General Relativity Revisited

Numerous physicists have challenged General Relativity Theory (GRT) from its first introduction by pointing out contradictions and absurdities within its framework. It is the purpose of this note to discuss the fundamental errors from which all the problems documented by others find their origin. *The basic flaws in GRT involve simple mathematics; fundamental principles of mathematics are violated*.

Reference will be made herein to *Gravitation* by Charles W. Misner, Kip S. Thome and John Archibald Wheeler (W.H. Freeman & Co., NY), because for some 30 years it has been a standard textbook for courses in GRT, and is considered the "bible" by Establishment Physicists. All quotations are from the 1998 Edition (21st Printing).

From its very beginnings, all mathematics (arithmetic and geometry) was considered separate from the physical sciences. Then early in the 19th Century, Carl Gauss, allowed that *...geometry should be ranked, not with arithmetic, which is purely aprioristic, but with mechanics... We must confess in all humility that, while number is a product of our mind alone, space has a reality beyond the mind whose rules we cannot completely prescribe. [Gravitation,* page 195] So Gauss was the first to suggest that abstract space is really part of physics. Gauss was, sort of, the father of curved-space; he devised a geometry of hyperbolic space. Later, for his General Theory of Relativity, Einstein adopted an elliptic space geometry devised by Riemann.

Now curved-space geometry means that there are no *straight lines*: *"The 'ideal straight line' is a myth. It never happened, and it never will." [Gravitation,* page 11] But *sans* straight lines, there are no rectangles or cubes; furthermore, parallel lines and circles are disallowed, and the sum of the angles of a triangle does not equal 180°. Also in Riemannian geometry, which is not a mathematics of precision, there are no parallel lines, and irrational numbers (like √2) and transcendental numbers (like p) are excluded. In addition, *infinity* becomes a real number, a place in space. "If *spacetime is considered from the point of view of its conformal structure only, points at infinity can be treated on the same basis as finite points."* Roger Penrose (1964) *[Gravitation,* page 936] If the reader is thinking "How odd!" then he has his head screwed on correctly.

Geometry, by reason of its axioms, is the rigorous foundation of general arithmetic, including the arithmetic of irrational numbers. Arithmetic was subservient to geometry until well into the 19th Century. Today arithmetic occupies a dominating position.

But in 1921, Albert Einstein disputed all this saying: *"As far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality." [Gravitation,* page 43] The arithmetic laws of reckoning are, of course, known with absolute certainty; so according to Einstein, *"they do not refer to reality;"* Einstein is serious when he says this; in his mathematics one plus one does not equal two; it only approximately equals two. Remember arithmetic and geometry are interrelated; when Einstein adopted a new geometry, he of necessity introduced a new arithmetic, and the old arithmetic laws do not apply. Fortunately for all, the Physics Establishment alone adopted Einstein mathematics; it is not used in the real world of business, finance, engineering, *etc.*

Space is properly defined as the set of all possible points, and a straight line is a dimension of space. Thus, space is an extension of number, and number gives a measure of space; *sans* number, space would be unintelligible. Ultimately, space (geometry) rests upon the laws of arithmetic, and none of Einstein's protestations can ever change this.

Einstein not only adopted a new geometry, but he also added a new dimension (time) to

space; then he promulgated that famous dogma of physics concerning the interaction between his new "curved spacetime" and "physical mass": *"Space acts on matter, telling it how to move. In turn matter reacts back on space, telling it how to curve." [Gravitation,* page 5] The magic of how physical mass exerts a force (or whatever) on *abstract* space and *vice versa* has never been explained, but no one dare question it.

The beleaguered graduate student either accepts this nonsense, or gives up a career in physics.

Mathematics and physics move in two entirely different orbits; the former is *necessarily* abstract while the latter concerns the material universe. It is the height of folly to try to combine abstract mathematical entities (like number, space and time) with material entities (like mass, charge and energy fields). Furthermore, there is not any reasonable way to combine space with time; there is just no common sense nexus between these two mathematical entities, and certainly *physical* mass cannot exert any influence on *abstract* space, nor can it affect number and time.

