere." **103:6.8** We are authoritatively informed that space is an ultimate reality, not an absolute one. If space was absolute, it could be differentiated into an infinite number of geometric points. Since space is not absolute, it cannot consist of geometric points. There must be an ultimately indivisible unit of space that is larger than a geometric point.

This concept seems to be most nearly represented by the idea of infinitesimals, a word coined by Leibniz. An infinitesimal is the somewhat imprecise idea of an arbitrarily small and indeterminate quantity which is still greater than zero. Zero is part of the number system but it is not a quantity, anymore than infinity is a quantity. Zero is a qualitative recognition of the absence of quantity. Things in space are countable by the natural numbers. The concept of zero signifies the state of a space in which there is nothing to count – a void. The number zero does not refer to a countable thing; it refers to a *qualitative state*. An infinitesimal does not correspond to a space of some finite quantity or to

a geometric point, a location. In the process of repeatedly subdividing a finite distance, number begins as a representation of quantity but eventually progresses toward a representation of quality as it draws near to zero. Number initially refers to quantitative distance and progressively becomes a reference to qualitative distance – an arbitrarily small distance. Adding quality to quantity changes the nature but does not change the measure of quantity.

This arbitrarily small distance is still a real quantity that is greater than zero, but it cannot be perfectly represented by a perfect rational number. It is only describable as a qualitative distance, an indeterminate quantity. The nature of quantity changes from the countable to the uncountable, from the finite to the infinitesimal, from the certain to the uncertain. An arbitrarily small distance is a real quantity that cannot be further subdivided. Half of an arbitrarily small quantity gives another arbitrarily small quantity that is indistinguishable from the original quantity. The repeated subdivision of a finite quantity terminates in an ultimate quantity that is greater than zero but cannot be precisely specified or further subdivided. An infinitesimal is larger than a dimensionless point and occupies some indeterminate volume; space is not infinitely divisible. The whole of space is the sum total of ultimately indivisible infinitesimals.

As scale diminishes from the finite to the infinitesimal, the realities of distance, area, and volume continue to be meaningful because they are first of all relations and secondarily potentially quantifiable. "As mind pursues reality to its ultimate analysis, matter vanishes to the material senses but may still remain real to mind." **112:2.11** The volume of an infinitesimal must have a boundary, so there must be a distance from the center of the infinitesimal to its boundary. But this radius is one half of the arbitrarily small diameter of the infinitesimal, and cannot be meaningfully subdivided. Nevertheless, infinitesimals have a real volume that is greater than the zero volume of a geometric point. The radius of an infinitesimal has no exact quantitative measure, but it does have a perfect qualitative meaning; the radius is part of the form of the infinitesimal. The form of an infinitesimal contains all of the definite qualities associated with spatial extension, but none of these qualities can be associated with perfectly defined finite quantities. In the ultimate analysis of physical space finite quantitative content vanishes, leaving only the form of the infinitesimal, which is still real to the mind.

Space is constituted of an arbitrarily large number of infinitesimals. "Space comes the nearest of all nonabsolute things to being absolute. Space is apparently absolutely ultimate." **118:3.5** Space is neither a finite nor an infinite reality. It is an

ultimate reality. Infinitesimals are transcendental forms which are real but are not perfectly quantifiable.

## 3. Local and Global Spacetime

Special relativity forces the recognition of the reality of local spacetimes. Every frame is absolutely at rest with respect to the velocity of light. Duration, as measured in every observer's rest frame, is exactly the same, since this is determined relative to the universal constant of light. Distance in every rest frame is defined as the velocity of light multiplied by duration: $d = ct$. A change in the unit of duration in a moving frame relative to an observer's rest frame results in a corresponding change in the unit of distance in the moving frame. A frame in relative motion has a different spacetime than a so-called rest frame. The degree of difference depends upon the square of the ratio of the moving frame's relative velocity divided by the velocity of light in the stationary frame: $v^2/c^2$. The changes in space and time in a moving frame measured in the duration ($t_0$) and distance ($d_0$) of an observer's rest frame are given by the special relativity formulae:

$$t = \frac{t_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$d = d_0\sqrt{1 - \frac{v^2}{c^2}}$$

A natural process requiring $t_0$ units of observer-time in the observer's rest frame requires $t$ units of observer-time to complete in a moving frame with relative velocity $v$. This change in the rate of time has been extensively verified by more than a century of experiments. A distance $d_0$ contracts to $d$ units of observer-distance in a moving frame with relative velocity $v$. However, this change in distance only occurs in the direction that is parallel to the vector of relative velocity. A sphere becomes progressively flattened into a pancake in the direction of relative motion. This change in the structure of space in the moving frame has not yet been empirically verified. However, the measurable differences

between the rest and moving frames conclusively demonstrate the existence of two different local spacetimes.

