The Rational Definitions of Time, Space, and Force

Robert L. Henderson
10529 W. Campana Drive, Sun City, AZ 85351
e-mail: Bob.Bet@Cox.Net

Of all the achievements attributed to Einstein, by far the most notable was his origination of the special and general theories of relativity. However, it is the writer's contention that the concepts of relativity have been an impediment to the rational progress of science for the last hundred years. Whereas it has always been assumed that the scientific process was based on sound, verified facts, systematically accumulated and woven into a tapestry of rational, understandable knowledge, such has not been the case since the inception of relativity. The ingredient that is missing in relativity is "rationality"; also known as "common sense." The truth of this statement is best expressed in the preface to the recent book by Eric Chaisson, Relativity, Black Holes, and the Fate of the Universe, in which the author states--with regard to relativity -- "I suggest that anyone willing to forgo common sense and human intuition can grasp the essentials of this, the grandest accomplishment of the physical sciences." Although this statement clearly indicates the condition of relativity (that it lacks common sense), the reason for its being in that condition is best explained by the following statement from Einstein's Herbert Spencer lecture of 1933: "Pure logical thinking cannot yield us any knowledge of the empirical world; all knowledge of reality starts from experience and ends in it." However, it is the purpose of this paper to show how "pure logical thinking" will reveal the impossibilities that are inherent in the theories of relativity.

1. Introduction

In 1687, in his **Principia Mathematic** [1], Newton defined the laws of motion and universal gravitation, including the mathematical relationship between force, mass, and acceleration; definitions that have become the defining concepts of modern-day classical mechanics. However, in the *Principia*, he also stated "I will not define time, space, place and motion, as being well known to all," an unfortunate omission that has permitted others, primarily G. F. FitzGerald, H. A. Lorentz, and Albert Einstein, to propose absurd interpretations of these phenomena, which have—unfortunately—become accepted by the scientific community and prevail to this day. It is primarily due to the acceptance of Einstein's absurd interpretations of time and space that the impossible theories of special and general relativity have posed such an imponderable problem for the scientific community.

It is therefore the purpose of this paper to develop the rational definitions of time, space, and force, derived entirely from their innate, intrinsic properties and without recourse to the various experiments that have been performed in the past and used to arrive at the present-day misinterpretations of these phenomena.

As an addendum, it will be explained how the theories of relativity have been an impediment to the rational progress of science for the last 100 years.

2. Time Defined

All phenomena within the real, physical world are defined in accordance with the way they are perceived by the human mind. Although everyone has a general understanding of the phenomenon of "time," it has—in fact—never been precisely, scientifically defined. The general understanding of time is perhaps best illustrated by the observation of St. Augustine of Hippo, who said—circa 400 A.D.—"If you do not ask me what is time, I know it; when you ask me, I cannot tell it." This lack of an exact understanding of time is, in fact, one of the main reasons why the irrational theories of relativity became so widely accepted.

When we speak of "time," there are two meanings that come to mind. One is the momentary *instant* of time that is indicated by the hands on a clock, as exemplified by the question, What time is it? The other is the broader concept of the *passage* of time, as exemplified by the question—How much time will it take? Although the word "time" is used in both these cases, common-sense understanding of the context in which it is used is usually sufficient to avoid confusion over which meaning is intended. In the discussion that follows, we are concerned with the broader concept; that is, with the *passage* of time.

In a general sense, the passage of time is perceived as the relationship that exists in the sequence of occurrence of events: as a continuum in which events succeed each other from the past, through the present, and into the future. In addition, for reasons that have never been clearly understood, common sense seems to indicate that the passage of time should be uniform throughout the universe: even Sir Isaac Newton believed this to be the case.

Although the elementary concept of the uniform passage of time is generally understood by almost everyone, it is not universally accepted within the scientific community. In particular, it has recently become acceptable to consider the passage of time as a variable, primarily due to the influence of Einstein's special relativity. Therefore—because "time" has never been rigorously defined so that its nature cannot be misinterpreted by those who wish to use it for scientific purposes—it would be helpful to develop such a definition. In this regard, then, the *rational* definition of time (also referred to as the "*classical*" definition) may be developed from the following considerations:

As previously stated, time is perceived as the relationship that exists in the sequence of occurrence of events. Now, in order for events to take place, things must move; thus if there were no motion of physical objects anywhere in the universe, then no events would take place and the concept of "time" would have no meaning (there would be no motion even of time-keeping devices). Therefore, it may be said that "time," as perceived by the human mind, is a *consequence* of the existence and motion of physical matter: or, since physical matter in motion is the elementary definition of energy (as explained later in this paper), we may also say that "time" is a consequence of the existence of energy.

