"Nor is time a mysterious illusion of the intellect. It is an essential feature of the universe."

-G. J. Whitrow

"It is impossible to meditate on time and the mystery of the creative process of nature without an overwhelming emotion at the limitation of human intelligence.

-A. N. Whitehead

"FIRST FUNDAMENTAL POSTULATE. The physical universe is composed entirely of one component, space-time (or motion), existing in three dimensions, in discrete units, and in two reciprocal forms, space and time."

-D. B. Larson

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Reciprocity
Frank H. Meyer, Editor
1103 15th Avenue S.E., Minneapolis, MN 55414

K.V.K Nehru, Associate Editor
P.G. School, J.N.T University, Hyderabad 500028, India

Phillip Porter, Associate Editor
P.O. Box 999, Englewood, CO 80151

Jan N. Sammer, Associate Editor
560 Riverside Drive, Apt. 3-Q, New York, NY 10027

A publication of the INTERNATIONAL SOCIETY OF UNIFIED SCIENCE
an organization devoted to advancing the Reciprocal System of theory

Treasurer: Rainer F. Huck
1680 East Atkin Avenue, Salt Lake City, UT 84105

Secretary: Ronald W. Satz
1 Oak Drive, Parkerford, PA 19457

President: Edwin Navarro
21 Steve Dr., Petaluma, CA 94952

Vice President: Frank H. Meyer
1103 15th Avenue S.E., Minneapolis, MN 55414

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Home-grown unified theory
yet to rock world of science

By DESTON S. NOKES

For decades, Dewey B. Larson preached a new brand of physics that he claimed could alter our understanding of the physical universe. The only trouble is the scientific community was never very interested.

Larson, a retired mechanical engineer living in Northeast Portland, died May 25 at the age of 91. He wrote numerous books and articles about his "Theory of Reciprocity," which he claimed was the one unifying theory that explains the nature of everything in the universe. Larson asserted that the physical theories in use today are a vast batch of assumptions, "a collection of parts and pieces."

"The accepted theories of physical science are based on thousands of assumptions," Larson said in an interview this past winter. "I know that a good many of them are wrong."

Basically, Larson's complex theory makes only two assumptions: 1. The physical universe is composed entirely of motion, existing in three dimensions, in discrete units, and with two reciprocal aspects, space and time. 2. The physical universe conforms to the relations of ordinary commutative mathematics, its magnitudes are absolute, and its geometry Euclidean.

In short, Larson believed that the Reciprocal Theory can be used to provide one universal explanation for quasars, pulsars and other astronomical phenomena, as well as predict the structure and properties of the tiniest atoms and largest galaxies.

It's a theory that Larson has worked on since the 1950s but despite his efforts, he had never been able to capture the attention of the mainstream physics community.

Larson began scientific research as a leisure activity he considered "more fun than playing golf." The native of McCanna, N.D., graduated from Oregon State University in 1922 with a degree in mechanical engineering. To make a living, Larson worked as an engineer, distribution superintendent and administrator for Portland Gas & Coke Co., the predecessor to Northwest Natural Gas Co., until his retirement in 1963.

On evenings and weekends, whenever he had an hour or two to spare, Larson would gather his 20 inch slide rule and graph paper and immerse himself in study. Dorothy Larson, his wife of 58 years, remembers his coming to the dinner table still lost in his work, taking several minutes to emerge from deep spells of thought.

"I devised a method of calculating physical properties from chemical composition, a task which kept me busy for a long time," he said. "But after years of working using orthodox methods, the accepted lines of thought just didn't fit. I saw the need for a change in basic thought in order to find the answers I was looking for."

In 1955, Larson began working on his first book, "The Structure of the Physical Universe," published in 1959. It was in this book that Larson set up the basic set of assumptions on which he based all his other work. He gained a few supporters by sending out free copies of his self-published book to physicists and university libraries, but for the most part the scientific community turned a deaf ear.

"Physicists haven't looked hard at my theories, but I can't blame individuals," Larson said. "The chances of an altogether different theory being proved are slim and people just don't have the time."

This sentiment is echoed by Maurice Stewart, a pro-fessor in Willamette University's physics department, who was unfamiliar with Larson's theories, but said, "Hardly a month goes by that I don't receive someone's new theory about the makeup of the universe or something else. I'd like to see a theory that talked about something that people don't already know. The only way to judge a new theory is in terms of its usefulness," he said.

Larson continued to write supplementary material to interested people throughout the world. It was this interest that spurred him to continue. He subsequently published books with titles such as "The Case Against the Nuclear Atom," "Beyond Newton," "New Light on Space and Time," "Quasars and Pulsars," "Nothing But Motion." Some of his topics went after some sacred cows, such as the nuclear atom, and he has taken stands that have practically invited derision.
"Of all the places I've tried to get a foothold, the United States has been the most difficult," said Larson, adding that if it had not been for reviews of his books in foreign scientific journals during the first five years, "I'd have never got off the ground."

By the 1970s, Larson had accumulated a number of supporters who formed the International Society of Unified Science. The organization promotes Larson's theories, holds conventions, publishes the quarterly journal Reciprocity, and reprints and publishes Larson's books, which have sold between 1,500 and 2,000 copies. There isn't a lot of demand for this type of book," Larson admitted.

Frank Meyer, a retired physics professor at the University of Wisconsin and society member, became a convert late in his career.

"When I first ran across the Reciprocal Theory, I was skeptical that it was a unification and reevaluation of physics as Larson claimed," Meyer said. But after further investigation, Meyer was intrigued enough to invite Larson to the University of Wisconsin to address his class.

"I was elated that Larson could sustain his positions, some of which were quite radical. "I was persuaded that some of the physics I was learning from the Reciprocal Theory was better than what I had been studying for 35 years," Meyer said. I began to teach some of his theories in class and almost got into trouble.

A physics professor from the University of Minnesota got wind of Meyer's teachings, became alarmed and tried unsuccessfully to get Meyer fired.

Robert Zimmerman, Professor of physics at the University of Oregon, reviewed a small sample of Larson's writings recently and dismissed them as "way out in left field."

"He doesn't have a theory at all," Zimmerman said. "A scientific theory must be able to predict things and must be based on some experimental observation. If a legitimate physicist could get hold of his theory, it could have predictive powers. But in order for that theory to be accepted, it has to do better than Einstein's Theory of Relativity and it doesn't. Einstein's theory is well documented and well proved and makes predictions that can be tested. What we have today is adequate to explain the physical universe."

Meyer disagrees, saying that Larson's theory does better than relativity in explaining the cause of the expanding universe. He is confident that reciprocity will one day replace current physical theories and be universally accepted.

Larson agreed that his writings are not conventional. "All new discoveries in science are experimental and the theory is worked out afterward," Larson explained. "My findings are theoretical first and then experiments will have to justify the theory. I've already done the research, but I need help in verifying it." Larson and his supporters said physicists have too much investment in accepted theories to change. They also agree that until something comes along that forces physicists to change their beliefs, it is unlikely that Larson's work will ever receive the careful analysis they think it deserves.

"All I have been trying to do is increase knowledge," Larson said. "Sooner or later my theories will gain greater acceptance. If you have something you know is correct, it's bound to come out."

Deston S. Nokes is a writer-editor for Northwest Natural Gas Co.

This article by Mr. Deston S. Nokes has been published in THE OREGONIAN Thursday, June 7, 1990. It is published here with permission of its author.

Publication Policy

The editors of Reciprocity welcome papers, especially from new contributors. The requirements that contributed paper must meet in order to qualify for publication are clarified below. Editorial assistance is available in those cases where a limited amount of revision will enable a paper to meet the requirements.

As stated in the by-laws of the International Society of Unified Science, the objective of the Society is the advancement of the Reciprocal System of physical theory. This theory, as it is defined consists of two fundamental postulates, together with everything that can be derived from those postulates by logical or mathematical processes, without introduction from any other source.

The unitary character of the theory, resulting from the derivation of all of its conclusions from the same set of premises, is its most essential feature. It is this status of the theory as a general physical theory - the only thing of its kind - that enables proof of its validity by the probability method, and enables extension of the theory into areas inaccessible to observation.