In Section 1.7 of *Gravitation,* which treats "The effect of matter on geometry," one reads: *"The idea that every physical quantity must be describable by a geometric object, and the laws of physics must all be expressible as geometric relationships between these geometric objects, had its intellectual beginnings in the Erlanger program of Felix Klein (1872)..."* [page 48] It is not explained what the term *"intellectual beginnings"* means, but Klein's thoughts were at variance with curved-space geometry, and he never suggested any nexus between geometry and physics.

In his Göttingen lectures during the 1920's, Klein said that there are precise fundamental notions of a point, straight line and plane and argued that these notions must be consistent with the geometrical axioms of connection, order and continuity. Klein called these *"the leading concepts and statements which one must of necessity put into the front rank of geometry,"* and said *"they are the intuitive possession of every person, and that they are of such obvious simplicity that no one could question them."* What did Klein think of curved-space? He objected to this geometry, because it violates the continuity axioms; Klein said: "I *regard it, rather as the death of all science." [cf.* F. Klein, *Elementary Mathematics from an Advanced Standpoint* (Dover, NY, 1939)]

Science is that body of knowledge acquired through the analysis of cause and effect by means of common sense and right reason. So if one disputes common sense axioms, he also deals a death blow to all science and in fact denies truth itself. *Truth becomes contingent upon subjective fancy and is divorced from objective reality*.

The term "space" includes "straight lines", and Cantor's axiom relating real numbers to points on a line states: If *all "real numbers" (points on a line) are divided into two classes such that every "number" (point) of the first class is "less than" (falls to the left of) every "number" (point) of the second class, there exists one and only one "number" (point) which determines this division of the set of "real numbers" (points on a line) into two parts.* The identity between real numbers and points on a straight line shows that straight lines (and hence space) are subject to the laws of arithmetic; so curved-space is invalid mathematics, and contrary to Einstein's aforesaid dictum, *Euclidean space and the laws of mathematics do indeed reflect reality*.

Contrast Einstein's views with those of the celebrated mathematician, Eric Temple Bell: "*The world that impinges on the senses of all but introverted solipsists is too intricate for any exact description ...By abstracting and simplifying the evidence of the senses, mathematics makes possible a rational description of our experiences ...Abstractness, sometimes hurled as a reproach at mathematics, is its chief glory and its surest title to practical usefulness.*" E. T. Bell, *Mathematics* (McGraw-Hill, N.Y. 1951) p. 19.

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Earth Expansion?

Had my name not been mentioned by Dr. Kokus in his letter to *Apeiron* (vol. 7, 1-2, p.123) I should not have been inclined to comment on the letter. However, as it was I feel it necessary to correct an apprehension of his on my work and to show that the conclusion resulting from it is not warranted. I apologise for the length of the reply.

First, Lee has not added two more "coincidences," as stated by Kokus, but has given physical relationships resulting from the probable development of the Solar System (S.S.). And he most definitely is *not* "always comparing the ratios of two gas giants to two earthlike planets, or the ratio of an earthlike planet and a gas planet to the ratio of a similar pair." Rather, he has compared many bodies—like and unlike—, shown how they may or may not be related physically and/or chemically, and derived a number of formulae (mostly of the form $A = B \times C^n$) showing the mathematical relationships. And he has shown how these relationships can be explained by a single sequence of related and inevitable events. With that off my chest, please permit me to explain, both astronomically and geologically, why my studies prevent me from accepting the "expanding Earth" hypothesis.

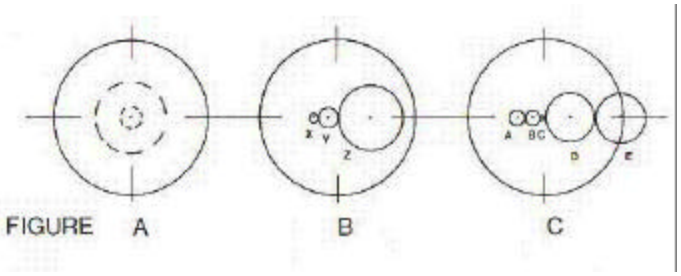
Some years ago I began an exhaustive theoretical investigation of the physical and chemical properties of the bodies of the S.S. Using the stratigraphic geology principle of historical succession, *i.e.* present to past, and assuming the S.S. has been a *closed force system* throughout its lifetime, the probable to possible sequence moving back in time suggested that a *single body* containing the total mass and volume of all the planets and satellites once orbited the Sun at 5.3 AU. (Where it came from is unimportant, here.) This body was in effect composed of a series of shells of mass and volume of decreasing density from the centre: Mercury (core), Venus, Earth, Mars, Io, *etc.* to Saturn, the outer shell. This structure, if true, negates Kokus's basic assumption of similar compositions for the planets. The body was prolate ellipsoidal in shape. Let me now proceed forward from that body to the present using only the physical properties of conservation of force, angular momentum, Newton's Third Law, and impulsive force to illustrate essential relationships.