When considering the character of "time," one perceives it as a continuum that flows from the "past," through the "present," and into the "future." The past covers the vast period from the unknown beginning of time up to the present; the future covers the equally vast period from the present out to the unknown end of time; however, the present covers no period of time at all: it is infinitesimal in length and exists as the dividing line between the past and the future. Now, although the present—which is also referred to as the instant of "*now*"—has no measurable interval associated with it, *all* physical matter *always* exists in that infinitesimal instant: things in the past exist only as memories in the human mind, while things in the future exist only as anticipations within the human mind.

Although everything physical always exists in the instant of "now," the positions and configurations of objects change from one instant of "now" to the next, and it is these changes that give rise to the concept of "the passage of time," or, simply, as "time." Although matter always exists in the present instant of "now," the human memory permits retention and contemplation of previous positions and configurations of objects, and the mind relates them with respect to their sequence of occurrence according to the scale called "time." The scale of the passage of time is simply the relationship that exists in the sequential instants of "now."

Now, there is no fixed, standard scale for the passage of time: the scale is established purely on a comparison basis with any convenient, uniform, cyclic phenomenon. For example, one rather coarse scale that is universally used is based on the cyclic rotation of the earth on its axis, the period of which is called the "day." By assigning numbers to the days as they transpire, we establish a comparative scale of time: we need only establish an arbitrary starting point (i.e., the birth of Christ) and specific events may then be identified by the number of the day in which they occur; or *intervals* of time may be measured by counting the number of days between the beginning and end of the interval.

However, since the number of days that transpire soon become too great for easy reference, we also utilize the longer cyclic rotation of the earth about the sun—the period of which is called the "year"—to assist in the counting of days: since 365 days (approximately) transpire during one rotation of the earth about the sun, it is more convenient to designate specific days by the year number (assuming we start counting the years at the same time we start counting the days), and the day number within the year, in which they occur.

In addition, if we wish to identify either points in time, or intervals of time, within finer increments than a day, we use the faster cyclic rotation of the hands of a "clock" to subdivide the day into hours, minutes, and seconds. There is, in fact, no limit to the fineness of the increments into which one may subdivide time: the only practical limit arises from the ability to devise a cyclic device capable of differentiating between, or counting, the desired infinitesimal increments. This concept may perhaps be more readily comprehended by noting that time exists in continuous, "analog" form, and that cyclic timing devices (i.e., "clocks") are, in essence, "digitizers" that identify discrete segments (e.g., years, days, hours, etc.) of the time continuum; and since time is continuous, there is no lower limit to the minuteness of the increments into which it may be subdivided.

We thus see that any type of uniform cyclic device—whether natural or manmade—may be used as a comparison for the measurement of the passage of time. However, there is no standard, universal, non-varying indicator of the passage of time: all *natural* cyclic phenomena, as well as all *man-made* cyclic devices, are subject to fluctuations, their cycle intervals being determined by their surrounding environments. For examples:

1. If a large meteor were to strike the earth at the right spot, it would slow the rotation of the earth about its axis and the length of a day would increase; however, this would not mean that time had slowed down but only that the rotation of the earth had slowed, and thus there would be fewer days in a year.
2. If a gravity operated pendulum clock were to be sent into orbit about the earth in a space ship, the clock would stop; however, this would not mean that *time* had stopped on board the space ship, but only that the *clock* had stopped.
3. If a mechanical clock were to be subjected to extremes of high or low temperatures, it would either slow down or speed up; however, this would not mean that time rate-of-flow had changed because of the temperature variations, but only that the timing cycle of the clock mechanism had changed.

It can thus be seen that *no* physical cyclic phenomenon is sacred and unvarying: all are products of their physical environments and all will change their cycle intervals with changes in their environments. If the interval of a cyclic phenomenon (i.e., a timing device, or clock) changes, rigorous analysis of its surrounding environment will reveal the cause of the change.