From the beginning relativity theory has maintained that such a statement about the co-existence of different spacetimes is invalid. The relativity of simultaneity theoretically precludes the possibility of synchronizing temporal sequences in two different spacetimes. The classical concept of existence is strictly local and only has empirical meaning in relation to a single specific frame of reference, which is typically assumed to be the observer's frame. Things in the universe may exist in relation to either a resting or moving frame, but it is meaningless to say that something exists in both frames at the same time. The universe exists in relation to any one local frame of reference, but it cannot be said to exist simultaneously in relation to more than one local frame. Although no logical flaw has been found in the reasoning behind the relativity of simultaneity, nonlocality fundamentally refutes this metaphysical assertion about the absolutely local nature of existence. Simultaneity of existence is empirically verifiable. Not all physical interactions are constrained by the finite velocity of light. There is overwhelming evidence of physical interactions which appear to be "infinitely fast", instantaneous.

Relativistic physics is clearly different from quantum physics in fundamental ways. A potential issue is that nonlocality on the quantum scale is not proof of simultaneity of existence on the macro scale of relativity. This concern is not justifiable. The vibration rate of a cesium atom in an atomic clock is a quantum scale phenomenon that is observable on the macro scale. This vibration rate is a direct measure of the passage of time and is determined by the relativistic spacetime in which the cesium atom exists. Relative velocity always decreases the rate at which this natural process occurs, as measured in units of observer-time. Quantum scale processes occur within a specific local spacetime, and this includes nonlocal interactions. On the macro scale, gravitational force acts instantaneously, and this necessarily requires the simultaneous existence of the bodies upon which this force acts. Simultaneity of existence is demonstrable on both the quantum and macro scale.

Simultaneity of existence necessarily means that the universe and all that it contains is a single existent whole at every instant of universe-time. The singular existence of the whole universe necessarily requires that it have its own spacetime, in exactly the same way that every local light-frame does. The spacetime of the whole universe must also be at absolute rest relative to the velocity of light in the same way and for the same reasons. The universe encompasses all that exists, so there is nothing "outside" the universe, relative to

which the universe might move. The whole of the universe is, therefore, necessarily at absolute rest with respect to all other smaller light-frames of reference.

Since the universe as a whole is absolutely stationary with respect to both the velocity of light and all other spacetime frames, the universe constitutes the one and only absolutely stationary frame of reference. As a single immovable whole, the center of the universe is also necessarily immovable and absolutely stationary. Special relativity and simultaneity of existence together outline a general concept that is consistent with revealed cosmology, which describes the whole universe revolving about the eternal and absolutely stationary Isle of Paradise.

> Absolutely nothing is stationary in all the master universe except the very center of Havona, the eternal Isle of Paradise, the center of gravity. **12:4.1**

Objective motion is sequential change of location in space. Space consists of transcendental infinitesimals, whose locations cannot be perfectly quantified relative to each other. Near the limit, objective motion is a qualitative, infinitesimal change in distance. The Isle of Paradise is perfectly stationary relative to the velocity of light and every material thing in the universe. Paradise defines an absolute inertial rest frame – the universal frame of light to which all other moving light-frames are related. Paradise is the stationary center of absolute gravity, since any variation in its location would destabilize the revolution of everything in the universe.

An absolute inertial frame requires absolutely precise locations. However, such locations are impossible in the reality of space. Infinitesimals are transcendental forms whose positions cannot be determined with perfect quantitative precision. The whole of the universe is a transcendental reality. "Among those realities which are associated with the transcendental level … The concept of the master universe." **105:7.4, 105:7.6** The Isle of Paradise at its center is eternal and one of the Seven Absolutes of Infinity. For these reasons, the Isle of Paradise cannot exist in space or time.