The first step, here of no interest, was removal of the outer Saturn shell; but without which none of the following would have happened. (This step permits a simple calculation of the tilt of Saturn using that of Jupiter.) Consider only the three stages sketched in figures A, B, and C. A more complete sequence is given on the Internet at the RMIT University website.[1]

Figure A is of the initial body with Saturn removed, the dashed lines giving the outer faces of the Uranus and Mars shells. Note that the ratio of the radii of the total body and Uranus shells is 1.23^4:1 and the ratio of the radii of the Uranus and Mars shells is a little less than 1.19^8:1. Figure B shows Mars (X), a composite Mercury (core)/Venus/Earth sphere (Y), and a composite Neptune (core)/Uranus sphere (Z). To be precise Mars should not be shown but as I wish to discuss all the inner planets I add it here with no error. Figure C shows the planets Earth (A), Venus (B), Mercury (C), Neptune (D), and Uranus (E).

Note that in figure B, using $x10^{24}$ kg and km, sphere Y has a mass of 11.18 and radius 7912.6, while sphere Z has a mass of 189.6 and radius 32089.2; giving ratios of 4.118^2 and 4.055. In figure C the ratios of the radii for spheres A/E and B/D are 4.100 and 4.091, respectively.

The important point for the body in figure A is that within itself it is a closed force system with the force at the centre equal to zero. If we re-adjust the internal masses, and the force system remains closed, then the force at the centre must ideally remain zero. (In the "real world" probably only closely so.) In figure B the sum of the forces exerted by X and Y at the centre is 0.98 ($0.724^{1/16}$) of the force exerted on it by Z. (Newton's Third Law closely obeyed.) Very closely, then, the internal bodies are in equilibrium. And if these bodies are broken up and/or ejected by a central impulse along their common diameter then the bodies when finally



FIGURE

in equilibrium must have force equality (or very nearly so) at the centre – at 5.3 AU from the Sun. Let the bodies be broken up to give those shown in figure C. The body order can be proved. Calculation of the sum of the forces of the six planets in their present orbits exerted on a point at 5.3 AU, when the planets are on a common radius from the Sun, shows that the force is very nearly zero.

Further, should the bodies move out from Jupiter and pass into control by the Sun they should do so when the total of the angular momenta of the six bodies about the Sun just exceeds that of the total of the angular momenta of the same bodies about a point 5.3 AU. And calculation shows this to be the case.

It is from figure C that I drew my measurements and ratios for my letter in Apeiron, vol. 5 and from which Kokus obtains his misapprehension.

Figure C allows one to deduce that *two* impulses drove out the five bodies; the first driving out Earth and Uranus, the second the remaining three bodies. In this case, due to the simplicity of the formation and the locations of Uranus and Earth it is a requirement that the ratio of the forces of spheres A and E on the central point of the body should be equal to the ratio of the forces on a point at 5.3 AU of the planets in their present orbits when on a common radius from the Sun. The two ratios are close –0.724 and 0.720.

Also, if the impulses were slightly inclined to the common diameter then it can be shown that $\text{tilt}_1/\text{tilt}_2$ must (ideally) equal $\text{radius}_1/\text{radius}_2$ and it clearly is closely so for Uranus and Earth. Make the tilt for Venus (180+2.67)° rather than (180-2.67)° and the ratio is obeyed by Venus and Neptune, which latter planet turned two revolutions plus its present measured tilt. (Comparing *like* bodies, two other couples obeying this rule are Mars/Moon and Triton/Pluto.) Further, because of the simple ejection of Earth and Uranus, if their rotations have not been changed since ejection by forces outside the couple then it should be possible to calculate by simple mathematics one rotation from the other. And it is easy *to calculate* the one from the other. (Yes! I know Earth is slowing down but there is a generally unrecognised mechanism which intermittently accelerates it.) Again, the figures permit one to predict qualitatively (i) the variation of the hydrogen/helium ratios between the gaseous bodies (something the Nebula Theory failed to do before the fly-byes) and (ii) the order of decreasing deuterium concentrations in the gaseous and terrestrial planets (ditto). And so on and so on.