Now, although the cycle intervals of the various cyclic phenomena that are used to measure the passage of time may vary, *the most significant aspect of time is that its so-called "rate-of-passage" is uniform throughout the universe*, a truth that is derived from the following consideration:

> Since all physical matter exists in a continuous state (that is, since there are no gaps in its state of existence), at any instant of time one is able to contemplate any part of the universe as it exists at that particular instant. This condition of being able to contemplate even the most remote part of the universe as it exists at the very same instant one is contemplating it gives rise to the concept that the infinitesimal instant of "now" exists simultaneously, or coincidentally, everywhere in the universe, *simply by rational understanding*. Furthermore, it is this simple, rational, mental concept that establishes the passage of time as being uniform throughout the universe, a truth that may be more clearly understood through the following example.

Consider a stationary observer at some local point in the universe who launches a rocket ship at an enormous velocity into the outer reaches of space, whereupon the ship turns around and returns. During the rocket ship's travels, at every instant of "now" at the observer's location the rocket ship can be contemplated as it exists in its remote location at that same instant of "now": no extra instants of "now" occur at the observer's location that do not occur at the rocket ship's location, or visa-versa. (If one were to assume that an extra instant of "now" occurred at the observer's location that did not occur at the rocket ship's location, one would have to explain why that instant did not occur at the remote location: did the rocket ship cease to exist for that instant?) We see, then, that when the rocket ship returns, it will have traveled throughout the universe, experiencing exactly the same number of instants of "now" as the local observer, and will therefore have experienced exactly the same passage of time as did the local observer. This will be true no matter how fast or how far the rocket ship traveled, and regardless of the unknown environments it may have encountered.

From the foregoing considerations, then, it can be seen that the primary *defining* characteristic of "time" is that its passage is uniform throughout the universe, since everything experiences the same number of the universal instants of "now." It is therefore meaningless to say—for whatever reason—that time can either speed up, or slow down, in one region of the universe with respect to any other region.

Furthermore, it should also be understood that the passage of time actually has no "rate" associated with it: the term "rate" is only used with regard to the clocks that are used to measure the passage of time. Since the concept of time derives from the motion of physical objects, the simple fact that physical objects are in motion denotes that time is passing, but without clocks to measure its passage, one could only say that time is passing and there would be no rate associated with it. The term "rate" is defined as "an amount of something measured per unit of something else," and therefore *does* apply to the chain of clocks that is used to mark the passage of time: each clock in the chain runs at a rate that is calibrated against the next clock in the chain. For example, a minute clock runs at a rate of 60 minutes per unit of the hour clock; an hour clock runs at a rate of 24 hours per unit of the day clock, etc. For this reason, then, if any clock used to measure the passage of time (including the atomic clock) is observed to either slow down or speed up, it is not because the passage of time has slowed down or speeded up in the region of the clock, but only that the clock under observation has changed its cycle rate for reasons that may not at once be obvious. It can thus be seen that there is no "rate" associated with the passage of time, but only with the "clocks" that are used to measure its passage.

Although there is no "rate" associated with the passage of time, it is quite common to refer to time as though it had a "rate-of-flow," such as in the expression—"time rate-of-flow is uniform throughout the universe;" however, this expression should correctly be stated as "the passage of time is uniform throughout the universe". Nevertheless, because the "rate" terminology is in such widespread use, it may be used at various times in this paper, only because it is believed that terminology has the most meaning for the majority of readers. It should be understood, however, that there is no "rate" associated with the universal, uniform passage of time, but only with the clocks that are used to measure that passage.

To further understand that the passage of time must be uniform for all observers, let us consider the following hypothetical examples where the passage of time may be considered to be non-uniform.

As universally understood, the passage of time referred to as a "year" is defined as the interval required for the earth to travel one revolution around the sun. Let us now assume that time passes slower for a person who travels through space at a very high velocity than for a person who remains at rest on the earth. Let us next assume we launch a manned rocket ship from the earth at a very high rate of speed into the outer regions of space, whereupon the ship turns around and returns to the earth. Let us also assume the velocity of the rocket ship with respect to the earth is so great that time passes only half as fast on the ship as it does on the earth. Let us further assume that the period of time required for the ship to complete its round trip—as measured by residents on the earth—is one year. Now, when the ship returns from its voyage, the earth will have made one complete circuit around the sun as noted by residents on the earth. However, to those passengers on the rocket ship—who are now again residing on the earth—the earth will have traveled only half-way around the sun: an obviously impossible condition.

