

RECIPROCALITY

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NOTICE
INSIDE THIS ISSUE REPORT ABOUT
FIRST ANNUAL NATIONAL CONFERENCE OF NSA*, INC
AUGUST 20-21, 1976-OWRE HALL ROOM III
UNIVERSITY OF MINNESOTA-MINNEAPOLIS
*NSA, INC (NEW SCIENCE ADVOCATES, INC.) IS
THE PUBLISHER OF RECIPROCALITY.

THE FALLACY OF REIFICATION!!

REALITY OF SPACE-TIME PROGRESSION

Although space, according to Newton, is immovable, this is not necessarily so. Nothing in Newtonian mechanics or relativistic mechanics decides whether in fact space remains at rest or increases at a uniform scalar rate with increasing time. H. Minkowski pointed out in his famous address, UEBER RAUM UND ZEIT, that it is just as possible that space is a progression as that it remains at rest.

The material sector of the physical universe expanding in space and the co-material ("anti-matter") sector expanding in time is explained, according to the Reciprocal System of theory, in the light of the space-time progression.

TIME AN ILLUSION OF INTELLECT?

The purpose of this critique is to examine why humankind frequently regard time and space as more mysterious and less real aspects of the physical universe than matter and energy.

Time and the tides wait for no man. Time progression is no vulgar illusion of the intellect, according to the Reciprocal System.

Meanwhile, according to modern relativistic physics, the progression or passage of time is a myth.

The conclusion that the passage of time is a myth follows from the assumption that the objective world simply is and does not happen. Then the time progression appears only to the gaze of my consciousness. Thus, the time progression would be a purely mental phenomenon and my knowledge of time is separated from its physical counterpart.

It is true that time is no thing, yet together with space it is an essential feature of the physical universe and is not to this degree simply an illusion of intellect. Without time and space the physical universe would be impossible, since no motion exists without the conditions of space and time.

Timelessness and spacelessness can exist but only beyond or outside of the physical universe of motion. The physical universe is not all that exists.

REIFICATION OF TIME AND SPACE

To reify means to represent relations as things, which relations are not. This is the fallacy of reification.

Relations are universal abstractions, which are mistakenly assumed to be less real than concrete entities or particulars. The mistake occurs because of the anthropomorphic illusion that the physical must be and therefore is ultimately a world of things, a universe of matter.

Nevertheless, the unity of the physical universe lies neither in its materiality nor in its spirituality but rather in its MOTION, according to the Reciprocal System. Motion is no thing, though all physical things and nothings emerge from it. MOTION is always a reciprocal RELATION between time and space. More space and less time means FASTER motion; less space and more time means SLOWER motion.

The whole tendency of modern experimental as well as mathematical physics is to eliminate the metaphysical notion of MATTER as an ULTIMATE substance, and to find the element of permanence - without which there would be no science - in the mathematical relations of MOTION.

RELATIVE MOTION AND LENGTH MEASUREMENT

Due to the mistake of Albert Einstein in overlooking that as motion space and time are reciprocally related, he took for granted space and time need not have the SAME number of dimensions. He and other adherents of relativity physics assumed without examination that time is one-dimensional and space is three-dimensional, together forming an immobile 4-dimensional space-time continuum.

In fact, time must and does have three dimensions if space has three dimensions, according to the Reciprocal System. If space and time are indeed inseparably and reciprocally related and motion does exist continuously in discrete units, then space and time must be dimensionally the same as well as symmetrical in all other respects.

The Reciprocal System provides the first quantitative measure of the rate of progression of clock time that can be used scientifically. The question has been asked: How quickly does time pass? The answer is not at a rate of one second per second. The answer of the Reciprocal System is that one unit of time progresses per one unit of space progression, equivalent to one second per 300,000 kilometers, the universe of unit speed, the reciprocal of the speed of light. The natural physical zero is not the mathematical zero but unity or unit speed. All motion below this physical zero must take place in space, while all motion above this level must occur in time.