Because using the above sequence explains so many physical and chemical relationships, and because Dr. Kokus cannot accept similar expansion rates for bodies with unlike compositions (neither can I) then relationships such as force equality and angular momentum as given above cannot be accounted for where bodies expand and "create" mass. They must become "coincidences," and I cannot accept the properties as being coincidences.

To me, all the above and its implication for no expansion was expected as I had already accidentally proved *geologically* that expansion, as the expansion hypothesis requires, was impossible. (I am certain the Earth has undergone minor expansion and will continue to do so for some time.) Why? Because in an even earlier study than my S.S. one I attempted to relate major Earth surface tectonics and other physical phenomena with the notion of an internally asymmetric Earth structure. While doing the study I discovered a method of using palaeomagnetic poles for

plotting the movement of a *continental* plate back in time to give latitude, *longitude*, rotation, and speed of movement. Present dogma, of course, says this cannot be done. During the study it became clear why present APWP palaeomagnetic methods of determining plate paths sometimes give correct results and sometimes give quite false results. [I commented on it in a small, personally distributed paper, a copy of which I send with this letter for you, Mr. Editor, to give to whom you will. (See pp.71-3.)]

The plate path plotting method is briefly explained in the book Gondwana Eight[2] and noted in an abstract in Abstracts of 30th. International Geological Congress.[3] It may, shortly after you receiving this letter, be on the Internet at the RMIT University website. Calculating and plotting is a bit tedious, being three dimensional, but is purely mathematical and *non-subjective* to the operator. After calculations, plotting onto a globe of the Earth can be carried out using a plate template, flexible ruler, compasses, and pencil. It takes only a few plate path plots on a globe to show movements *cannot* be explained by Earth expansion. This is despite the "evidence" given to support expansion; which evidence is subjective and/or explainable by alternative physical processes.

Pardon my bluntness, but expansion of the Earth, as presently espoused, is a no-no.

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Reply to M.W. Evans

Dr. Evans has raised objections to my previous paper [5] on the basis that it does not use the non-Abelian Stokes theorem to prove the existence of the $\mathbf{B}^{(3)}$ field. The non-Abelian Stokes theorem has indeed been proposed in the works of several authors, *e.g*. [1]; it is well known and it represents the equations of *isospin* components.

Non-Abelian generalizations of other laws of electrodynamics have also been found, *e.g*. [2].

However, I have unfortunately not found a correct form of the non-Abelian Stokes theorem either in Dr. Evans's work [3], which he refers to, or in any other work by the AIAS group. To the best of my knowledge, the correct connection between spin and isospin has not yet been established. Therefore, I consider that Dr. Evans's critical comments [4] on my papers [5] are without foundation.

Dr. Evans's comments clarify almost nothing in his own debate with Drs. Comay and Hunter. Dr. Comay's answer to my work [5a] is even more irrelevant to the essence of the problem (see [5b]).

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Time Dilation in Special and General Relativities

The special theory of relativity (STR). Recall that time t plays a role of the forth coordinate in the united Minkowski space-time. As a result, according to STR, the duration of physical processes depends on movement velocity v. This is expressed by the known equation of relativistic time dilation (increase)

$$dt=d\tau\gamma=d\tau(1-v^2/c^2)^{-1/2}. \qquad (1)$$

Here the relativistic (coordinate) time figures at left, and the "classical" (proper) time at right. In the non-relativistic (Galilean) approximation of small velocities $dt\to d\tau$, we have to deal with the proper or invariant time (independent of velocity).

One should pay attention to a poor expression: "time dilation." As known, the change of time rate is conditioned by changing the time standard. But in the given case, dt and dô are measured in the same seconds.

The increase of the lifetime of moving elementary particles (*the relativistic time is larger than the proper one*) is the known consequence of eq.(1).

The general theory of relativity (GTR). Let us consider now the general-relativistic relationship (see, *e.g.*, [1])

$$dt_S=d\tau(1-2|\Phi|/c^2-v^2/c^2)^{-1/2} \qquad (2)$$

corresponding to eq.(1) and based on Schwarzschild's solution. As seen, it indeed transits to (1) in the case $|\Phi|=0$, and we have a pure gravitational time dilation (increase) in the case $v=0$. Thus, the stronger a gravitational field the larger the duration of physical processes (*the general-relativistic time is larger than the proper one*).