As a second example, let us assume that time passes slower in the vicinity of massive physical bodies—such as the sun—than in the vicinity of less massive bodies—such as the earth. Now, if this were the case, then the passage of time on the sun would be slower than its passage on the earth due to the greater mass of the sun. And, due to the enormous amount of time the earth and sun have been in existence, the sun would—at what we call the present instant of "now" here on the earth—be existing at some time in the far distant past: again, a condition that defies rational comprehension. In addition, If the sun were presently existing thousands of years in the past, how could light from the sun travel to the earth in some ten minutes?

For these reasons, then, we see that it is not possible for the passage of time to vary for any reason: the passage of time must be uniform throughout the universe.

Based on the foregoing considerations, then, time may be rationally defined as follows:

> **Time** exists as a consequence of the motion of physical matter, which is to say, as a consequence of the existence of energy; it is the relationship that exists in the sequence of occurrence of events; it is a continuum without spatial dimensions; its passage is uniform throughout the universe as derived from the concept that the instant of "now" occurs simultaneously everywhere in the universe; and its passage is measured on a comparison basis with any type of uniform cyclic device.

We thus see that simply by rational, common-sense understanding, the passage of time is *defined* as being uniform throughout the universe and cannot be proven to be otherwise by any type of test or experiment. It should be understood that variations which may occur—for whatever reasons—in the rates of cyclic "time-keeping" devices (including atomic clocks) that are used to measure the passage of time, have no meaning insofar as determining whether or not the passage of time is uniform: the fact that it is uniform is based on the rationality of purely mental considerations. Furthermore, the rational progress of science depends upon adherence to this rational, or "classical", definition of "time."

3. Space Defined

Space is one of the fundamental elements of the universe: we perceive it to be everywhere around us and have a general, common-sense understanding of what it is. However, because space has never been rigorously defined in such a manner that its properties cannot be misinterpreted by those who wish to involve it in scientific matters, it would be helpful to develop such a definition. The rational definition of space may be developed from the following understandings of its various aspects.

One can best perceive the concept of space by considering the vast expanse of the heavens filled with innumerable stars and other physical matter; then imagining what would remain if all the physical matter were removed. That which would remain would be the empty expanse of amorphous nothingness called "space": the setting within which all physical matter exists and moves.

Although physical matter has finite shapes and sizes that can be observed, measured, and defined, space—on the other hand—has no *finite*, identifiable shape of itself: it is only *finitely* defined by the locations and shapes of the physical matter that exists within its expanse. Furthermore, although physical matter is subject to all the changes in size, shape, density, temperature, etc., that various forms of physical interactions can produce on physical matter, space—on the other hand—is not subject to variation of any kind: it cannot be compressed, expanded, bent, or otherwise deformed since it has no identifiable shape of itself and already fills the universe.

Neither can physical matter interact with space, nor can "space" exert forces on physical matter since space consists of nothingness and "nothing" cannot interact with, or have an effect on, "something": matter only *occupies* space. Physical matter that is observed to contract or expand does not also contract or expand the space within which it resides, it only occupies less or more space, as the case may be. No physical phenomena, or manifestations of energy, have any effect on the dimensions or character of space: they simply take place within its vast, amorphous expanse.

Although certain currently popular cosmological theories hypothesize an outer limit to the *physical* universe, this would not mean that space would also cease to exist beyond that outer boundary. If one assumed that space did not extend beyond such a boundary, it would be necessary to define whatever *did* exist there. Now, the only rational definition of what would exist there is "nothing," which is—in essence—an elementary definition of space. Thus, simply by rational comprehension, the boundaries of space are limitless.