The purpose of Reciprocity is to contribute toward the accomplishment of the objective of the organization. Acceptance of items for publication shall therefore be determined by the following criteria:

(continued)
Letter to Mr. Nokes from
Frank H. Meyer

Dear Mr. Nokes,

We appreciate your sharing your excellent article concerning Mr. Dewey B. Larson. Thank you for giving your consent to reproduce your article in RECIPROCITY, provided we credit it and print it in its entirety. I plan to print "Home grown Unified Theory yet to rock World of Science" in next issue of RECIPROCITY, Vol. XIX, No. 2, Summer, 1990. Your article is very timely and a truthful report about the present and future significance of Mr. Larson's full life and work, an elegy instead of an obituary.

"The true joy of life is the being part of a purpose you your self recognize to be a mighty one; the being thoroughly worn out when you are thrown on the scrap heap; and the being a Force of Nature instead of a selfish little clod of ailments and grievances, complaining that the world won't devote itself to making you happy."

Dewey B. Larson is the very model of a joyful, ethical human being, a man of uncommon honesty, courage, ambition, humility and love; an individual equal in ultimate human worth to the whole of humankind. He also is a husband, worthy of his lovely equal in human worth, his wife, the woman, Dorothy; and a father worthy of his other future equals in worth: his son, his daughter, his immediate family and his extended family, the present and future ethical individuals of the humankind. "We all belong to the same family and have the same smell," says Carl Sandburg.

I am sending you a complimentary copy of Vol. XIX, No. 2, Summer, 1990, including the reprint of your Dewey Larson article soon.

If you are able and wish to help our cooperative purpose and projects, you are eligible and welcome to support us further and/or to join us.

Sincerely,

Frank H. Meyer

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Publication Policy (Continued)

1. All items must have relevance to the stated objective of the International Society of Unified Science.

2. Original technical articles must deal with the Reciprocal System, of theory, as defined above, or aspects of thereof; that is, the propositions supported must purport to be derived from the postulates of the Reciprocal System, or from previously published conclusions reached on that basis, without introducing further assumptions.

3. Arguments advanced against previously published material must be similarly based.

Papers should be sent to one of the editors. All published papers become property of ISUS, Inc.

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New Policy

You may now, if you wish, submit your papers on 3.5 inch disks for the Macintosh, computer, in Word 4.0 or MacWrite (version 2, 4.5, and 5.0) formats. This helps to eliminate the errors that may occur in transcription and reduces the amount of time it takes us to put the journal together.

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1990 ISUS Annual Summer Conference at Reed College in Portland, Oregon on August 3-5

ISUS has reserved a number of dorm rooms on Reed College campus for conference participants to stay in on Thursday, Friday, and Saturday night. Single, double, and triple rooms will be available. If you would like to be assured of having a room available please contact Rainer Huck, at 1680 East Atkins Ave., Salt Lake City, UT 84106; (801) - 467 - 3795, to make a reservation.

President Navarro urges all ISUS participants to consider making a presentation at the conference. Presentations do not have to be formal papers. They can be reports on work under progress, or merely ideas to present for discussion. This year ISUS plans to initiate a new policy regarding presentations at the conference; If you wish to make a presentation, you must, by July 15th, submit an Abstract along with an indication of the time the presentation will take, to Dr. Huck. This will allow us for the first time in several years, to have an agenda ready for the conference before it begins. If you also wish to have your presentation considered for publication in Reciprocity, you should be ready to submit either a typed paper or a 3.5 inch Macintosh formatted disk containing the paper.
Dorothy Larson
755 N.E. Royal Court
Portland, OR 97232

Dear Dorothy,

Rainer gave me the news.

Of the four mentors I've had (Dewey, Ayn Rand, Samuel Alexander, and Sherwin Wine), Dewey was the only one I knew first hand. I was very fortunate in coming in contact with his work at the early age of 15 and to meet him at age 20; to this day I marvel at the breadth of his knowledge and the manner in which he expressed it in his books and papers. His independence of thought must be regarded as legendary. He was a true genius.

As a proud disciple, I've kept every letter he wrote to me. Much of the history of the development of the ideas is contained in the hundreds of pages he sent me; someday I promise to publish these together with letters he wrote to other students of the Reciprocal System.

I wrote the Unmysterious Universe in 1971 as a tribute to Dewey's ideas and to spread them as quickly as possible. At the time, I naively thought that everybody would see the light and adopt the new system -- but no such luck! I soon learned that major shifts in theoretical paradigms can take a generation or two to effect. Nonetheless, the book did help in attracting a couple of thousand of converts.

On a personal note, I remember his very wise counsel at meetings; he really understood parliamentary procedure and the intricacies of the postal system. The house and the car were kept immaculate (this may be your doing as much as his, I don't know). He always responded to questions thoughtfully and fairly.

At the time when we first met, I was a Democrat and he was a Republican. Later on, after college, I became a Libertarian; he was still a Republican; finally, some years later, I too became a Republican (after the anarchist wing of the Libertarian Party wrested power from the minarchist [sic] wing). So, although we differed on certain political questions, he did finally persuade me to join his party.

I know that he wants Rainer and I and the other members of ISUS to carry on the work of extending and promoting the Reciprocal System. I plan on writing another theoretical physics book some ten years from now which will include all of the work done since 1971. I hope that in the future we will attract higher quality scientists and engineers to the cause.

I have enclosed some readings from Sherwin Wine's book titled Celebration. I think that they are appropriate for the occasion. I know that Dewey believed that "survival of the non-physical aspect of the human personality beyond physical death is theoretically certain" (Beyond Space and Time, chapter 27). I hope for his sake (and ours) that that is correct.

Sincerely yours,

Ronald W. Satz
Secretary, ISUS
The Photon: Displacement in a Second Scalar Dimension
(Updated and Revised)

Tom Kirk

Introduction

The development presented here provides a reconciliation of the apparent conflict between the left-right vectorial motion and the inward-outward motion of the photon. This is shown on page 50 and page 98 of Nothing But Motion. For those not familiar with the problem, this photon model in Nothing But Motion requires inward to be left vectorial and then switch to right vectorial in different units of time. Study was given to the problem from every conceivable angle and by applying every principle which related to the motion in question. (Careful examination was given to the copy of Reciprocity with the discussion of the photon by David Halprin and others.) After following many deductive trails, a complete rational correlation of all factors remained elusive. But then it finally hit me.

As discussed in the Chapter 15, Intermediate Ranges, in The Universe of Motion, on page 208 and 209, the maximum vectorial motion that can manifest itself in extension space is unit velocity (in fixed reference frame). Therefore the outward motion of the photon at unit speed is all that can be represented in the spatial reference frame. The vectorial sum of this motion and an additional motion either left or right would obviously exceed the one unit limit. A careful reading of Chapter 15, which discusses motions beyond unit speed shows this to be unquestionable.

There is therefore no vectorial component to the motion which "is" the photon. Only the translation of the photon object is vectorial. The inconsistency between inward and outward, and right and left does not exist. Whatever motion the photon has other than the object’s translation, can not manifest itself in extension space. The sequence of inward and outward motion occurs in a second scalar dimension. The problem of conservation of direction disappears.

The concepts of the photon motion are very fundamental. So much so that other areas of theory may be profoundly affected by this finding. This becomes more and more apparent on reviewing reciprocal theory while considering that all phenomena in the physical universe come forth from photons as their prima base.

On one deductive trail extending from this new finding, can be found a new answer to the enigmatic question of how inward gravitational motion can coincide precisely with the outward motion of a photon. The gravitational motion is restricted to one scalar dimension (for reasons that are found on the trail), but the photon is not so restricted. It has a full two scalar dimensions open to it. Therefore a photon can move on a path which appears to be inward in relation to the gravitational scalar dimension but is actually outward in a second scalar dimension.

The Theory

The fundamental postulates provide for a background motion outward at unit speed in three independent scalar dimensions. The familiar three dimensions of our perception constitute but one of these scalar dimensions. This outward motion in three scalar dimensions is the natural progression of the true state of what is commonly referred to as the proverbial infinite eternal void of nothingness.

The simplest displacement to the natural progression is a unit reversal in one scalar dimension of the outward motion (natural progression) of a unit of space associated with a unit of time. The motion which constitutes the simplest displacement is identical to the natural progression.
except it has a negative magnitude, a pure simple reversal.