For example, the reading of an "airplane" clock (t^h) in the known experiments on the investigation of the gravity influence on the clock rate [2-4] must be smaller than the corresponding reading of a clock on the ground (t^g):

$$t^h< t^g. \qquad (3)$$

However, this experiments give an opposite result:

$$t^h_{ex}> t^g_{ex}. \qquad (4)$$

Emphasize that the observed change of atomic clock rate is here conditioned by its own construction.

Thus, the previous conclusion [5] of the failure of GTR is confirmed experimentally.

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V.N. Strel'tsov

Relativistic Gravidynamics & Black Holes

Relativistic gravidynamics. According to the special theory of relativity and taking into account the Newton formula to the potential energy, we have

$$í_g=í(1+\Phi/c^2) \qquad (1)$$

for the photon frequency radiated in a gravitational field (GF) (see, *e.g.*, [1]). Here, í is the photon frequency in the absence of GF

(Φ=0). Emphasize that this equation is a consequence of relativistic gravidynamics or the Lorentz-covariant theory of gravity (see, *e.g.*, [2]). A 4-vector potential Φ^i, the time component of which represents the Newton potential, is its base. As a result, we have for the "potential" 4-momentum

$$p_g^i=m\,\Phi^i, \qquad (2)$$

describing the GF influence on a particle with mass m. Whence it directly follows that *the photon is gravitationally neutral* since its mass is zero.

As clearly seen from eq. (1), the stronger GF, the smaller the frequency of a radiated light. In the limit, when $|\Phi|\to c^2$, $\nu_g\to 0$. Thus, atoms (nuclei) being part of a massive body (star) lose a radiation ability. Such a formation which sends no signals in the surrounding space and interacts with the external world only by its static GF is named the black hole (BH) or collapsar. On the other hand, the BH atoms, evidently, also lose an absorption ability since their energy levels amalgamate in fact. Besides, the interaction of photons with electrons, nuclei and other BH microobjects (accompanied by energy exchange) becomes, it would seen, impossible since their total energies are zero.

Based on the limiting relation $|\Phi|=c^2$ and the explicit expression for the potential of mass M, we obtain for the gravitational radius

$$r_g=kM/c^2, \qquad (3)$$

where k is the gravitational constant.

Let us consider now the equation of the relativistic law of energy conservation for a trial body with mass m in GF

$$Mc^2\gamma+m\,\Phi=mc^2 \qquad (4)$$

Here, the Lorentz-factor $\gamma=(1-v^2/c^2)^{-1/2}$. Leaned on the limiting relation, we find that $\gamma_{max}=2$; whence for the limiting velocity (named the second cosmic velocity) we obtain

$$v_2=\sqrt{3}c/2 \qquad (5)$$

Remark that $r_g\approx 1.5$ km for the Sun. The mean mass density of the corresponding "ball" BH is $\rho_s\approx 0.3\cdot 10^{15}/cm^3$, *i.e.*, it exceeds considerably the nuclear density. Only bodies with mass greater than 5 Sun masses have the mass density smaller than the nuclear one after collapse.

General relativity (GR). Earlier, the failure of this theory was proved (see, *e.g.*, [3]) and, in particular, it was shown that GR contradicts directly the experiments on "gravitational time slowing down" [4]. As we see below, this theory gives contradictory results also in the case of the discussed problem.

Recall that the horizon of events in GR is defined by Schwarzschild's radius $r_S=2r_g$. This quantity stipulates reducing the light velocity to zero, which depends on the gravitational potential in GR according to the formula

$$c_g=c(1+2\,\Phi/c^2) \qquad (6)$$

Thus, if the velocity of material bodies increases approaching to a massive object, the velocity of photons, on the contrary, decreases according to (6). The effective repulsion of light takes place! As a result, material bodies pass photons running up to BH (beginning from $r\approx 4.5\ r_g$).

On the other hand, according to (6), the light velocity on the Earth surface must be

$$c_E=0.9999999986c \qquad (6E)$$

This means that protons with energy reater than E_p=18 TeV and electrons with energy E_e>9.6 GeV pass the light. The electrons of the Stanford linear accelerator answer the latter condition. Thereby, the light velocity loses its fundamental property of the limiting velocity of interaction transmission.