## 4. Absolute Paradise Extension

"Paradise exists without time and has no location in space." **11:2.10** The frame of reference defined by the Isle of Paradise must be an eternal, absolutely stationary, inertial frame. The whole of the universe is a rotating non-inertial frame of reference, and this revolution can only occurs in and relative to an absolute inertial frame. This universal rotating frame consists of the reality of space and all that space contains. The absolute inertial frame cannot consist of the reality of space, because it is defined by Paradise, which cannot exist in the infinitesimals of space. The transcendental rotating frame of the material universe and the absolute inertial frame of Paradise must be co-existent and co-extensive to the limit of the master universe. The extension of the Paradise frame must be real, since the spatial extension of the universe is rotating relative to the Paradise light-frame.

At first it appears that this Paradise extension is Newton's absolute space, which is just the ideal of Euclidean space objectified. However, locations in this Paradise extension must be perfectly precise because of its absolute status. This precludes the possibility that Paradise extension perfectly corresponds to the ideal of Euclidean geometry.

The hypothesis of infinitesimals implies that perfectly precise locations cannot exist in space. If space is not infinitely divisible, then all spatial distances correspond to irrational numbers, which are imperfect quantities. Paradise must have an absolutely precise location, because it is eternal and absolute. The absolute extension defined relative to Paradise must also consist of absolutely precise locations, since only such locations can be absolutely stationary relative to Paradise and thereby constitute an absolute inertial frame. The absolute extension of Paradise cannot be quantified with irrational numbers, but it can be theoretically quantified with perfect rational numbers.

In a temporal frame infinite divisibility leads to Zeno's paradox. There is no such paradox in an eternal frame, since there is no time, only the everlasting *now.* The absence of time does not preclude the possibility of motion. The revolution of the infinitesimals of space is a transcendental motion occurring relative to the absolute Paradise frame. Transcendental motion involves a sequential change of objective location but it does not require such locations to be perfectly defined. Zeno's paradox is only apparent, since it arises from the conflation of the

infinitesimals of physical space with the perfectly defined points of absolute extension.

Pythagoras lived in the 6th century B.C. and was the most influential Greek mathematician. His mathematics and geometry were based upon the doctrine that all quantities are perfect, since they can be reduced to whole numbers or ratios of whole numbers. Geometers have been aware of a difference between rational and irrational numbers since at least the 5th century B.C., when Hippasus of Metapontum is credited with discovering them. Hippasus proved that the hypotenuse of an isosceles right triangle cannot be reduced to a whole number or to a ratio of whole numbers. If the sides of a right triangle are each perfectly equal to one whole unit of distance, the hypotenuse has a length of $\sqrt{2}$ units, which is an imperfect irrational quantity. Irrational numbers introduce error into what was Pythagoras' perfect ideal of geometry. Mathematics does not always yield perfect quantities, and geometry does not always measure perfect quantities in space.

It seems paradoxical that an imperfect quantity should arise from a process which begins with perfect geometric axioms and perfect rational quantities. How can imperfection emerge out of perfection? This seemed impossible to a number of theorists. The effort to overcome irrational numbers and restore the Pythagorean ideal of an absolutely perfect geometry became focused on the problem of squaring the circle. A square is a perfect geometric form, since its sides and internal angles can be measured in rational numbers. Squaring the circle refers to constructing a square with the same area as a given circle in a finite number of steps, using only a perfect compass and ruler. Accomplishing this would prove that irrational numbers are actually rational numbers. This would validate the Pythagorean belief in the perfection of all quantities. It was not until near the end of the 19th century that a theorem was finally developed that conclusively proves squaring the circle is impossible. The incommensurability of rational and irrational numbers is fundamental and irreconcilable. Neither mathematics nor geometry necessarily gives perfectly precise quantities, despite the perfect axioms upon which they are built.

This is not a practical concern, since rational and irrational numbers can be calculated as close to one another as may be desired. But they can never exactly equal one another. The sets of rational and irrational numbers are both infinite, but they arise from different processes. A rational number is the ratio of two integers: $p/q$. If $p$ is set to one and $q$ is progressively increased by one, the resulting rational numbers approach the limit of zero in a perfectly discrete sequence of exactly defined quantities. The set of numbers generated by this

process can be counted one at a time with the natural numbers, so it is considered a theoretically countable set, even though the set has a potentially infinite number of members. The set of all real numbers is uncountably infinite. No single process can generate the whole set of real numbers, which would then make them theoretically countable. Since rational and irrational numbers make up the set of real numbers, the set of irrational numbers is both uncountable and larger than the set of rational numbers.