This displacement is the simplest physical object and being an object it necessarily occupies a location. This location is moving with the natural progression in the other two scalar dimensions and therefore moves outward at unit speed in reference to the spatial reference system. This object can be shown to possess the properties of a photon.

The inward motion which is the photon must continue with its original scalar magnitude, because its energy is of course conserved. It is also at the lowest energy state possible for a space displacement. It follows that it cannot change form readily. It constitutes the simplest type of energy, as it is energy itself in its purest form. A 1/n displacement is a pure inverse speed, or a pure energy. This is established many times in Larson's works.

The inward unit motion which is the simplest photon can not continue over a second unit of time, because that would require an additional unit of energy. The single unit displacement is one unit greater that the natural progression of 1/1, that is 1/2. To carry over to a second sequential unit of time would require one more unit of energy for a total inverse speed of 1/3. So the inward motion inevitably lapses and is replaced by the natural progression for one unit of time at the end of which it can assume the form of a unit displacement again. For convenience in the remainder of this word, n will represent the actual number of units of displacement. The motion which "is" the photon is then 1/n+1.

The mechanism for the lapse is an energy limitation at the end of the units of time associated with the inward motion. The mechanism for reversal to the opposite, inward, direction is the unrelenting tendency of the inward motion to manifest itself due its energy conservation.

This 1/n+1 motion is similar to translational motion but it does not involve motion making up the displacement. Without an object to move, the subject motion does not lend itself well to representation in extension space. Another way to look at this is that the motion of the object predominates over the more subtle inner motion which "is" the object, as far as manifestation in 3-D space. All of the available speed representation, unit speed, is fully used by the photon object translation, leaving no link in this respect between the photon inward motion and the fixed reference system.

The photon motion which manifests itself in extension space is the motion of the photon as an object. This is the outward translation of the location which is occupied by the photon. This outward motion is in 2 scalar dimensions. One of these is represented in the spatial reference system, which will be named the extension scalar dimension for convenience in this work. One of the other two scalar (second scalar dimension in this work), while in the third is an additional unit outward translation of the photon object. The motions in the second and third scalar dimensions, though real, have no influence on the motion represented in the spatial reference system, except under certain circumstances where this motion interacts with matter. Some of these interactions will be investigated further on. Also, any circumstance where the speed of the object in the extension scalar dimension is less than unity.

The inherent motion which is the photon is in scalar dimension other than the extension scalar dimension. The motion 1/n which is the photon itself could not be represented in extension space, even if it was the motion of the object, if that object were also moving in another scalar dimension at unit speed (see page 209 of Universe of Motion). This would constitute motion greater than unity when the two motions are added vectorially. In fact, even a motion
greater than unity in the extension scalar dimension could not be represented in the 3-D fixed reference frame. Dewey Larson clearly establishes this in many contexts.

Summarizing to this point, the motion which is the photon is a pure linear displacement in a second scalar dimension. The second dimensional motion is carried along with the object photon in its translation in extension space.

Region of Influence

The simplest photon is a one unit displacement of the natural progression. As such it cancels the motion of the outward progression with a unit of inward motion. This creates a pocket of zero motion of unit size within the continuity of the natural outward (relative to the fixed reference frame) progression. When this pocket of zero motion impinges on a material object, if acts similar to a pulse at point of contact. The pocket of zero motion is a simple discontinuity in the ever pervasive background motion of the natural progression.

The pulse varies in intensity depending on the energy of the photon. The intensity is therefore essentially the duration of the pulse, because each unit of energy simply increases the number of consecutive units of time over which constant motion inward, that is the pulse, is effective. The exact duration of this pulse must be determined further on, because the nature of the photon must be further deduced beforehand.

Being similar to a pulse does not mean the photon is just like a wave. It is actually motion of translation without an object of translation. The motion, being in a second scalar dimension, is not manifested in extension space. However its motion is real nonetheless. Therefore when the photon interacts with other displacements in its environment, the inherent inner motion of the photon exhibits responses depending on circumstances. The question that naturally follows is, what is the region of influence for the photon?

The distortion of the space progression which constitutes the photon in the second scalar dimension exists at the location of the photon in extension space. Since the second scalar dimension motion of the photon is not represented in extension space, only the spatial distortion is evident. The nature of this distortion is of course space. It follows that an n unit distortion is of greater magnitude than a one unit distortion. The space in the distortion must exist in units as do all physical phenomena. Therefore the distortion of the uniform natural space progression, which is the photon displacement, manifests itself in extension space as n units of space, this distortion is a distortion of the space progression, not space. Only because of the linking with the fixed reference system, does the distortion manifest as simple space.

Before actually measuring a photon, some other parameters of the photon's region of influence need to be brought out. The displacement in the natural progression which is the photon is linear and will manifest as the units of space aligned linearly to a length of n units. The only spatial attribute of the photon motion manifest in extension space is the length, its displacement, just as the period of the displacement is the only temporal attribute represented in time within the extension scalar dimension. The motion is not generally represented in the extension scalar dimension, neither the direction nor the magnitude, only the units of progression involved in the process transmit between scalar dimensions. If only the units of the progression reflect between scalar dimensions, the time units and space units will be independent of each other. Therefore, their direct interrelation, the properties of motion, are lost in the transference. (Under special circumstances the magnitude or direction of the motion will be manifested, as will be discussed in more detail below.)
The unit length of the photon is located in extension space at the location of the photon. The orientation of the length, being not defined in extension space is centered at the photon location in extension space and extends \( \frac{n}{2} \) units radially outward from this central point. The photon, being linear and continuous within itself, will have the other \( \frac{n}{2} \) units extending on the same alignment radially outward in the opposite direction.

**FIGURE 1**

**UNIT SPEED PROPAGATION**

**PHOTON SPHERE OF INFLUENCE AT MATERIAL INTERFACE**

The radial orientation of the unit displacement is the final item pertaining to the region of the influence of the photon. When the photon left its point of formation in a physical phenomenon, it immediately lost its link to the 3-D reference system. Only in contact with matter or other phenomena existing in extension space can the radial orientation of the photon be manifested, and even then only under certain circumstances. Therefore, the radial orientation is completely indefinite yet it does potentially exist. The conclusion is that the photon region of influence is completely distributed about the central point at the location of the photon. This is a spherical region with diameter \( n \) space units, as represented in Figure 1.

All interaction with objects in extension space are through those objects encroaching within the sphere of influence. It is through interaction with material objects that the wavelength of light is measured. The wavelength is the diameter of the sphere, \( n \). The frequency is determined by dividing the speed of light by the wavelength. This is \( \frac{1}{n} \).

The progression of time in both scalar dimensions is the same, because time is undisplaced by the photon under study, and therefore proceeds uniformly outward. (A cosmic photon does displace time, but not space; all principles developed here apply in the inverse sense to the cosmic photons). The period of the photon in extension space is one unit of time less than the period in the second scalar dimension. The period in extension space is the inverse of the frequency \( \frac{1}{(1/n)} = n \). In the second scalar dimension, the period is the units of time within a complete cycle: \( n \) units inward followed by a one unit lapse outward that returns the process to the point of beginning, for a total of \( n+1 \) units. The period in extension space is the time for a photon to completely pass a given point in extension space. That is, the time for the wavelength to pass a given point. Because the speed of propagation is one unit of speed in one unit of time, the units of time in the period are equal to the units of space in the wavelength, \( n \) units.

This demonstrates further the relative independence of processes in each scalar dimension. The motion which "is" the photon, as previously discussed, has no speed in the extension scalar dimension, while the speed of the photon in the second dimension is \( 1/n+1 \). The speed is the source of the period in each dimension, therefore the different speeds, \( 1/n+1 \) as opposed to the 1 unit speed of propagation in extension space, naturally yield different periods. However since there is no distortion of the time progression there is no manifestation of the second scalar dimension period in the extension scalar dimension. The period in the latter is an entirely unrelated property extending solely from the independent propagation of the photon in extension space.
Without this independent unrelated propagation speed, there would be no period in the extension scalar dimension, just the photon spatial distortion.