In order to dimensionally define the limitless expanse of space, three linear, mutually orthogonal axes are required. Since these axes are *defined* as being linear, they are therefore not subject to being curved or otherwise deformed by interactions with things physical, or by *assumed* deformations of space. Other sets of axes may be contemplated to define the dimensions of space, employing any number of axes of any conceivable type; however, any number less than three will not completely define the location of every point in space, nor will any more than three—of whatever type or shape imagined—serve any function other than to complicate the rational, common-sense understanding of the dimensions of space.

Based on the foregoing understandings of the various aspects of space, then, it may be rationally defined as having the following characteristics:

> **Space** is the empty, amorphous expanse of nothingness that fills the universe; it is composed of nothing physical; it is infinite in size and provides the setting within which all the physical matter of the universe resides; it is incapable of interacting with physical matter, or of being deformed in any way, and is dimensionally defined with three linear, mutually orthogonal axes.

We thus see that the rational, common-sense definition of space specifies that, among other things, it cannot affect, or be effected by, interactions with physical matter. Furthermore, the rational progress of science depends upon adherence to this definition. If a phenomenon is observed, which, in order to explain the cause-and-effect relationships of the phenomenon, appears to require that this definition of space be violated, reinterpretation of the explanation in a manner that does not violate the definition will lead to new insights into the rational understanding of the physical universe.

4. Force Defined

The terms "force" and "energy" are widely used within the scientific domain; however, there are no intrinsic definitions of the physical composition of either of these phenomena. The term "force" is presently defined only as that, which, when applied to a physical body, causes the body to accelerate. In similar manner, "energy" is presently defined only as the capacity for doing work, or, in other words, as the capacity to make things move. However, in neither case is the description of what it is that constitutes either a "force," or "energy," clearly defined. It is proposed that by defining the intrinsic makeup of these two phenomena, a deeper insight into the physical nature of the natural world can be achieved.

Perhaps the most important relationship in the field of science is the one that interrelates force, mass, and acceleration, as expressed by the classic equation $F = ma$. This relationship—first proposed by Sir Isaac Newton—provides the foundation upon which the entire body of modern-day mechanics is based.

It should be noted, however, that when one considers the three factors in the above relationship, one finds that it is possible to mentally visualize the physical embodiments of "mass," and "acceleration," but that there is no mental image of the physical embodiment of "force" that immediately comes to mind. For example, the concept of "mass" may readily be visualized as a physical object: perhaps as a solid steel ball. “Acceleration" may readily be visualized as an object moving along at an ever-increasing speed. However, there is no such visual image for the concept of "force" since the intrinsic makeup of a force has never been clearly defined. Although one may perhaps conjure up the image of a man pushing a car as the visualization of a force, the actual "force" that exists at the point of contact between the man and the car is not visualized: there is no difference in appearance between a man simply resting with his hands on a car and a man who is exerting a force on a car.

In order to better understand the intrinsic nature of "force," then, one must ask the question: Of what would a force be composed if it existed as an isolated entity, alone in an otherwise empty universe? Serious contemplation of this question will lead to the realization that a force does not exist as an isolated entity: within the context of physical reality, forces are only produced when one physical body is in contact with another physical body and the energy possessed by one body is being transferred to the other: it is the transfer of energy at the point of contact that constitutes the force. In order, then, to understand the intrinsic makeup of "force," one must also understand the intrinsic makeup of "energy," since the two concepts are inextricably related.

Now, the term "energy," in a general sense, is understood to be the capacity for doing work, or the capacity to make something move. Although we speak of many different types of energy, such as mechanical, electrical, nuclear, heat, kinetic, potential, etc., it is the capacity of each of the types of energy to make physical objects move that the term "energy" is understood to imply. The question then becomes: Are there actually many different types of energy, each physically and irreconcilably different from the others; or is there only one fundamental type of energy that manifests itself in different ways, with the underlying energy being the same in all cases?

The answer to this question is to be found in the well-known maxim of the conservation of energy—namely that although energy may be converted from one form to another, it cannot be created or destroyed. From this maxim, one may glean the truth that, since all forms of energy can — through one process or another — be interchanged, there must be some underlying principle that interrelates them all. Serious contemplation of this fact will lead to the conclusion that there is only one *fundamental* definition of "energy" that can interrelate all its various forms, as follows:

> In the most elementary way, energy may be defined as the property possessed by an object of mass when it has a velocity with respect to any given reference frame.