Cantor's theory establishes a hierarchical order between different infinite domains. Rational numbers consist of the countable infinite set of perfectly defined quantities. Irrational numbers are an uncountable infinite set. The infinity of real numbers is larger than the infinity of rational numbers, because almost all real quantities do not correspond with quantities in the domain of rational numbers. Almost all real numbers are irrational. Between any rational number *m* and zero there are an infinite number of perfectly defined rational quantities which form an infinitely divisible continuum beginning at zero and ending at *m.* Between zero and *m* there is a larger infinite set of imperfectly defined irrational numbers which form a continuum. None of the quantities in the continuum of irrational numbers can be mapped to quantities in the continuum of rational numbers. These two continua are incommensurable; they constitute two perfectly separate and distinct quantitative domains.

These differences between perfect rational and imperfect irrational quantities have always been of limited interest to non-mathematicians. However, the difference between the realities of physical space and absolute extension brings a new metaphysical significance to this distinction. From a scientific perspective, an irreducible attribute of objective reality is its quantifiability. There are two incommensurable quantitative continua. Perfect rational numbers are infinitely divisible. Imperfect irrational numbers are not infinitely divisible because of the uncertainty inherent in their quantities. The guidance of revelation leads to hypothesis that rational and irrational numbers represent quantitative continua which correspond to two objectively real but ontologically different realities.

The irreducible nature of space is extension. Extension without quantity is simply an abstraction, a Platonic archetype. Spatial extension must be quantified to become a physical reality. It can be quantified by perfect rational numbers or imperfect irrational numbers. These two quantifications of extension are co-extensive but incommensurable. Their incommensurability constitutes them two different realizations of extension. Physical space consists of movable infinitesimals between which there are imperfect quantities of extension; physical space is a transcendental reality that is not infinitely divisible. Absolute extension

consists of perfectly precise and immovable locations between which there are perfect quantities of extension; absolute extension is infinitely divisible. The Isle of Paradise exists in the reality of absolute extension. The galaxies of the universe exist in physical space, which is ontologically distinct from absolute extension. Absolute extension and physical space are both objectively real, but they co-exist on different ontological levels of reality.

The Divine Counselor informs us that "The Isle of Paradise has a universe location but no position in space." **0:4.12** This statement is inconceivable within the context of current scientific thought. It does not seem possible for something to have a location relative to the space in which all material things exist but not to be in this finite space. The statement begins to become conceivable if the extension in which Paradise is located is assumed to be an absolute objective reality existing independently of the transcendental reality of physical space.

## 5. Origin of Space

Space is undetectable. The quantification of extension between material objects in space is the only measure of its objective reality. The incommensurability of the continua of perfect rational quantities and imperfect irrational quantities reveals an ontological difference between spatial extension and absolute extension. We intuitively assume that there is an infinite "outside" or "beyond" which contains the finite space of the universe; that is, the boundary of finite space is expanding into the infinity of absolute extension. Current cosmology considers this a naïve and erroneous concept. It describes space with a non-Euclidean geometry which gives spacetime a curvature. This curvature leads to the closure or containment of spacetime on the largest scale. In current thought there is no objective reality "outside" this finite boundary of the universe. This is admittedly unimaginable, since it appears to conceive of a boundary to space on the other side of which is no void or extension of any kind. In fact, there is no boundary in this non-Euclidean geometry. There is a bounding limit to space beyond which there is nothing – not even the idea of nothing.

This 20th century concept depends upon the perfection of geometry, and geometry conflates rational and irrational quantities. The inherent uncertainty this introduces makes geometric conclusions about the final form of the universe

uncertain near the limits of physical space. It has been established that geometry corresponds to space with progressively less accuracy, as it attempts to describe things approaching the quantum scale of reality. This same decrease in accuracy necessarily applies when geometry attempts to encompass the whole of the universe. There is an imperfect relationship between spatial quantity and geometry. There is a perfect distinction between rational and irrational quantities. This perfect distinction must supersede the conclusions of any geometric relationships or conclusions, which always conflate rational and irrational quantities. This distinction parallels the difference between infinite absolute extension and finite physical space.