Further Development

At this point it would be appropriate to launch into a calculation of Planck's constant, however a complete derivation of the constant cannot be made without a detailed study of the ratio of the natural unit of mass to grams. The gram is a unit arbitrarily defined under the assumption that mass is an independent quality bearing no direct relation to time or space. To develop the needed ratio requires a careful derivation of the number of natural mass units, \( t^3/s^3 \), in one atomic weight unit, plus derivation of the equation: \( E=MC^2 \). The latter derivation is accomplished in a straightforward manner, however the former is a major undertaking beyond the scope of the present work. It requires a careful analysis of the atomic structure. In fact, a clearer understanding of \( E=MC^2 \) can be attained through atomic theory.

If the assumption is made that one atomic weight unit equals one mass unit, then a one unit electric displacement in the atomic structure of Larson's development is somehow equal to a half unit inward displacement. This entire area of atomic structure must be reevaluated before a complete derivation of Planck's constant can be provided without discontinuities. Filling discontinuities with assumptions will never yield a theory acceptable to the scientific community as a whole.

It must suffice at this stage of the development that the natural equivalent of Planck's constant is unity with adjustment for transference across the unit space boundary, within which the photon motion exists, to extension space where energy manifests itself for our purposes. This is evident from the following derivation:

Energy is equal to inverse speed or more precisely net inward speed in relation to the natural reference frame. This photon is essentially inverse speed: \( 1/n+1 \). This is \( n+1 \) units of time in one unit of space since speed less than unity does not exist. The inverse speed is the same as a speed or outward displacement, \( n+1/1 \), with time and space inverted. Both are simply displacements from the natural datum, \( 1/1 \), but one is a time displacement (speed \( n/1 \)) and one is a displacement in space \( (1/n) \).

Since the natural datum is \( 1/1 \), the speed or inverse speed in relation to this datum is one unit less than the speed in the fixed reference. Therefore an inverse speed of \( 1/n+1 \) has a net displacement of \( n \) units, just as a speed of \( 2/1 \) is a net effective speed of \( 1 \) with relation to the natural datum. Only \( n \) of the units of inverse speed \( 1/n+1 \) of the photon are effective displacements, therefore only \( n \) units of energy are included in the photon.

The frequency of the photon is \( 1/n \), therefore in terms of pure numbers, the energy of the photon happens to equal the inverse of the frequency, \( 1/(1/n) = n \). This is not a physical relation between frequency and energy, as if a frequency contains energy. It is simply a correlation between quantities of two related aspects of the same phenomena. Their equality of quantity is the result of the linking of the photon motion with the extension scalar dimension.

The units of frequency are cycles per time unit, \( 1/t \), and units of energy are time unit per space unit, \( t/s \). Yet a formula can be structured representing the equality of quantity between these two entities. The energy of the photon is equal to the inverse of the frequency, subject to modification from crossing the unit space boundary. The interregional ratio used, \( 1/154.44 \), is comprehensively derived by Larson in Nothing But Motion.

\[ E = 1/154.44 \times 1/\text{frequency} \]
Since a photon exists entirely within one unit of space, the energy manifested in extension space is modified by the interregional ratio. The photon theory developed above clearly establishes that the photon occupies one unit of space in the second scalar dimension, where it actually exists. It has a specific location there within one unit of space which moves inward at unit speed for \( n \) units of time and outward for one unit of time in a continuous cycle. As such the theory fully reconciles the difficulty that the photon seems to have properties such as wavelength that extend greatly beyond one unit of space. This is simply due to the linkage with the fixed reference system in extension space, merely a distorted reflection of the true photon phenomenon.

A photon of course can not be viewed, because directing light at a photon would accomplish nothing, even if the speed of the photon could be overcome in this task. Another photon would not reflect from another photon. All of the supposed properties of a photon have been induced from the photons' interaction with matter.

An example is the phenomenon of diffraction. When light passes through a slit about the size of the wavelength, the light is affected by the slit. The wavelength is equal to \( n \) where \( n \) is the number of space displacements constituting propagation but also radially outward in all direction. The concept that the region of influence of the photon is fully distributed around the central location on the line of propagation corresponds very well with the diffraction phenomena. A slit one wavelength in width just begins encroaching on the photon; a larger slit does not. This is as opposed to conventional theory which puts the wavelength along the line of travel with the hypothetical amplitude extended laterally. As such the diffraction should take effect based on the amplitude not the wavelength.

Matter is made up of net time, a concentration of time units in the otherwise uniform realm of space-time. To illustrate the consequence of this, it is easier to look at the inverse situation, a medium of net space. A location moving outward at unit speed upon entering a region of net space will slow down, relative to 3-D space, because the time progression continues at the usual rate but there are more space units to traverse. The space progression of the location also continues as before at one unit of space per one unit of time. But there are more units of space in a given volume of net space than in a vacuum. Therefore at the progression of one unit of space in one unit of time, the space in the net space region takes more units of time to traverse than a vacuum.

Now consider the inverse condition, a region of net time. The location will traverse the net time region in more units of the space progression, the inverse of clock time, than traversing the same distance in normal space-time. However, in this case also, clock time progresses uniformly at one unit of time in one unit of the space progression. Therefore the units of clock time to traverse the medium of net time is more than through normal space-time. The clock units are equal to the greater units of space in the space progression.

This is the base explanation of the reduction of the speed of the photon in matter. Now when the speed in the fixed reference system falls below unity, it provides an opening for the motion in the second scalar dimension to manifest itself in 3-D space. The motion in the second scalar dimension is inverse speed or motion in time. Therefore an additional outward motion of time becomes effective. This increases the number of units of time traversed in one unit of the space progression in the extension scalar dimension, or 3-D space. Again, the clock time in the extension scalar dimension is still one unit of time per one unit of space in the space progression and therefore the clock time is also reduced for traversing the net time region.
The net time in the medium is fixed, and if it were not for the varying inverse speeds of photons of different wavelengths, the speed in a medium for all photons would be the same. Actually the speed varies in relation to the inverse speed of the photon. The greater the inverse speed the greater the speed in the medium. The net inverse speed is equal to \( n \) units of time per unit of space. The wavelength is also equal to \( n \) and so the speed in the medium is greater for larger wavelengths. This corresponds to measurements of light speeds.

A more complex phenomenon of light is its refraction at the interface of two mediums or a medium and a vacuum. This is a result of the change in speed from one medium to the other as the photon crosses the interface at an angle to the surface less than perpendicular. The speed of the photon in a medium is, as previously discussed, retarded in relation to extension space. It follows that since the photon has distributed motion in a second scalar dimension centered on the line of travel, it begins to retard on the side of the photon which contacts the interface first.

Naturally the greater the angle from the perpendicular, the longer does this differential effect act on the photon motion. This bends the photon line of travel as a function of the angle of approach. The side of the photon furthest from the surface continues at the original speed longer while the other side of the photon changes speed in extension space. Thus the photon twists around to a different line of travel (Figure 1).

As discussed above, the greater the wavelength, the greater the neutralization of the speed reduction in a physical medium. Therefore photons of larger wavelength have less differential in speed between the side in one medium to the side in the other and so less refraction at a given angle of approach than a photon of smaller wavelength.

A more complex phenomenon of interaction between light and matter is what has been called interference. This is the result of diffraction at two slits location parallel and a short distance from each other. In diffraction the slit is about the size of the wavelength. Therefore any photon passing through the center of the slit will pass through without hindrance. If offset from the center the edge of the slit will impede the forward translation of the distributed motion in the second scalar dimension. The remainder of the photon will continue at unit speed causing the photon to twist similar to refraction.

The motion in the second scalar dimension exists in discrete units. When the outer most unit is impeded, a certain angle of twist occurs. If the photon is offset from slit center one more unit, an additional angle is added to the total twist, and so forth for each additional unit. As a result the photons leaving the slit are redirected on radial lines at different angles. Both slits have the same action.

This combination of the radial lines of photons and the spaces between the lines create points of intersection of radially projected lines from the two slits with relatively empty spaces between. When a screen is placed within a certain range of the slits, light bands will appear at each radial line with dark bands between them. These will be much more pronounced if the screen is placed at such a distance from the slits, that its plane passes through intersections of two radial lines, one from each slit.