Of course, to understand how this elementary definition of energy is able to produce the forces that manifest themselves in all the various types of energy mentioned above (which is what we originally set out to define) one must first understand the physical makeup of matter on the atomic and subatomic scales, as well as the physical nature of the energy fields such as gravitational, electrostatic, electromagnetic, etc., that permeate the universe down through the atomic and subatomic domains. However, to first illustrate how this definition of energy is capable of making matter move through the generation of forces, let us consider the following elementary example.

Let us first consider two objects of mass that are moving with respect to each other, thus having "energy"—as we have just defined it—with respect to each other. Now, if the 1st object strikes the 2nd object, it will cause the 2nd object to instantaneously change its direction and/or magnitude of motion. With this example we see that the energy of motion of one object generates a *momentary* force (called an impulse) upon a second object when it impacts upon the second object, causing the second object to instantaneously change its state of motion.

If we next permit a continuous stream of objects to strike a 2nd object, the 2nd object will *continuously* change its direction and/or magnitude of motion; which is to say—by definition—it will "accelerate." With this example, then, we see that the continuous impacts of moving masses upon a reference body cause the reference body to accelerate; which, in accordance with Newton's laws, is accomplished through the application of a force F at the point of contact between the moving masses and the reference body. Of course, to generate what we interpret as a *continuous* force, the continuous impacts must be applied at an extremely high rate, beyond the ability of the human senses to discern as individual impacts.

From this example, then, it may be concluded that in the most fundamental way, "force" may be defined as follows:

> All **forces** are digital in nature, consisting of a continuous series of impulses delivered by particles of mass in motion.

Now, this concept may be readily understood in the case of forces produced by the moving particles of mass that comprise matter in a gaseous state, but not so readily understood in the case of forces produced by stationary matter in the solid state—such as by a compressed spring. However, the concepts of "force" and "energy" as herein defined have a significant impact on the overall understanding of the physical world; in particular, on the interrelationship that exists between physical matter and the various "fields" that permeate the universe. And it is this interrelationship that provides the explanation of how forces—as herein defined—manifest themselves in solid, stationary materials. Let us therefore delve further into that interrelationship, as follows.

Let us first consider the gravitational field. Since the gravitational field exerts forces upon physical objects, the field must be composed of physical, infinitesimal, invisible, particles of mass in random motion with respect to each other, since—in accordance with our definition of "force"—it is only the impingement of particles of mass in motion that can generate forces (e.g., as the invisible, moving particles of the atmosphere generate the forces of atmospheric pressure and the wind). Furthermore, since particles of mass in motion with respect to each other are said to constitute energy, and since gravitational forces exist throughout the universe, we may conclude that the universe is filled with an energy field composed of infinitesimal particles of mass in a state of random motion with respect to each other. Such a field may then logically be referred to as the "Universal Energy field" (UEF). Now, it should be noted that this is the same field previously referred to as the "aether" that was initially required only to explain the wave properties of light, but which we now see—through an intrinsic understanding of the nature of "force" and "energy"—is also the same field required to explain the phenomenon of gravity.

When one then realizes that a UEF exists, it will also be realized that all physical matter is immersed in that field, and that some form of interaction between the moving elementary particles of the field and physical matter must exist. Furthermore, when this interrelationship is properly understood, it will be seen that the moving particles of the field permeate the structure of subatomic and atomic matter, and, in fact, are themselves bound together to actually *form* subatomic and atomic matter, thereby providing the moving particles of mass within stationary, physical matter that are required to generate the forces exerted by that stationary matter (such as by the force of a compressed spring). In addition, it may reasonably be concluded that all other fields such as electrostatic, magnetic, etc., are simply different configurations of the UEF caused by particular interactions of the field's particles with particular forms of composite matter. A more thorough description of the UEF and its relationship with physical matter—including how matter itself is created out of the field, and how gravitational forces are generated—is contained in the author's book, **Einstein and The-Emperor's-New-Clothes Syndrome: The Exposé of a Charlatan** [2]

Using the above definitions of "force" and "energy," then, there are certain conclusions that may be drawn concerning the nature of all field forces, as follows:

1. In those cases where forces are present but the origin of the forces are not readily apparent—such as with atmospheric, gra-

vitational, electrostatic, electromagnetic, or any other so-called "field" forces—the forces must, in some manner, be produced by the impingements of moving, invisible, physical particles that have the properties of mass and inertia.