> Paradise is a material sphere as well as a spiritual abode. All of the intelligent creation of the Universal Father is domiciled on material abodes; hence must the absolute controlling center also be material, literal. **11:0.1**

Paradise does not exist in space. Nevertheless, it is the literal physical reality from which absolute gravity originates, dynamically unifying the material universe. It exists in infinite absolute extension and has specific dimensions. "It is definitely ellipsoid, being one-sixth longer in the north-south diameter than in the east-west diameter. The central Isle is essentially flat, and the distance from the upper surface to the nether surface is one tenth that of the east-west diameter." **11:2.2** The Eternal Isle is elliptical in shape with a north-south major axis of seven units, an east-west minor axis of six units, and a thickness of 0.6 east-west units. Paradise occupies a volume of absolute extension, and its surfaces have absolute areas. "The concept of distance, even absolute distance, has very much meaning as it may be applied to relative locations on Paradise. Paradise is nonspatial; hence its areas are absolute and therefore serviceable in many ways beyond the concept of mortal mind." **11:2.11** Distance is the primary measure of extension. Absolute distance in absolute extension must, therefore, be a perfectly precise quantity – a rational quantity. Spatial distance is an imperfect irrational quantity which measures the ultimate time-space of the universe or the finite time-space of a local frame of reference.

"Time comes by virtue of motion" relative to Paradise, which is eternal and absolutely stationary. Absolute extension is eternal, and its locations are perfectly stationary relative to Paradise. During his time in Carthage, Jesus said: "Space is measured by time, not time by space. The confusion of the scientist grows out of failure to recognize the reality of space. Space is not merely an intellectual concept of the variation in relatedness of universe objects." **130:7.6** Absolute extension appears to be an intellectual concept of the variation in the relatedness of objects without regard to time. Spatial distances do not exist without relation

to time; "Space is measured by time." Time is measured by motion relative to Paradise. The reality of space cannot exist without motion relative to Paradise and the absolute extension in which it exists.

In the recounting of cosmogenesis, the Universal Father is the origin of the Eternal Son and the Isle of Paradise. The union of Father-Son activates the Paradise pattern and the central universe of Havona appears simultaneously with the "birth" of the Infinite Spirit. The Infinite Spirit verifies that "the central universe … eternalized simultaneously with his attainment of personality and conscious existence." **8:1.8** In this hypothetical sequence the Isle of Paradise and absolute extension exist prior to the creation of the central universe and the reality of space. "Prior to this hypothetical eternity moment the space-energies inherent in Paradise are existent and potentially operative, but they have no actuality of being…. There is no material universe at this (assumed) eternally distant moment…" **8:1.4** Absolute extension is a non-material realization of infinity. "Paradise is the pattern of infinity." **9:3.8** "The Paradise Isle is the absolute of cosmic reality, the absolute pattern." **104:5.6** Imperfect physical space is patterned after perfect absolute extension. "Space is neither a subabsolute condition within, nor the presence of, the Unqualified Absolute, neither is it a function of the Ultimate. It is a bestowal of Paradise…" **11:7.4** The ultimate reality of space originates in the absolute reality of Paradise. "Space is not infinite, even though it takes origin from Paradise; not absolute, for it is pervaded by the Unqualified Absolute." **12:5.2**

From the beginning of the cycles of eternity the billion worlds of the central universe are in clockwise revolution about the Eternal Isle. If they were not, gravity would pull them all into Paradise. The motion of these material spheres induces the clockwise revolution of physical space relative to the absolute inertial frame of Paradise extension.

> It may help to an understanding of space relationships if you would conjecture that, relatively speaking, space is after all a property of all material bodies. Hence, when a body moves through space, it also takes all its properties with it, even the space which is in and of such a moving body. **118:3.6**

The realities of matter and space are dynamically associated, even though "Space is not force, energy, or power." **11:5.9** The space inside a body moves with the body as the body moves through surrounding space. This motion of space through space would be impossible, if space was just "an intellectual conception of the variation in relatedness of universe objects." When the space within a sphere moves through space, the surrounding space must be physically displaced by the space contained within the sphere. This displacement of space

by space requires the existence of something in which this displacement can occur. Space is something which can move and motion is only possible relative to something which does not move. In the case of moving space this something can only be an absolute and immovable extension.

In 1918, a couple of years after Einstein published his General Theory of Relativity, Josef Lense and Hans Thirring speculated that if the geometry of space is curved in the immediate vicinity of a material body by gravitational force, then the space around a rotating body, such as the earth, should also rotate with the body. If the spacetime frame of the earth is different from the spacetime frame encompassing it, there should be rotational frame-dragging where these different frames overlap near the earth. The predicted measurement of this effect is very small. In 2004 NASA's Gravity Probe B satellite was launched into an earth orbit with an altitude of 400 miles (650 km). In May 2011 NASA announced tentative verification of the Lense-Thirring effect in its final report on this experiment. This is the first empirical evidence that the space within a body moves with the body. Relatively speaking, space can be treated as a physical property of material bodies.