The conventional explanation for this light pattern on the screen is based on a major leap of inference. Longitudinal waves, such as water waves which are visible, create a similar pattern after passing through two slits. The diffraction in this case is due to a discontinuity in a longitudinal wave which allows the end of the wave after passing the slit to move laterally. The hump of the wave when cut off vertically at the end will redistribute laterally such that the top of the wave at the end will taper off on a slope. This slope
supports the remainder of the wave. The slope extends a substantial distance inward towards the center of the wave segment created by the slit.

This lateral movement of wave energy causes the ends of the wave segment to move out radially. This causes further loss of lateral support to the central wave and more lateral motion occurs with more radial effect. At the slit size of one wavelength, the effect is a nearly complete radial wave.

These radial waves form a new pattern with waves from one slit crossing waves from the other slit. This sets up the true interference pattern with peaks of double amplitude, and points of net zero wave where crest meets trough.

A photon in conventional theory is not a longitudinal wave. The radial arcing of the photon as in the case of the water wave is clearly not possible. The action of the slit would be to clip off the top of the postulated wave amplitude peak in conventional theory. However this would only happen to photons within one half amplitude of the slit edge. The phenomenon occurs when the slit is about one wavelength in size. The appearance of multiple bands of intensity with multiple dark bands is not explained by this.

There would be perhaps a somewhat diffused band on the outer ends of the pattern with one very bright band in front of each strip. There would be little in the way of concentration of photons. In fact the concept that photons can occupy the same location and cancel each others energy is pure assumption. There is no real evidence that this effect ever occurs.

Photons Theory Comparisons
Dewey Larson is far and away the greatest scientist of all time. His contributions the understanding of physical science are more fundamental and of far greater scope than those of any previous scientist including such all time greats as Einstein and Newton. He discovered a complete new system of theory that encompasses and unifies all phenomena in the physical universe. Even more important and exhibiting a work of incredible proportions, was his development and extension of the theory in published form to almost every area of physical science. No one before or after Larson can hope to match these amazing achievements. If civilized man has a history extending decades or centuries into the future, Dewey B. Larson will surely be recorded as having made the greatest contribution to physical science.

Yet even Dewey Larson is not superhuman, and he would be the first to admit his theory is not nearly complete in its development. After all, the universe is tremendously vast in every sense of the word. A theory covering every aspect accurately in every detail is obviously beyond the ability of one man. The inconsistency in the photon theory is simply a gap in the theory, of which there are doubtless many others. It remains for the rest of us to attempt to fill the gaps in the theory structure and continue to extend the theory into uncharted areas; those areas not outlined in Larson's works.

Larson's theory of the photon was, as always, very close to the mark. His photon, as the one in this work, was an oscillation, a linear inward displacement or reversal of the magnitude of the outward natural progression, within a unit of space existing at a location in extension space, and propagated outward with the natural progression. The only inconsistency between the two theories extends from the idea that the photon is a sine wave, as is so widely accepted within conventional physics. The tendency to conform to this longstanding concept may have been the reason the sine wave concept crept into his theory. Clearly this present work is simply a minor clarification of a relatively small part of the vast study undertaken and presented to us by Dewey Larson.

* * *

"We always have time enough if we will but use it aright." - W. Goethe
David Halprin

As a result of my rereading of various sections of the text on the Reciprocal System of Theory, with a view to making an attempt to find a simple approach to teach the theory to newly interested 'students', I came across, what appears to me to be, thirteen assumptions:

1) How can the rotation be said to require precisely an integral number of time units, to match each complete revolution, since we must have recourse to the most famous non-integer of all, π?

2) How can we justify from the premises, alone, the rotation of the space unit in time? (see pp. 5, 6 & 7)

3) Rotation is equivalent to a linear displacement. (see pp. 3, 7 & 8)

4) The alternation of temporal and spatial motions give stability to the atom, is not only derivable from the basic premises, but such alternation being at all possible is doubtfully found from the same premises. (see pg. 7)

5) That there is only a one-stage process of antagonism to recession, and that it involves only one type of motion. (see pp. 4, 6, 7 & 8)

6) All electromagnetic waves are of the same type, in that the equation to describe them can be generalized for all of them. (see separate paper, 'S. V. M.')</n
7) That a rotational base is NECESSARY for the description of atoms and sub-atoms. (see pp. 3, 5 & 6)

8) That the triplet 1-1-1 is an unidentified unstable particle when it may be a viable alternative form to describe the hydrogen atom. (see pg. 7)

9) That there can be two alternative forms of the triplets to describe some atoms. (see pg. 7)

10) That two space units can take up a concentric geometry, each containing the vibration within its temporal environment, and these two vibrations are orthogonal to each other, in a manner that is analogous to spatial orthogonality. (see pg. 5)

11) Electromagnetic waves can be generated in ALL directions from the same source. (see pg. 3)

12) The triplets represent rotations. (see pg. 5)

13) Simple Harmonic Motion is a description of the vibration within space units, and within time units. (see separate paper, 'S. V. M.')</n
Over four decades ago, D. B. Larson found dissatisfaction with Relativity Theories, and so looked for and found some implicit assumptions therein, namely that time and space were assumed continuous. On that finding alone, he decided to attempt to work out the consequences of them being discrete, and so The Reciprocal System of Theory was born.

This writer, although completely convinced of the absolute merit of these discrete properties, fears that if, indeed, there are any assumptions from without the basic premises, then any newly-interested parties will have cause for doubts, since ABSOLUTE RIGOR will have been forfeited, by the presence of these assumptions.

So, using the example, set by D. B. Larson, by taking the same approach, but at the same time, eliminating any of the possibly spurious assumptions, the following paper ensues:-

Looking back at the previous paradigms, which have been used to explain and predict the phenomena of the physical universe, giving special mention to Ptolemy, Newton and Einstein, we see that they were progressively capable of explaining observations and experiments, and had some predictive capabilities too. However, with the increasing accuracy of observational apparatuses, certain discrepancies crept in, that were inexplicable, until the proponents of the succeeding paradigms were able to point out the invalid assumptions to date, and how the latest model was not so derelict or deficient.

Nevertheless, the new paradigm is always based on premises, which cannot be devoid of assumptions, by its very nature, and in times to come, those very excellent assumptions are frequently found wanting. Sometimes, the assumptions are frequently found wanting. Sometimes, the assumptions are so deeply implicit, that they are not immediately obvious, and one has to search for them.

Such was the case with D. B. Larson, when he found Relativity Theories wanting, and he eventually recognized that both time and
space were not infinitely divisible, but were
discrete, in like manner to matter and energy.
One of his early findings was the series of
number triplets, which were a means of
identifying the atomic elements, but at the time,
he did not have an explanation for the
conceptualization of their relation with reality.
Eventually he attributed them to rotations, both
spatial and temporal.

This paper questions that conclusion, as
to whether it is deducible from the basic
premises, or whether is is an assumption in its
own right, and must, of necessity, be added to
the basic premises.

Let us now look, in depth, at some of the
possibilities for many possible entities/existents,
deducible SOLELY from the basic premises, and
then eliminate those ones found to be
improbable, if and only if they clash with the
aforesaid premises, but NOT if they are merely
unmentioned in the texts or subsequent papers,
dealing with the Reciprocal System of Theory, to
date.

The approach by D. B. Larson has always
been, 'what can be, will be', and as a result, he
predicted Quasars and Pulsars in his first
publication, in 1959, so in similar vein of 'CHE
SARA SARA', we may proceed:-

**DERIVATION WITHOUT USE OF ASSUMPTION No. 3**

Because this writer has always found it
difficult, if not impossible, to 'picture' that a
rotation of a space unit, while representing a
continuous change of direction, was also
capable of representing a linear displacement,
(in effect), the following hypothesis has come to
light, which, in no way, conflicts with the
overall Reciprocal System of Theory, but only
some of the ILLUSTRATIVE procedures and
CONCEPTUALIZATIONS, while seeming to
retain all the LOGIC and MATHEMATICS of D.
B. L.

**DERIVATION WITHOUT USE OF ASSUMPTION No. 7**

In this primal physical universe, at the
FIRST STAGE of the theoretical construction, it
appears, superficially, to be no more than an
expanding void, devoid of any possibility of
content, without some assumption(s). However,
a little deductive perseverance reveals the
possibility that a change of direction of the
outgoing units of space, (or time), will not
conflict with the premises, so the SECOND
STAGE of theoretical construction is reached.
We consider that a periodic reversal of direction
of a space unit is permissible, and the simplest
element is the return to its previous location,
which means that an extra time unit is
associated with this vibration at half unit speed,
where unit speed is the terminology for the
speed of the outward recession of space units.