In the Reciprocal System absolute rest does not exist; rest is relative to the absolute motion, clock time and clock space of the space-time progression.

Absolute motion does not exclude relative motion. A significant point about motion is that we do not observe it as it actually exists; we observe it only in the context of some particular reference system. Components of time and space that must be taken into account in addition to clock time and clock space are coordinate time and coordinate space, whose values are relative to the reference frame selected to examine any particular motion.

In this issue of RECIPROCITY appears another example of the application of the Reciprocal System to measure another important kind of absolute magnitude in physics - the equilibrium interatomic distances of solid materials, when the observer and the materials are in relative motion. This presentation, 'Relative Motion and Length Measurement', by Steve Berline, member, NSA, INC. Board of Trustees, follows:

RELATIVE MOTION AND LENGTH MEASUREMENT

Steve Berline
Belleville, Illinois

(Presented to August, 1976 NSA Conference at UM-Minneapolis)

Introduction

The purpose of this paper is to discuss what anyone must do if one wished to measure correctly the length of an object moving with respect to oneself. It will be shown also that the Lorentz transformation relations can be developed by using the Reciprocal System of physical theory.

Interatomic Distances between Atoms in Solids

D. B. Larson has treated already the question of interatomic distance of atoms at rest with respect to an observer. I recapitulate his treatment briefly as conclusions I, II, and III below:

I. No two atoms can ever be closer than one natural unit in space. Indeed, a solid may be characterized as a three-dimensional periodic aggregate of atoms the minimum distance apart in space.

II. When two atoms are the minimum distance apart, they cease moving in space, but their motions in time continue unabated.

III. As a result, we can detect and measure an equivalent distance in space less than the natural unit of space because of the reciprocal relation of time to space.

As a corollary of the above conclusions, we may note the following:

IV. The "length" of a solid is the number of atoms in its length multiplied by the interatomic distance multiplied by a geometric factor, where this latter value is determined by the rotational forces between the atoms.

Relative Motion and Interatomic Distances

With these reflections we can now tackle the problem of conceiving the procedure an observer must follow to calculate correctly the length of an object translating longitudinally with respect to this observer.

First of all, note that when an object translates relatively to an observer, such object not only moves in coordinate space, but also in coordinate time. Since the interatomic distance in an object is a function of motions in time, and since relative motion results in a certain type of motion in time, relative motion must affect the measurement of interatomic distances. However, the effect of the relative motion is different from that of the motions which produce the interatomic distances in objects at rest. For the motions at work in objects at rest are gravitation and the space-time progression - both scalar motions. Hence the interatomic distance in an object at rest is less than a natural unit in all directions in the solid. (This does not mean the interatomic distance is exactly the same in all directions, because the rotational forces of the atom are not necessarily uniformly distributed). The motion in coordinate time that the relative motion induces is, by its "coordinate" nature, vectorial, and hence affects the at-rest interatomic distances only along the line of motion.

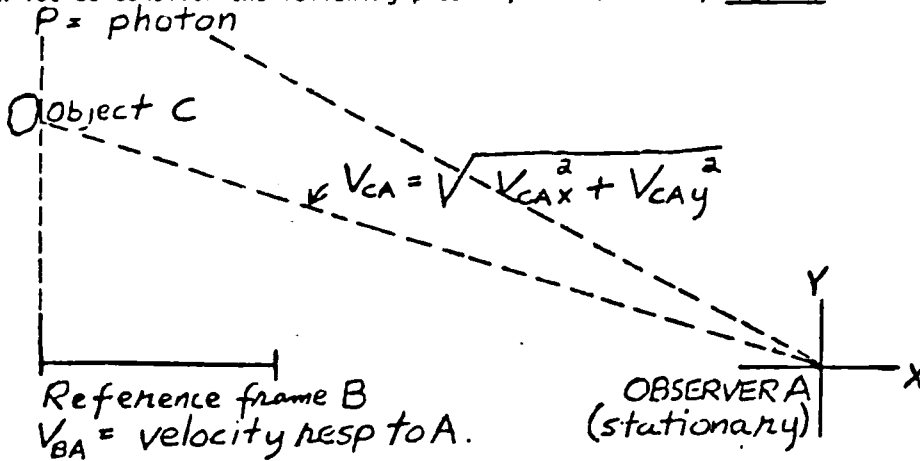
Finally, let us note that an object moving at uniform velocity, whether toward or away from an observer, is opposing gravitation, and hence, in the direction of the motion only, augments the action of the space-time progression. But in the time region, the space-time progression acts to reduce the apparent interatomic distance, and so the relative motion, in the direction of the motion, must act to reduce further this distance. Thus we come to the conclusion:

V. If an observer uses Newtonian relativity to compute the length of an object in motion, then the motion of the object in coordinate time will make it appear as if the object were contracting in the direction of motion.

Now we wish to compute the amount of the discrepancy. To do this, we will need some intermediate results.

In the following computations - V will stand for translational velocity measured as a fraction of the speed of light. Since "C", the speed of light, is unity in this system, we will simply write "V" for "V/C" when this does not lead to any confusion.

Now let us consider the following problem, illustrated by Figure 1 below:



In Fig. 1, observer A is at a stationary frame of reference at the origin of the xy axis. Reference frame B has velocity v_{BA} with respect to A parallel to the negative x axis. v_{CAx} is the velocity of object C with respect to A along the x axis and v_{CAy} its velocity along the negative y axis of frame A.

The goal is to find v_{CB} , the speed of object C relative to frame B for the special case when $v_{CAx} = v_{CB}$. In achieving this aim we assume we know nothing about physics except the basic postulates of the Reciprocal System and what has been affirmed so far in this paper.

Now the length of the reference frame B will not appear the same to observer A as it would to observer B, because of conclusion V; but this is of no consequence in the present case, since the object C has no motion in the x direction with respect to frame u. Thus, this case enables us to compute that portion of the motion in time which does NOT reveal itself as an apparent contraction of the reference frame B.

In any time t_A with respect to A, we have

$$v_{CBx} t_A = (v_{CAx} - v_{BA}) t_A = (v_{BA} - v_{BA}) t_A = 0.$$

since I have assumed that $v_{CAx} = v_{BA}$. But this means that $v_{CAy} t_A = v_{CB} t_A$, and this is how far the object C travels with respect to B in a given time t_A .

To find the time relative to B, I need only find out how far, during this period, a photon would go relative to frame B when it is traveling in the same direction relative to B as the object C. Such a photon has a velocity with respect to frame A of unity, and therefore in time t_A the photon travels a distance $1 t_A$ with respect to frame A. By the Pythagorean theorem the photon travels the time

$$\sqrt{t_A^2 - v_{BA}^2 t_A^2} = t_A \sqrt{1 - v_{BA}^2}$$

with respect to frame B and this is the time applicable to frame B. Dividing the distance the object C has traveled by the time just computed, I get

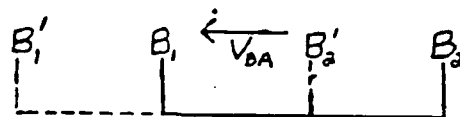
$$v_{CB} = v_{CAy} t_A / t_A \sqrt{1 - v_{BA}^2} = v_{CAy} / \sqrt{1 - v_{BA}^2}$$

Although I have NOT used the Lorentz transformations to obtain the above result, the transformations are compatible nevertheless with this result.

The essential point of the preceding example is that if the time relative to a stationary observer is t_A , the time relative to a moving frame B is $t_A \sqrt{1 - v_{BA}^2}$. INDEPENDENTLY of that portion of the motion in coordinate time which manifests itself as an apparent spatial contraction of frame B in the directions of the motion. In other words,

$$t_B = t_A \sqrt{1 - v_{BA}^2}.$$

Next consider a rod $B_1 B_2$ in motion with respect to observer A, as in Fig. 2 below:



OBSERVER A

If the rod B_1B_2 is moving with respect to A with velocity v_{BA} , what length will observer A measure for the rod?