2. Within tenuous mediums such as gasses or "fields," there is no such thing as a force of "pull": only a force of "push." Forces are produced only when a series of particles strike an object; therefore if two objects are apparently being "pulled" together by an unseen force of attraction, the force must actually be produced by either a greater number of particles, or particles with more energy (i.e., velocity), impinging on the outer, or "facing-away" surfaces of the two objects than on the inner, or "facing-together" surfaces, thereby pushing the objects together. As an example, when an evacuated container collapses, it is caused by the impingements of moving particles of the atmosphere on the outside of the walls of the container, not by an attractive force of a vacuum existing within the container.
3. Since forces produced by tenuous mediums are actually generated by particles of mass in motion, there must therefore be velocities associated with the forces; those velocities being directly related to the velocities possessed by the moving particles that generate the forces. For this reason, then, when a body is accelerated by a field-force of any type, the magnitude of the force on the body will diminish as the body approaches the velocity of the field particles that are generating the field-force.

In conclusion, then, the foregoing discussion presents the thought processes involved in arriving at the rational understanding of both the phenomenon of "force," and of "energy," as well as a general understanding of how field forces are generated. An understanding of the fundamental nature of these phenomena and their properties as described above is essential for the rational, coordinated understanding of the physical universe.

5. Addendum

The following discussion is an explanation of how the theories of relativity have been an impediment to the rational progress for the last 100 years.

In his general relativity, Einstein, in an attempt to explain the cause of gravity without incorporating physical forces in the explanation, arrived at an explanation as follows.

Accepting Newton's concept in his *Principia* that a moving body of mass would proceed through space in a straight line forever unless acted upon by a force, and not being able to conceive of how invisible forces could be transmitted through seemingly empty space, and wondering, then, how to account for the fact that a celestial body traveling in a straight line through space would be deflected toward a gravitational object without physical forces being involved, proposed the following explanation.

First, he assumed that the path of a light beam traveling through space was the *definition* of a straight line. He next assumed that if the space surrounding the gravitational object were curved by the presence of the gravitational object, it would also cause all straight lines within that curved space to also be curved. Thus the moving celestial body would simply still be traveling a straight line which had been curved by the curved space surrounding the gravitational object. Therefore, there was no need for physical forces to explain the effects of gravity: gravity was simply a phenomenon produced by curved space and was not a phenomenon produced by forces.

The manner in which this concept of curved space accounting for the effects of gravity was ostensibly verified is well known by the scientific community, consisting of an experiment performed in 1919 by the astronomer Sir Arthur Eddington who detected a slight deflection in a beam of light passing close by the sun. This was considered sufficient evidence by a gullible segment of the scientific community to confirm Einstein's assumption that light beams traveling through space defined straight lines; that the space surrounding the gravitational sun must therefore be curved, and that it was simply the curved space surrounding gravitational objects that accounted for the now not-required forces of gravity. Other more rational scientists, not willing to admit they could not understand Einstein's irrational explanation of gravity, fell victim to the Emperor's-New-Clothes syndrome and also accepted the light-bending experiment as sufficient evidence to confirm Einstein's explanation of gravity, thus forming a phalanx within the scientific community that to this day, refuses to consider any objections to any of Einstein's theories. However, the numerous fallacies in Einstein's line of reasoning are at once evident, as follows:

1. First, the assumption that space could be curved violated the rational definition of space in that it consists of nothingness, has no discernable, physical properties of its own, and is therefore incapable of being bent, or otherwise deformed in any way.
2. Second, the assumption that the path of a light beam *defined* a straight line violated the *rational* definition of a straight line, which is that a straight line is the shortest distance between any two points, and there will always be a shorter distance between any two points on a curved line in an assumed curved space than on the path of the assumed curved line.
3. Third, the assumption that curved space was actually the cause of gravity only ostensibly explained why a celestial body traveled in a curved path when passing by a gravitational object and did not in any way provide an explanation for the gravitational force that is exerted on one physical body by another physical body when the two bodies are motionless and in physical contact with other, such as the force exerted on a person at rest on the earth as registered when the person steps on a scale. No attempt has ever been made by anyone in the scientific community to explain how a curved space could account for that force: they simply accept that since Einstein said it did, that it must somehow do so.