We also conclude that anything which
takes place within one space unit cannot be
spatial, therefore must be considered to be
within a temporal environment. We do not
identify this in the texts, nor its reciprocal
counterpart within one time unit.

**THIRD STAGE & DERIVATION WITHOUT USE OF ASSUMPTION No. 11**

We consider next, that two space units in
the line of the outward recession, may
simultaneously reverse their direction
periodically, and thereby we have an
ASSOCIATION of two contiguous space units,
each with two time units, and the overall result
is a vibration of length 2 space units, whose
speed is half unit speed, but in this case we have
a spatial entity. In this case and in the one
above, the vibration can no longer recess in the
same line of outward direction of the recession,
that the vibration moves backwards and
forwards along, but there are still two
dimensions open to such recession, so the
vibrating 'unit' may recess in any direction
along a PLANE, which is orthogonal to the
vibration, and hence not in ALL directions in 3-
D space, but in all PLANAR directions.

In the first, unidentified, case we can only
assume some form of latent energy, but in the
second case we have coplanar electromagnetic
waves.

Now let us consider the former case,
which can be subject to a direction reversal, and
becomes a doubly-vibrating unit, each vibration,
can be at half unit speed, and still be temporal,
and this new unit still has one dimension left,
along which to recess at unit speed, so it does.
This is not discussed not identified in the texts.
Perhaps it can be called latent mass. An
extension to this derivation, would be to add
more time units to the aggregate, resulting in a
slower vibration and therefore a variety, (series),
of doubly-vibrating aggregates.

Next, reconsider the latter example of the
contiguous, (tandem), pair, vibrating together in
space. As is, this entity may recess along any
line in the plane, orthogonal to this vibration,
and manifest itself to us as an electro-magnetic
wave, but, if further, this is subject to a periodic
direction reversal along that line in a second
scalar dimension, then this doubly vibrating
unit is no longer a wave, and has to be identified. Since it is a very probable consequence, no less probable than rotations, it may well be some form of cosmic particle or neutrino, and as such travels at unit speed in the remaining scalar direction, orthogonal to the plane of the double vibration, and it probably does not have mass. It is also most probable that this vibration in the second scalar dimension is within one space unit, meaning in a temporal environment, since the probability that the contiguous pair of space units, comprising the basis for the first vibration will associate with contiguous space units in the second scalar dimension is slight, if not near improbable. So, at this stage we consider the original vibration to be two space units long and the second vibration to be only one space unit.

**FOURTH STAGE & DERIVATION WITHOUT USE OF ASSUMPTION No. 5**

Finally we can consider that such a doubly vibrating aggregate of time and space units, may also be able to vibrate in the remaining scalar dimension, thus putting a halt to its outward recession at unit speed, and thereby creating a mass, which may not be gravitating. (These VIBRATIONS are the first part of the derivation of the 2 antagonists to the natural recession). This vibration in the third scalar dimension will most probably be only one space unit long, for the same reason as above. This object can then be considered as a candidate for various types of rotation, (about a choice of 3 axes, perhaps), whether regular or oscillatory in its nature, and this rotation probably gives its property of gravitation. (This ROTATION is the second part of the derivation of the 2 antagonists to the natural recession).

If one then looks into the mathematics of these entities, and what they represent, one is confronted with the serious consideration, as to whether they can be described with triplets and represent the atoms of elements in a comparable way as in the texts of D. B. L., and further if they may describe the Reciprocal System of Theory more understandably, with, perhaps, some advantage, (yet to be determined), but with no disadvantage.

Let us examine a small check-off list of comparisons:

**DERIVATION WITHOUT USE OF ASSUMPTION No. 10**

1a) Matter consists of double units, which rotate about the same centre and have the same spins, (not to be incompatible, geometrically), and the need for double units is to have a more stable geometry, than a single unit would provide for a given element. How these two units can superimpose themselves, the one on the other, is not easily explained, although the 'fait accompli' has proven to be a useful tool in standard texts of the Reciprocal System of Theory.

This is not the basic premises, but more of a convenient assumption to justify alleged greater stability, than from a single unit with more alleged rotations. The circumstances, under which they may adopt such a union are not spelled out.

1b) This new look at matter also finds it to have a double unit, because a single unit exists within a unit of space and is therefore wholly temporal, with no known spatial manifestation. While the double unit is immediately recognized theoretically to be the basic minimum requirement for the spatial entity. This double unit is easily imagined to form in the event of the probability, that two contiguous space units while recessing, the one behind the other, simultaneously reverse direction and thereby begin a periodic reversal, in tandem.

**DERIVATION WITHOUT USE OF ASSUMPTION No. 12**

2a) In the texts, the rotational base has an unidentified frequency of vibration, and there is no obviously preferred frequency, so it is left open to conjecture.

2b) In this case we eliminate an unknown frequency, and replace the meaning of the triplets, to identify three frequencies, instead of three rotational speed displacements. There may be an opening here for a different mathematical approach, but the results will be the same, no doubt.

Perhaps the numbers for the vibration triplets could have the extra unit added to each, so that 2 means vibration speed is half unit speed, 3 means a third of unit speed, hence p-q-r represents individual vibrations of 1/p, 1/q & 1/r of unit speed and the resultant vibration would be the SQUARE ROOT OF THE SUM OF THE SQUARES.

**DERIVATION WITHOUT USE OF ASSUMPTIONS Nos. 2 & 7**

3a) Let us be analytical about this alleged rotation of the space unit. We certainly say that while the vibration within the space unit is
acceptably temporal, and we wish to rotate it spatially, such that the overall resultant will be the association of at least one more time unit, then we can use the basic premises, to say that there are now several time units associated with the space unit, and therefore the four dimensional manifestation, were it actually observable to us, would be a reduction in its outward speed from unity to $1/n$. Of unit speed, for $(n-1)$ extra time units, so appended. Similar arguments would apply for subsequent spatial rotations about either or both of the remaining scalar axes, to give a grand resultant of an entity, decidedly spatial, not recessing in any direction at unit speed, and the conclusion would be matter. However some assumptions are worth noting: (See thirteen alleged assumptions listed on first page).

3b) Following on from the above, changing its direction back along its linear path merely returns it whence it came, but still retains its speed magnitude, in this case unit speed. However, this in the six-dimensional context, and such a return back one unit takes another time unit to traverse, yet it never leaves its unit of space, hence the spatial manifestation in our four-dimensional universe is a vibration at half unit speed, since the ratio of space units to time units is $1:2$.

**DERIVATION WITHOUT USE OF ASSUMPTION No. 5**

4) Rotation must occur at sometime however, and when better than when it is already matter and has mass, without any recession at unit speed, where the three vibrations in the orthogonal scalar dimensions are each cancelling out the ‘force’ of the recession at unit speed, and create a local effect, which is constantly an antagonist to the outward force? No doubt the magnetic and electric charge require explanation, in this new context.

One aspect of the rotation is that it makes the whole act as a gyroscope and hence all atoms of a particular element will have the same inclination to one another, as well as the presence of the gyroscopic force concomitant with that rotation, without which the atoms would not have the same properties that we know them to have.

It seems that we always have had the choice with the triplets, whether to have the third rotation in space or time, both forms being said to be equivalent, mostly, but if the vibration concept is given serious consideration, it will become necessary for vibration in time for atoms always to be for the second and third vibrations exclusively, since the double unit is always spatial with the first vibration and therefore cannot vibrate in time, however, the vibrations in time of the sub-atoms are not precluded.

The one spatial vibration manifests itself directly in space in one scalar dimension, while the two temporal vibrations would have to combine their vibrations in two-dimensional planar time. One can calculate the resultant vibrations in 2-D time and conjecture that this magnitude is altered by the inter-regional ratio, and then it manifests itself in combination with the spatial vibration of the contiguous pair of space units.

The nth atom would manifest itself to the 4-D observer as a PLANAR VIBRATION, contained within an ELLIPSE, whose major axis is 2 space units and whose minor axis is one space unit, and whose eccentricity is $\sin(\pi/3)$. This would describe ALL atoms, before rotation. This rotation would most probably be about the major axis.