This physical relationship between space and matter is the reflection of an absolute pattern. Prior to the "hypothetical eternity moment" when the Infinite Spirit and the central universe appear at the beginning of the cycles of eternity, the absolute physical reality of Paradise exists in the infinite reality of absolute extension. At first it seems that absolute extension must exist prior to the creation of the Eternal Isle, but an infinite void is just an intellectual abstraction in the absence of actual material reality. The dimensionless quality of absolute extension has no objective reality until it is quantified by the presence of Paradise. The quantification of distance requires at least two identifiable locations, but there are no identifiable locations in absolute extension prior to the appearance of Paradise. Absolute extension becomes an objective reality at the same "eternity moment" that Paradise is materialized as the absolute physical actuality. Infinite absolute extension can, therefore, be treated as a property of the absolute materialization, the Isle of Paradise. At the "next eternity moment" the Infinite Spirit acts, and physical space and the central universe are created within infinite absolute extension. "The God of Action functions and the dead vaults of space are astir. One billion perfect spheres flash into existence." **8:1.4**

In 1929 Hubble published his observations showing that the recessional velocity of other galaxies is proportional to their distance from us. This discovery raised the question of what space was expanding "into." General relativity considers space to be a reality derived from energy-mass and gravity. Distances

are increasing because the geometry of spacetime is changing. The metric of spacetime is changing because the density of matter in the universe is decreasing. The density of matter is decreasing because space is expanding. The expansion of space causes distances to increase. Distances are increasing, but space is not expanding "into" anything. There is some confusion here. If space is not moving relative to something else, then space is motionless. If space is motionless, it cannot be expanding, the density of matter cannot be decreasing, and distances cannot be increasing.

This reasoning holds that space is expanding because distances are seen to be increasing, but the volume of space does not move or change relative to anything else. This also contradicts NASA's tentative confirmation of the Lense-Thirring effect, which demonstrates that space can be treated as a property of matter and appears to move with matter through surrounding space. The expansion of the universe is only scientifically meaningful relative to some underlying frame of reference which does not move, but it is claimed that there is no such rest frame.

Prior to the hypothetical eternity moment when the Infinite Spirit first acts, "the space-energies inherent in Paradise are existent and potentially operative, but they have no actuality of being; neither can physical gravity be measured except by the reaction of material realities to its incessant pull." **8:1.4** Actual energy does not arise from a dimensionless geometric point. Energy emerges in physical space in relation to the absolute energy of *absolutum* constituting the three-dimensional reality of Paradise existing in the infinity of absolute extension. "The endless possibilities of the Unqualified Absolute are centered around the *absolutum* of the Isle of Paradise." **104:4.28** Physical gravity is an unmediated and instantaneous force reaction between material bodies. The force of gravity is an inherent potential of Paradise, but it only becomes an objective actuality in physical space with the creation of the billion worlds of Havona.

## 6. Space and Inertia

Historically, the infinite void of space was thought to be the formal condition of objective existence. Space, itself, was conceived of as perfectly insubstantial void. Zeno's paradox arises from the assumption of the absolute perfection of space, which leads inevitably to the conclusion that motion and time are

illusions. This metaphysical conclusion persists. Just before his death in 1955, Einstein wrote in a letter of condolence to the family of his recently deceased friend Michele Besso: "People like us, who believe in physics, know that the distinction between past, present and future is only a stubbornly persistent illusion." The intuitive equivalence of space with geometry has not weakened over the millennia. "Though man's mind is rigidly space-bound, the creative human imagination is comparatively time free." **12:5.5**

We find it nearly impossible to conceive of space apart from the ideal of geometry. When confronted with the paradox of infinitesimal motion, theoretical intuition leads to a resolution which retains a full equivalence of space with geometry. The discovery of imperfection in geometry by Hippasus, did not lead to a corresponding recognition of imperfection in the reality of space. As a practical matter, geometric relationships can be *almost* perfectly precise. Space is now known to be a less than infinite, but space is still treated as though it is an infinitely divisible continuum. There is still no clear recognition that space must consist of ultimately indivisible units – infinitesimals. Space continues to be conflated with geometry, even though relativity demonstrates that space has no objective reality apart from matter, motion, and time.