An observer moving with the rod can measure its length by seeing how long it takes a photon to traverse it and return; in other words, by seeing how long it takes a photon to complete the round trip $B_2B_1B_2$

Observer A would measure a time

$$s_A / (1 - v_{BA}) + s_A / (1 + v_{BA}) = 2s_A / (1 - v_{BA}^2) \quad (1)$$

where s_A is the apparent length of the rod as measured by A. But we also know that, due to motion in time, observer B will measure a different amount of time. By the preceding example, that portion of the motion in time which does NOT reveal itself as a discrepancy in the length of the rod can be found by multiplying equation (1) by $\sqrt{1 - v_{BA}^2}$, thus giving B's time measure as

$$2s_A \sqrt{1 - v_{BA}^2} / (1 - v_{BA}^2) = 2s_A / \sqrt{1 - v_{BA}^2} \quad (2)$$

If the apparent length of the rod with respect to observer B is s_B , then the total distance the photon travels with respect to B is

$$2s_B = B_2B_1 + B_1B_2 = \text{round trip distance} \quad (3)$$

The average velocity of the photon with respect to observer B is thus (3) divided by (2) or

$$1 = s_B \sqrt{1 - v_{BA}^2} / s_A \quad (4)$$

$$\text{or } s_A = s_B \sqrt{1 - v_{BA}^2} \quad (5)$$

Equation (5) leads us to our conclusion VI:

VI. Observer A will measure more empty time between the atoms of an object moving relative to one self than one would if that same object were at rest relative to self. As a result, observer A must divide the length given him by Newtonian relativity by $\sqrt{1 - v^2}$ if A wishes to arrive at the correct length of the object.

CONCLUSION

The whole point of this presentation is that the appearance of the factor $\sqrt{1 - v^2}$ in the Lorentz transformation is NOT inconsistent with the concept of constant absolute length. It merely means that in order to get the measure of that length for a moving object, it is necessary to go through two steps instead of one. It is necessary not only to correct for the motion of the object in Newtonian fashion, but also to correct for its motion in time.

Acknowledgements: I wish to thank Dr. Rainer Huck and Prof. George Windolph for their criticisms of the original draft of this paper.

NOTE: Steve Berlinc, author of above presentation, has developed an improved presentation of this important issue of theoretical physics, which will be published in RECIPROCITY as soon as it is received.

1976 NSA CORPORATION CONFERENCE

The advocates of the Reciprocal System of theory, the first unified GENERAL theory of physics and chemistry, have taken several important steps this year toward uniting ourselves. The non-profit corporation, NEW SCIENCE ADVOCATES, is now incorporated as of January, 1976 in the State of Utah.

As of October, 1976 Internal Revenue Service at St. Paul, Minnesota has informed NSA Secretary, R. W. Satz, that NEW SCIENCE ADVOCATES, INC. is allowed to be exempt from Federal income tax as a publicly supported non-profit corporation during an advanced ruling period to August 31, 1978, beginning with the date of its inception, January 20, 1976. Tax exempt status will be reviewed and continued after the advanced ruling period, if it then appears that NSA continues to merit that status. This means that donors now may deduct contributions and that bequests, legacies, devises, transfers or gifts to NSA or for its use are Federal tax deductible in accord with the tax code. Such monies should be sent to NSA Treasurer, Dr. Rainer Huck, whose address is on this RECIPROCITY masthead.

The Editor of RECIPROCITY has submitted an application to the U.S. Post Office in Wisconsin to mail RECIPROCITY and related NSA material at special bulk third-class rates, beginning in 1977.