The rotational base in the texts may have been SUFFICIENT to achieve results, but PERHAPS it was not NECESSARY, since it is the less probable of the two alternatives, the latter being the vibration within an ellipse, which appears without any apparent assumptions.

Summarily, we have the rotation of a planar existential, which differs markedly from the rotational base of the texts, and this new approach to the basic premises may ‘open the door’ to the new findings. Let us have open minds and examine this new prospect. N. B. The rotation of a space unit ‘occurs’ at the boundary, within which is a temporal environment, and without which is a spatial environment, ERGO THE ROTATION IS NEITHER SPATIAL NOR TEMPORAL.

**DERIVATION WITHOUT USE OF ASSUMPTIONS Nos. 4 & 9**

Also by removing these optional primary temporal vibrations, we are also removing, what was an UNEASY alternative form, which, on the one hand, was an equivalent alternative, when we calculated Atomic Number, but, on the other hand, did not give the same momentum magnitude, when one calculated the resultant axis of spin etc. etc. These two alternate forms, therefore, did not correspond with observations.

In 'Basic Properties of Matter' Page 61, dealing with Specific Heat, the term $T$ is added in equation (5-8), to take into account the specific heat contribution of the basic vibration. However, since the whole problem of specific heat was not solved, (ideally), perhaps it is
because the actual value of ‘I’ was not accurate, due to the greater vibrational contribution, revealed in this paper.

In developing an alternative paradigm, one can make limited use of one’s experience with other paradigms, BUT must always be on the alert for ‘paradigm creep’, which is a manifestation of the traditional paradigm imposing itself insidiously. (c.f. Memes in the ideosphere, and genes in the biosphere).

DERIVATION WITHOUT USE OF ASSUMPTIONS Nos. 1 & 8

I put this as a modification, (without assumption), to the basic theory, and suggest, humbly, that current Reciprocal Theory does have several assumptions regarding the conclusions about rotations. I cannot get it out of my head that the ratio of a circumference to a diameter, is always a non-integer in any system, hence we cannot expect a rotation of a discrete unit to produce the equivalent of a discrete linear unit, another integer.

Another thought to ponder, that comes directly from the above :- the allegedly unidentified particle, mentioned by D. B. L., claimed to be unstable 1-1-1 has an atomic number 1 and is one vibrational format for Hydrogen. Perhaps this can be better represented by 2-2-2, showing immediately that each vibration is at half unit speed.

DERIVATION WITHOUT USE OF ASSUMPTIONS No. 3 & 5

Rotational vibration seems to be capable of adding time units to the aggregate in the same way as the linear vibration does, and the net result either way is to lessen ‘effective speed’ in the 4-D observational universe.

continuous rotation is the quintessential motion for gravitation, the SECOND antagonist to the recession, which complements the vibrations, which lower the recession speed from unit speed to 1/n of unit speed, in the 4-D observational universe.

In neither of the above rotations does there seem to be an equivalent of a linear displacement, only a lowering of ‘effective’ speed of vibration, i.e. observed speed in 4-D.

If we were to pursue the eradication of the apparent assumptions, along the lines attempted in this paper, we could refer to them as AMENDMENTS, and such papers, that ensue, that vary from parts of the texts, could ‘plead the fifth amendment’ etc.

ANALOGIES FOR UNDERSTANDING OUR 4-D VIEWPOINT

In Flatland by Abbot, the creatures live in a 2-D Euclidean plane, and cannot have a realistic picture of 3-D objects, except by their extrapolation of what they observe, into a higher dimension. So a circle, to them, is a real entity, which can be measured for its circumference, radius and curvature. They may believe it to be the projection into their universe of a sphere or a cylinder, whose mathematics they could evaluate, but whose image they could not entertain. Similarly, they could look at a parabola, hyperbola and ellipse without realizing that they could all be projections into their universe of a cone, since such a mathematical induction may not be self-evident to them.

If one of their philosophers were to raise the question, as to the reality of these objects, whether they were, in fact, merely existing in their minds, the answers would be various, depending on the deep philosophical bents and subjective idealism of the solipsists. In one sense, those objects do exist, as such, since they can all observe them and agree on what they see. But the question arises, would those objects still exist if they, the Flat-landers were all to die? Some might answer yes, while the others would say that once their unique type of observer ceases to exist, then the objects, being part of a higher dimensional universe, would only be, what they had always been, and that the 2-D viewpoint was only part of the whole, and therefore that part was not an object in its own right, so they never really existed, save in the minds of the Flat-landers.

The Flat-landers cannot conceive a 3-D observer in an observation sense, not such observer’s life form in an existential sense.

By analogy, our four-dimensional vectorial universe is only that part of the whole six-dimensional scalar universe, that we are capable of observing. We, too cannot conceive what the physical universe would ‘look’ like, nor what existents would have any meaning to such an observer, nor can we conceive such an observer’s life form in an existential sense, without going into some theosophical ad hoc speculations, which have no basis in science.

* * *

“Dost thou love life? Then do not squander time, for that is the stuff life is made of.”

-Benjamin Franklin

C 19.2-17
Time Exploration

Daeron P.N. Meyer and Frank H. Meyer

The existence of the cosmic sector and motion in time challenges all advocates of the Reciprocal System to explore and discover the geometry of time and temporal entities, analogous to the well-known geometry of Euclid concerning the structure of space and spatial entities of the material sector. This is a difficult but not impossible challenge.

Before briefly reviewing what is known about the geometry of space and spatial entities, let’s understand why a geometry of time and temporal entities now must be explored and discovered in analogy with spatial geometry.

Is there anything in addition to the material sector inside the universe of motion?

Dewey B. Larson’s answer to this question is yes, the cosmic sector; that is, motion in time at finite inverse speeds in excess of unit speed (the speed of light.)

Motion in time at finite inverse speeds in excess of unit speed is distinguishable from motion characteristic of the material sector, that is, motion in space at finite speeds less than unit speed.

Physicists have misnamed the cosmic sector ‘anti-matter’ from their mistaken supposition that ‘anti-matter’ is the additive inverse of matter, that is, the matter of the material sector of the universe of motion.

Instead, the material sector and the unfamiliar cosmic sector exist in a reciprocal relation. That is, these two main sectors of the known physical universe exist as the multiplicative inverse of each other.

Mr. Larson has named the sector multiplicatively inverse to the material sector the ‘cosmic sector’, because the existence of cosmic radiation presently constitutes the best available evidence for the existence of this sector and of motion in time.

Each individual sector is and both sectors together are a further manifestation of the reciprocal character of the universal space and time relation that constitutes all motion.

Inner Space and External Space of Material Individuals

The material sector is populated by numerous finite physical individuals. They include the Sun, Other Stars, the Moon, the Earth, the Earth’s Atmosphere, the Earth’s Oceans, the Furniture of our Homes, the Buildings and Thoroughfares of our Cities, Towns, Villages, Other Marketplaces, etc. These individual physical systems are distinguished from one another by their spatial separation. Each material system counts as an individual of the material sector by way of its spatial separateness.

Physical individuals of the material sector manifest various appropriate motions in space at finite speeds less than unit speed. Each material individual occupies some finite inner space and is surrounded by an external finite space, because every physical individual is finite, including finite as motion.

Physical individuals of all kinds display two basic kinds of motion. These two kinds of motion are translation and rotation, including translational oscillation (photons) and rotational oscillation (electronic charge, magnetic charge, atoms.) Consequently, translational spatial structures, such as the unit cube, and rotational spatial structures, such as the unit sphere, have been well studied by mathematicians and natural philosophers for centuries.

Physical systems of the material sector come in 3-dimensional, 2-dimensional, 1-dimensional and 0-dimensional spatial forms. Some of the forms associated with translation and comparable forms associated with rotation are illustrated in Figures 1 and 2.
A 3-dimensional individual, such as a unit cube, includes an inner space, called its volume, equal to \( 1 \times 1 \times 1 = 1 \) cubic unit. The unit cube includes also a 2-dimensional external boundary region, called its surface area, composed of six facial planes, equal to \( 6(1 \times 1) = 6 \) square units of area.

![Figure 1](image)

A 2-dimensional individual, such as a square window, includes an inner space, called its area, equal to \( 1 \times 1 = 1 \) square unit. The square window includes also a 1-dimensional external space boundary, called its perimeter, equal to \( 4 \times 1 = 4 \) units of length.