Space is a physical reality because it consists of infinitesimals, instead of geometric points. Infinitesimals are approximated by irrational quantities. This indefiniteness makes it impossible to perfectly locate the center of an infinitesimal or to perfectly measure the distance between two infinitesimals. Geometry can assume the existence of a perfectly precise distance between two points, but absolute precision is empirically impossible in the physical reality of space. Space cannot precisely correspond to geometry, because geometry incorporates both perfect and imperfect quantities. Any remaining doubts about the imperfection of space should be dispelled by quantum mechanics' discovery of the uncertainty principle: "It is impossible accurately to determine, simultaneously, the exact location and the velocity of a moving object; any attempt at measurement of either inevitably involves change in the other." **65:6.1** Every physical thing in space is in motion, and it is inherently impossible to measure the perfectly precise location of anything while it remains in motion.

Absolutely precise distance is measurable in absolute extension. Absolute extension is quantifiable by rational quantities, which are infinitely sub-dividable into dimensionless points. The Isle of Paradise has static dimensions, so there are perfectly defined units of absolute distance. The measurement of absolute distance on Paradise requires two points which perfectly locate two real objects. However, the measurement of absolute distance does not involve time, since

Paradise is an eternal reality. The velocity of light measures spatial distance, which is the change in a photon's location over time and equals *ct*. However, absolute extension is eternally static, so absolute distance cannot be measured by the velocity of light.

Paradise is existentially eternal, and there is nontemporal motion on Paradise. "Motion is not inherent on Paradise; it is volitional." **11:2.11** There is no duration without motion, but there can be volitional motion without duration. Time comes by virtue of motion relative to absolutely stationary and eternal Paradise. Motion on Paradise is a change of location without a change in time. It appears that volition on Paradise can cause instantaneous translation from one absolute location to another.

Motion without time is sequence without duration. "Time, as you understand it, is not a feature of Paradise existence, though the citizens of the central Isle are fully conscious of nontime sequence of events." **11:2.11** There is a "time" on Paradise consisting of a sequential order to events between which there is no duration. This sequence of events, all "happening at the same time," is ordered into a whole and perfectly related cycle; "in this way will circular simultaneity increasingly displace the onetime consciousness of the linear sequence of events." **130:7.5** Such cycles are perfectly related to a whole cycle of the eternity. Sequences of eternity events form a cycle of eternity, and the cycles of eternity recur relative to the higher whole of an endless circle which progressively reveals the eternal purposes of God.

In time-space, causality requires the sequential motion of energy over duration. In transcended time-space instantaneous and continuous force causes motion. The linear sequences of finite causation become the ordered circular sequences of transcendental eventuation. In eternity volitional causation is sequential but there is no duration and motion is instantaneous translation. Motion in eternal, infinite, absolute extension is synchronized with motion in temporal, finite, relative space. The past, present, and future of time must be real, since eternity cannot be synchronized with an illusion. The reality of time appears to arise from the absolute motion of the infinitesimals of space relative to Paradise absolute extension. Secondarily, time arises from the motion of infinitesimals in one spacetime relative to the infinitesimals in other spacetimes. The relationship between time and space is a reflection of the relationship between eternity and absolute extension.

> The eternal Isle is composed of a single form of materialization — stationary systems of reality. This literal substance of Paradise is a homogeneous organization of space potency not to be found elsewhere in all the wide

> universe of universes. It has received many names in different universes, and the Melchizedeks of Nebadon long since named it *absolutum.* This Paradise source material is neither dead nor alive; it is the original nonspiritual expression of the First Source and Center; it is *Paradise*, and Paradise is without duplicate. **11:2.9**

Paradise is a stationary material body consisting of *absolutum,* which are "stationary systems" of energy derived from space potency. Space potency is "ancestral to all relative functional nonspirit realities — all manifestations of force-energy and the organization of power and matter." **11:8.8** It is a manifestation of "the unquestioned free space presence of the Unqualified Absolute." **42:2.3** Absolute distance separates these perfectly stationary *absolutum* from one another, giving actuality to locations in the reality of absolute extension. Beyond the shores of Paradise, absolute extension appears indistinguishable from an abstract geometry projected infinitely outward from the Eternal Isle as nothingness.

However, locations in absolute extension beyond Paradise are actualized by the *absoluta* of space potency in the Unqualified Absolute. "On Uversa, space potency is spoken of as ABSOLUTA." **42:2.6** As the origin of all physical force, energy, and power, the *absoluta* of space potency are characterized as potential physical reality, a *prereality*. "Space potency is a prereality; it is the domain of the Unqualified Absolute and is responsive only to the personal grasp of the Universal Father…" **42:2.5** The infinite potential for physical reality in the Unqualified Absolute is directly associated with the absolute actuality of physical reality, the Isle of Paradise.