While the Viking space craft were diligently at work in an initial step of the practical effort to determine if living organisms exist everywhere or elsewhere in the physical universe, NEW SCIENCE ADVOCATES, INC. (NSA) held its First Annual World Conference during August 20-21, 1976 in Owre Hall on the University of Minnesota-Minneapolis campus. Since the Reciprocal System implies that theoretically extra-terrestrial intelligence must and does exist, NSA, INC. supports the NASA inquiry.

The principal aim of NSA is the promotion of the Reciprocal System of Physical Theory, originated by Dewey B. Larson, engineer and author of Portland, Oregon. This involves the investigation of the Reciprocal System and its many implications and also a reexamination and reevaluation in its light of the theories of nuclear chemistry and physics, quantum and wave mechanics, relativity physics, classical physics, astrophysics, biological evolution and the psychology of memory, passion and creative thought, including parapsychology of the human spirit.

The highlight of the August Conference was a Progress Report by D. B. Larson. It was entitled "The Expanding Universe in Space and Time" and dealt with the physical universe of matter and 'anti-matter', a permanent universe of ceaseless motion.

Prof. F. H. Meyer, UW-Superior, presented a paper entitled "The Inseparability of Matter From Motion", concerning the explanation of solid cohesion by the Reciprocal System, including the reasons for the minimum equilibrium interatomic distance existing in crystals. R. W. Satz, Transpower Corporation, discussed "The Unmysterious Universe", presenting a lively commentary on his pamphlet by that name, which is an excellent introduction to the Reciprocal System, still in print and available from the author. Steve Berline, Belleville, Illinois, discussed "Relative Motion and Length Measurement". This important presentation is now available to a wider audience in the present issue of RECIPROCITY.

The August NSA Conference transacted also essential business of the non-profit corporation. The NSA by-Laws were approved and adopted for the corporation by the Conference. The by-Laws provide among other things that everyone interested

In supporting the further investigation of the truth values of the Reciprocal System and other purposes of NSA, INC. has an equal opportunity to join it. An advantage among many is that NSA members help one another in the adventure of studying and learning more about the Reciprocal System and reexamining prevailing science, philosophy and religion.

The Conference agreed that annual NSA membership dues for 1976-December, 1977 be \$8.00. Dues are sent to NSA Treasurer, Dr. Rainer Huck, whose address is listed on current RECIPROCITY masthead. If your dues are already paid and/or you desire to make a voluntary contribution to build RECIPROCITY in addition to your NSA dues or instead of joining NSA, such donation marked for this purpose can be sent either to Dr. Huck or directly to the Editor, RECIPROCITY at address on masthead. Members and donors will continue to receive issues of RECIPROCITY as a benefit of your material support of this essential NSA activity.

Officers and members of the Board of Trustees of NEW SCIENCE ADVOCATES, INC. were retained by the August Conference with the following qualifications: Donald Elkins and Carla Rueckert of Louisville, KY, while desiring to remain active NSA members, requested to resign as board members. The Conference accepted their resignations with commendation for their fine services to building NSA and RECIPROCITY. Their places on the board were filled through Conference election by Steve Berline, Bellville, Illinois and Lawrence Denslow, Miami, Florida.

Dr. Paul de Lespinasse, Adrian, Michigan, present, first and only NSA Chairperson, proposed to the NSA membership and to the Board at the conference that a search be made to find a successor to this high office. Dr. Paul agreed to continue to serve until this search can be competently and successfully completed. The NSA board of Trustees requests the participation of NSA members and interested supporters in this search. Please send your suggestions and nominations to NSA Secretary, R. W. Satz, whose present address is listed on the current RECIPROCITY masthead.

Presently out-of-print are two of D. B. Larson's early books, THE STRUCTURE OF THE PHYSICAL UNIVERSE and NEW LIGHT ON SPACE AND TIME. Discussion began at the August Conference what, if anything, NSA, INC. should do about this unsatisfactory situation.