A 1-dimensional individual, such as a hair on your head, includes an inner space between its two ends, equal to a unit of length. The hair includes also an external space boundary, consisting of one unit at each end.

A 0-dimensional individual, such as a geometrical point, includes an inner space of one unit equal to 1 scalar unit. A point, however, has no external space, since a spatial dimension less than 0 does not exist a point.

Similarly, a 3-dimensional unit sphere includes an inner space, called its volume, equal to \( 4/3 \pi(1 \times 1 \times 1) = 4/3 \pi \) cubic units. A 3-dimensional unit sphere includes also a 2-dimensional external spatial boundary, called its surface area equal to \( 4\pi(1 \times 1) = 4\pi \) square units.

A 2-dimensional rotational individual, such as a circle, includes an inner space, called its area equal to \( \pi(1 \times 1) = \pi \) square units. A 2-dimensional circle includes also an external spatial boundary, called its perimeter or boundary, equal to \( 2\pi(1) = 2\pi \) length units.

A 1-dimensional individual to be rotated includes an inner space equal to two length units. It can be rotated about any axis located perpendicular to its length. To rotate in a circle, the axis must be intersecting then the centerpoint of the length, dividing the diameter into two radii.

**Internal Time and External Time of Cosmic Sector Individuals**

The cosmic sector is populated by Cosmic Stars, Cosmic Planets, Cosmic Moons, etc. These temporal entities are distinguished from one another by their temporal separation from the others. They count as individuals of the cosmic sector by the way of their temporal separateness. Each occupies a finite inner time and a finite external temporal boundary with a dimension other than the inner time dimension.

The challenge is to compute the geometry of the inner time and external time of cosmic sector individuals analogous to the geometry of the inner space and external space of material sector individuals.
Questioning the Law of Conservation of Direction

- Tom Kirk

In The Law of Conservation of Direction article by Dr. K.V.K. Nehru in the Autumn issue of Reciprocity, an experiment was described concerning rotation of a disk due to its irradiation by light under certain conditions. The light must be polarized and the disk must be suspended such that the light travels in the direction of gravity and strikes the disk normally. Of course, the disk should be black to absorb as much light energy as possible.

I touched on polarization briefly in my article, The Photon: Displacement in a Second Scalar Dimension, but did not pursue the topic, because for anything definite to be developed, a thorough examination of atomic structure is needed. The interaction of light and matter in the subject experiment is on two levels: 1.) the nature of the polarization after passing through matter, and 2.) the nature of the integration of the photon with the atoms in the disk.

This experiment is quite fascinating and may shed some considerable light on both the structure of light and atoms. Some preliminary extensions of deductive development are definitely worthwhile, at least to lay a conceptual structure and probe the depths of where this development might lead.

First, polarization of the light is surely filtration of photons such that only photons with limited tendency to interfere with the filter medium pass through. The Photon: Displacement in a Second Scalar Dimension presents a photon which has the unit displacement of the photon centered on and extending radially from the location of the photon in 3-D space. The radial orientation is distributed in all directions unless the photon makes contact with matter, because it is in a second scalar dimension. Once interference with matter occurs, the potential direction of the photon comes into play.

Based on this photon model, it follows that the radial orientations not closely aligned with the direction of propagation, would be filtered out. Due to their high profile, the photons with radial orientation outward from the line of propagation are impeded in their forward propagation by the filtration material. The result is polarized light made up of photons with directional alignment along the direction of propagation. The motion which is the photon itself could be forward or backward along the line of propagation.

The atoms of matter in the disk all have inward rotational motion. The scalar motion of the atoms is inward and, being 3 dimensionally based, is manifested in a single direction, the direction of gravity. Since the linking of this inward scalar motion to the 3-D reference system is in one direction at a particular location, it follows that the rotational motion in 3-D space is oriented in a uniform way to this direction also. That is, if the direction of gravity is taken as reference or axis, the rotational motion would always have the same direction in reference to the axis. Otherwise, the orientation of rotation would be random and if so it would be difficult to explain how random rotational motion could produce an inward motion in a single distance.

Now if all atoms of the disk are rotating in the same direction in reference to gravity, and each photon has its motion aligned with gravity, and each photon has its translational motions on and equal number of rotational motions is similar to thrusting sticks into the spokes of many spinning wheels attached to a single plate. If all the wheels are spinning in the same direction, the interaction will create a moment at each wheel location. The net result is a moment on the plate equal to the sum of the total of moments at each wheel. It makes no difference from which direction the sticks are thrust into the wheel, as long as the direction is orthogonal to the plane. So also for the photon, the motion in the second scalar dimension could be propagation, but being orthogonal to the rotation, the effect in terms of the moment created is the same.

This above concept of interaction of matter with polarized light explains why the same experiment with light beamed orthogonally to the direction of gravity yields no rotation. If the photons themselves were rotating and causing the rotation of the disk, the rotation should occur when light traveling orthogonal to gravity strikes the disk.

Evidently, the atoms are aligned with gravity in their rotation at all times. This is because the inward motion which is the atoms is the gravity and of course is always aligned with itself.

There are many difficulties with the photon model presented in the Law of Conservation of Direction which need to be addressed for a complete model:
1. How does the simple displacement from the natural progression become a rotational motion, or if a photon is rotational, what phenomenon is the negative of the outward progression?

2. How does a phenomenon which is a compound rotation exist after half of its component rotation is removed as in the postulated polarization? How is this the same phenomenon, a photon?

These are fundamental problems, but the mechanics of wavelength, frequency and energy must also be worked out, the alternate photon concept of displacement in a second scalar dimension begins with the pure negative of the natural progression, and develops readily from there to a full concept. All aspects such as wavelengths, frequency, energy, polarization, refraction, diffraction, interference, and speed reduction in a medium fall into place quite well once the theory is developed far enough. Besides, Larson's original concept that rotation can not exist without an object to rotate is probably very true.

We know that space and time existing together provide a one to one relation of space/time that is the natural progression. The negative of this follows quite naturally. This is the photon, the simplest displacement in the universe, which is the basis of rotational motion in matter and subatomic particles. Aside from charges, the remainder of objects in the physical universe is made up of photons of varying wavelengths. (There are also forms of motion which do not qualify as objects, and the inverse objects in the cosmic sector.)

Obviously it is important to clear this up and not spend a lot of time going in the wrong direction. The rest of the universe will be put on hold for anyone without a good grasp of the valid photon concept. The principles revealed by the photon phenomena yield great insight to all other phenomena. However, the direction of development is always outward and inward; inward to confirm, verify and expand the original concept, and outward to develop concepts of more complex compound motions extending from the original base, the photons.

**Motion in Time and Absolute Speed**

In the Reciprocal System the time component of the progression of the natural reference system is identified as the "flow of time" registered on a clock.

Motion in time takes place in three dimensions, in the same manner as motion in space. The time component of the progression of the natural system (clock time) is a one-dimensional outward motion through a stationary three dimensional temporal system of reference, in which independent motions at different speeds and in different directions also occur.

Motion at unit speed is a motion in time as well as motion is space.

When motion takes place in time, the constant progression analogous to clock time is in space, and would be measured by some kind of "space clock". But the rates of progression are the same ... Thus, the measurements relative to the "space clock" are identical with those relative to a clock that registers time, if expressed in the same units.

A reduction of speed as, for instance, by an increase in the distance between gravitating objects does not alter the absolute ratio of space to time in the effective motion; it reduces the proportion of the total motion that is effective in increasing the spatial separation of the objects. The effective portion of the motion increases the separation by x units of space per unit of clock time, where x is a fraction and because of the fixed relation between space and time in the individual units as increases the separation in time by x units.

Where only one motion is involved, the x units of time are coincident with the time progression, and do not enter separately into the determination of the speed. But if two objects are both moving their relative position in space may change at a rate exceeding unity by some quantity x. The change in the separation in time then also exceeds unity (clock time) by some quantity x. The speed is \((x+1)/(x+1) = 1\). Thus, if at least one of the two objects is a photon or other object moving with unit speed, the relative speed is always unity.

(This is the explanation of the observed fact that the speed of light is independent of the reference system)