> Paradise is the absolute source and the eternal focal point of all energy-matter in the universe of universes. The Unqualified Absolute is the revealer, regulator, and repository of that which has Paradise as its source and origin. The universal presence of the Unqualified Absolute seems to be equivalent to the concept of a potential infinity of gravity extension, an elastic tension of Paradise presence. This concept aids us in grasping the fact that everything is drawn inward towards Paradise. The illustration is crude but nonetheless helpful. **11:8.9**

Gravity is an instantaneous attractive force between material bodies which varies with distance. The Unqualified Absolute is infinite in both physical potential and extension. The universal presence of this Absolute in absolute extension is equivalent to the potential for an infinite extension of absolute gravity centering on Paradise – the potential for the cosmos-infinite. Absolute gravity is characterized as an elastic tension between Paradise and actualized physical realities. The instantaneous and continuous force of gravity is the primary physical manifestation of the Universal Absolute.

> … the Universal Absolute. This cohesive correlation of the material universe is best understood by all personalities — material, morontia, absonite, or spiritual — by the observation of the gravity response of all bona fide material reality to the gravity centering on nether Paradise. **56:1.2**

The potential for all forms of physical energy is hidden in the *absoluta* of the Unqualified Absolute, which are located in absolute extension. When the prereality of space potency emerges from the Unqualified as actual energy, it is gravitationally grasped by the Universal Absolute and responds to the absolute presence of Paradise. The gravitational response arising in the Universal Absolute varies with the absolute distance from Paradise. Absolute distance is the measure of absolute extension, which can be treated as a property of Paradise.

From the variability in the gravitational response of energy to Paradise, it can be inferred that the property of inertia is inherent in energy. Inertia causes energy to proceed in a straight line, unless acted upon by superior force. Without inertia all forms of energy would be unable to resist being drawn directly inward toward Paradise by gravity. This implies that the property of inertia is ultimately derived from the space potency of the Unqualified Absolute.

> The eternal Isle is absolutely at rest; all other organized and organizing energy is in eternal motion; in all space, only the presence of the Unqualified Absolute is quiescent, and the Unqualified is co-ordinate with Paradise. Paradise exists at the focus of space, the Unqualified pervades it, and all relative existence has its being within this domain. **105:3.4**

> … the Universal Absolute … functions to unify and co-ordinate the dynamic infinity of Total Deity and the static infinity of the Unqualified Absolute. **0:3.21**

The static infinity of the Unqualified Absolute is manifest in the *absoluta* of space potency, which are stationary in the absolute extension of Paradise. The absolute immovability of the *absolutum* of Paradise and the *absoluta* of space potency imply potentially infinite inertia. The actual energy arising from *absoluta* has both finite force-energy and relative inertial-response and is, therefore, movable. The relative inertia inherent in actual energy derives from the potentially infinite inertia inherent in space potency. The instantaneous actual force of absolute gravity centered on nether Paradise is opposed by the instantaneous potential force-reaction of inertia, which originates in the static infinity of the Unqualified Absolute. All motion occurs relative to the coordinate Absolutes of the Unqualified and Paradise. All motion is functionally unified by the Universal Absolute through the continuous force of gravity and the variable force-reaction of inertia.

Newton conceived of inertia as arising from absolute space. Einstein did not alter Newton's concept of inertia in his formulation of the special theory of relativity. But the interdependence of space and time makes the existence of absolute space impossible. In the general theory inertia is conceived to be a consequence of the curvature of finite spacetime. Einstein's concept of inertia also does away with the instantaneous force of gravity, which is instead conceived of as waves of gravity energy propagating from a material body at the velocity of light. Both Newton and Einstein attempt to derive inertia from space, but "Space is not force, energy, or power." **11:5.9** "Space is neither a subabsolute condition within, nor the presence of, the Unqualified Absolute …" **11:7.4** The force-reaction of inertia originates in the Unqualified Absolute and is ultimately conditioned by the Universal Absolute.

The force of gravity traces back to the absolutely stationary Isle of Paradise at the center of absolute extension. The force-reaction of inertia traces back to the static infinity of the Unqualified Absolute which fills absolute extension. Inertia demonstrates the potential substantiality of the Unqualified Absolute underlying absolute extension. The physical dynamics of the universe require an inertial reality frame in which force can act upon force-reacting inertia.