Furthermore, in his special relativity, Einstein violated the rational definition of time (i.e., that its passage is uniform throughout the universe) by assuming that if two reference frames were in motion with respect to each other, that time passed slower in each reference frame with respect to the other frame, the greater the velocity between the two frames, the greater the time slowdown. This concept gave rise to the well-known "twin paradox," briefly explained as follows.

Let us assume there are twin astronauts residing on the earth. Let us then launch one twin in a rocket ship into the far reaches of outer space at a very high velocity, whereupon the ship turns around and returns to the earth. Now, in keeping with Einstein's interpretation, the returning twin will be younger than his earth-bound brother due to the slow-down in the passage of time that occurred on the moving rocket ship with respect to the earth. However, also according to Einstein, during the rocket ship's trip, the earth would have had an equal velocity in the opposite direction with respect to the rocket ship; thus, when the rocket ship returned, the earth-bound twin would be younger than his brother. It can thus be seen that this condition results in a paradox: both twins cannot each be younger than the other.

This twin paradox was discerned soon after special relativity was proposed and was used in early attempts to discredit the theory, since within the realm of classical science, a paradox (i.e., a self-contradictory condition) is a positive verification of the irrationality of any theory. However, the paradox was ostensibly resolved by Einstein who said—in an off-hand manner—that because of "other relativistic effects" (which were never defined) involved in the process of leaving and returning to the earth, the twin on the rocket ship would be the one who experienced the time slowdown, and thus there would be no paradox. This statement by Einstein led others to *assume* it was actually the acceleration and deceleration of the rocket ship that caused time to slow down. It will be noted, however, that an acceleration-deceleration assumption has nothing to do with Einstein's initial assumption that was concerned only with time being a variable *as caused by relative velocity*. To further confirm that Einstein's speculative "other relativistic effects" involved in the process of leaving and returning to the earth has nothing to do with eliminating the paradox inherent in the theory, one should consider the case of the twins each taking off in separate rocket ships heading in opposite directions, with the two traveling twins now comprising the two reference frames moving with respect to each other. In this case, both twins would experience exactly the same "other relativistic effects" in leaving and returning to earth, and therefore there would be no way to surreptitiously obscure the fact that the paradox exists. There should be no misunderstanding in this regard: the twin paradox *conclusively* confirms that special relativity is an irrational, impossible theory. The attempt to mask one irrationality (i.e., that time rate-of-flow varies with relative velocity) by vaguely imposing another irrationality (i.e., that acceleration or deceleration somehow affects time rate-of-flow) is a prime example of the relativistic modus-operandi—"if you cannot elucidate, obfuscate."

From the foregoing explanations, then, it can be seen that the impossible assumptions made by Einstein in his special and general theories of relativity not only violated the rational definitions of time, space, and force, but his general relativity, which ostensibly verified that there was no physical aether, greatly impeded the rational progress of science by inhibiting the acceptance of an aether (or Universal Energy Field as it is referred to in the book **Einstein and The-Emperor's-New-Clothes Syndrome** [2]) as an essential scientific necessity, required to explain the as-yet unexplained phenomena of gravity, light, the nuclear binding force, nuclear energy, radioactivity, and the missing mass of the universe as well, all of which are explained in the afore-mentioned **Emperor's-New-Clothes** book.

6. Conclusion

Based on the explanations presented above and substantiated by Einstein's gymnasium (i.e. high school) teacher's appraisal of his poor academic record (i.e. the teacher who told him he would never amount to anything and expressed the wish that he drop out of school, saying, "Your very presence destroys my respect in class"), it is therefore the writers contention that Einstein was not the greatest man of the 20th century and the greatest scientist of all time as presently hailed by the scientific community, but was actually the most irrational charlatan ever to masquerade as a mathematician or scientist.

References

[1] Isaac Newton, **The Principia: Mathematical Principles of Natural Philosophy**, 3rd Ed. (1726).

[2] R. L. Henderson, **Einstein and The-Emperor's-New-Clothes Syndrome: The Expose of a Charlatan** (BookSurge Publishing, 2007).