Both out-of-print Larson books as well as the still in-print books, CASE AGAINST THE NUCLEAR ATOM, BEYOND NEWTON and QUASARS AND PUSARS, express the first unified general theory of physics and chemistry that has come into existence, so far as we know.

Dr. Rainer Huck has received a bid to print in paperback both SPU and NLOST in 1000 copies each for a total of \$3500. Several questions for NSA members and supporters arise: Is support of publishing and marketing Larson books, assuming D. B. Larson approves, a proper NSA activity? Is an immediate market for that many books potentially in existence? Can and should we raise the sum of \$3500 for this purpose? Please communicate your thoughts and decisions to Rainer Huck.

D. B. LARSON, CREATOR OF RECIPROCAL SYSTEM

Participants in the First Annual NSA World Conference were fortunate and glad to welcome Dewey B. Larson, creator of the Reciprocal System to our midst. Larson's main presentation to the Conference, THE EXPANDING UNIVERSE IN SPACE AND TIME, will be published in a future issue of RECIPROCITY. As the leading theoretician of NEW SCIENCE ADVOCATES, he was also available to those present to answer the many questions that we had and have about the enormous and subtle implications of the Reciprocal System. In particular, a question raised several times before in RECIPROCITY was discussed, as time permitted at the August Conference, and is further discussed by Mr. Larson in this issue's Question Box.

QUESTION BOX

R. W. Satz

(D. B. Larson answers question how photons can collide in the Reciprocal System in a continuation of his enlightening remarks at August, 1976 Conference).

THE CASE OF THE COLLIDING PHOTONS

D. B. Larson

One of the issues that usually comes up at some point during any extended discussion of the fundamentals of the Reciprocal System of theory is what the writers of detective stories would probably call The Case of the Colliding Photons. This perennial stumbling block that troubles so many of those who try to follow the development of the theoretical structure was given some attention during the conference in Minneapolis, but inasmuch as there were still a number of question marks in the air when it became necessary to turn to other matters, a full review of the situation is no doubt in order.

As brought out in the publications which describe the theory of a universe of motion, the natural system of reference to which such a universe conforms moves outward at unit speed (the speed of light) with respect to a stationary coordinate system of reference. Any object which has no capability of independent motion, and is not acted upon by any external forces, remains stationary with respect to the natural system of reference, and it therefore moves outward from all other such objects at unit speed. It is not possible for two such objects to meet.

Atoms of matter are likewise carried outward away from each other by the outward progression of the natural reference system, in the same manner as the photons, but these atoms do have independent motions of their own. These atomic motions are inward, in opposition to the progression, and if the atoms are within the applicable gravitational limits, the magnitude of the inward motion is greater than that of the outward progression. The total number of atoms subject to a system of interrelated gravitational motions constitutes what we call a gravitationally bound system. Atoms within such a system can collide under appropriate conditions.

Photons emitted by atoms in a gravitationally bound system have no capability of independent motion, but they are subject to external forces (that is, to motions of external origin) inasmuch as they participate in whatever motions the emitting

aggregates of atoms may have had when the emission occurred. At the instant of emission, the photon is moving with the aggregate, and it has no mechanism whereby it can eliminate that motion. The progression therefore takes place outward in a reference frame defined by the emitting aggregate. Each such aggregate is the center of a sphere of radiation, and in a gravitationally bound system the spheres are coexistent. Photons of this radiation may therefore collide with other photons emitted within the bound system, or with atoms of that system.

Some objections have been raised to this explanation of the colliding photon situation on the ground that the addition of the unit speed of the photon to the preexisting speed of the emitting aggregate on the foregoing basis conflicts with the established fact that the speed of light is independent of the speed of the emitting object. However, this objection is based on an erroneous assumption. It assumes that the changes in the relative spatial positions of the photons are determined by the relative speeds, which is not true.

I have discussed the general question of motion at high speeds at some length in most of my books (see, for instance, page 36 of Quasars and Pulsars). In the illustration that I have generally used, I consider two photons emitted simultaneously from a common stationary source in opposite directions. At the end of one unit of clock time photon a has reached point A, one spatial unit distant from the point of emission, which we will designate as O. This distance OA in the stationary reference system is an absolute magnitude that is totally independent of anything that any other photon may do. During the same interval of clock time photon b moves to point B, one unit of space distant from O in the direction opposite to A. The distance OB in the stationary reference system is also an absolute magnitude totally independent of anything that may happen to any other photon. Thus, during one unit of clock time the spatial separation between photons a and b in a stationary three-dimensional frame of reference, which was originally zero, has increased to two units. This is a simple objective fact that does not depend in any way on the particular theoretical system in whose context the situation is viewed.

If we replace photon b by a material object that moves with a speed of $\frac{1}{2}$ natural unit, the separation at the end of one unit of clock time is $1\frac{1}{2}$ spatial units. If we substitute a stationary object for photon b, the resulting separation is only 1 spatial unit. In all of these cases, the separation, and consequently the time rate of change of the relative spatial positions of the moving objects is determined by a combination of the individual speeds involved. But both conventional theory and the Reciprocal System agree that the speed of a relative to b is unity, the speed of light, in all three examples. Thus the measured speed of the photon does not determine the relative spatial position that it will occupy at any particular time.

This may seem paradoxical, but the explanation is that any excess of the rate of spatial separation over one unit of space per unit of time is offset by motion in three-dimensional time, and therefore has no effect on the relative speed. The same considerations apply where photons are emitted from a moving object. Although the measured speed of the photon is simply the magnitude of the progression of the natural reference system, and is independent of the motion of the emitting object, the change of relative position within a stationary frame of reference is determined by the combination of the speed of the progression with the velocity which is imparted to the photon by the emitting object. The presumed conflict between the constant speed of light and the photon collisions is therefore without foundation.

LETTER TO SCIENCE NEWS EDITOR

September 20, 1976

Editor, Science News
1719 N. Street N.W.
Washington, D.C. 20036

Dear Editor,

The article on "Quasars and Physical Constants" in your September 4 issue assumes that there are only two ways of looking at the fundamental constants: we must either "swallow them ad hoc" without justification for "their necessity, their constancy, or their values", or we must accept the Machian hypothesis that they are, in some unknown way, determined by the contents of the universe as a whole. But there is a third alternative that you have overlooked.

in the system of theory which our organization supports, the Reciprocal System, as we call it, the natural datum, the level from which all physical activity extends, is not the mathematical zero, but unity. The speed of light, for example, is unity in the natural system, and the true magnitude of any speed is its deviation from unity, not the deviation from zero. All of the other fundamental physical constants have the same status in the natural system as the speed of light; that is, each is the natural unit value of the quantity involved. As brought out in the publications which describe the theory, the observed values of these fundamental constants are mutually consistent on this theoretical basis. This is a situation in which the advice given on page 149 of the same September 4 issue is clearly appropriate: "If you're having to stretch your line of reasoning too far to explain what you're seeing, even if you have not been proved wrong, perhaps it's a sign that an alternative approach is closer to the truth".

Cordially yours,

Frank H. Meyer

Frank H. Meyer
Department of Physics
University of Wisconsin-Superior

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P.S. We call ourselves NEW SCIENCE ADVOCATES (NSA). It is a non-profit corporation of scientists and philosophers, devoted to promoting a unified comprehensive general theory of physics, originated by Dewey B. Larson, engineer and author of Portland, Oregon. As a general physical theory, the Reciprocal System covers all physical fields, including astrophysics, and inasmuch as all of the conclusions reached in the theoretical development are derived entirely by deduction from the basic postulates of the system, these conclusions provide an important new source of astronomical information that is completely independent of observation. The quasar theory of the Reciprocal System can be learned from the book, 'Quasars and Pulsars', by D. B. Larson.