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The Problem of Changing the Motion of Inertial Disc Applying the Einstein Relativity

Introduction

The ratio between circumference and radius of the rotating disc is preserving the radius higher

than at the inertial disc in Einstein relativity. [1], [2]

Solution

Let us have the inertial disc. The observer on the disc has fulfilled the circumference and radius of the disc with the given number of linear measures. Then the disc will rotate. If the ratio between circumference and radius of the rotating disc is higher than at the inertial disc and the radius is the same as before rotation, the number of linear measures fulfilling the disc circumference should be higher than before rotation.

Conclusion

If the number of linear measures fulfilling the disc circumference is given before rotation, it cannot be multiplied by rotation. Therefore the ratio between circumference and radius of the rotating disc cannot be higher than before rotation. So the inertial disc cannot change the motion if applied the Einstein relativity.

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"The Universe: finite or infinite?"

In *Apeiron* Vol. 7 Nr. 1-2, on pages 126-127, Christopher John Davison argues that the universe must be completely infinite, that is infinite in duration and in size. The core of his argument is his asking "those who claim limited size and lifespan to explain how space and material came into existence from nothing, how it will disappear again, and to explain the situation beyond the edge of a finite-sized Universe." The answers are as follows.

Either the universe arose from and was preceded by absolute nothing or else it, or its creator, always existed, that is had no beginning. Only those alternatives are available; the positing of anything other than nothing as a beginning immediately requires accounting for that something's existence so that the only alternative to a beginning of nothing is no beginning at all.

Thinkers over at least the past 4,000 years have consistently come to that conclusion and, since the universe arising from nothing seemed impossible and ridiculous, they consistently concluded that the universe arose from something that always existed, something that so to speak was the cause of its own existence. Shakespeare has King Lear say, "Nothing can be made out of nothing." And, that so overwhelming limitation has made thinkers throughout the ages opt for the infinite.

But, under closer examination the infinite that this line of reasoning requires has problems as severe as does the universe arising from nothing. Further, the universe arising from nothing is not so insuperable a problem as it has appeared. Somewhat in the manner that Alexander resolved the challenge of the Gordian Knot [he drew his sword and cut the knot in half] it can be shown not only that the universe could have arisen from nothing but that it must have, as follows.

The Problem of the Infinite

We can readily grasp the idea of nothing; it is easily within our ken. But, the idea of infinity is much more difficult. We use expressions such as "without limit" and "unending" to convey the idea but we do not really comprehend ["in our gut" so to speak] what "forever," "always," "without limit" really signify. To us the symbol, ∞, subtly means a specific quantity standing at the end of a long list of increasing numbers, but its true meaning is that that list of numbers goes on and on, that if we go out and "stand on" the most distant number we will see still more going on and on, forever.

So, for the universe to extend in space forever and for it to have existed forever is at least as troubling as for it to have arisen from nothing. Furthermore something existing forever means that it is its own cause. But, that contradicts the essential requirement that a

cause exist independently of what it causes, that the cause "precede" in the causal sense that which it causes.

To account for existence it is necessary to show why it is as compared to the alternative, it not being. Thus one must begin at the beginning, it not being. The starting point is absolute nothing—the state before there was anything, before everything. It is the only state that requires no explanation nor accounting for its existence. It is naturally what one would expect before anything started.

How a Universe Could Arise from Nothing

The problem with a universe [or anything as Lear said] arising from nothing is that conservation must be maintained. The inputs and outputs, the amounts at the start, any intermediate stages, and the finish must reconcile. There can be no overall loss nor gain. But, starting from nothing while maintaining conservation would appear to preclude any progress at all. Yet, paraphrasing Descartes, "I [part of the universe] think, therefore the universe is."

The resolution of the dilemma is: The primal nothing changed into something and a conservation-maintaining equal-but-opposite un-something

That Our Universe Did Arise from Nothing

That initial event was so unstable that it exploded too immediately for the two opposites to recombine and cancel. That explosion was an immense shower of matter particles and energy now referred to as the "big bang."

But there is another difficulty in the universe so arising from nothing - the transition. How is it possible to accommodate the transition from nothing to something plus its opposite without an infinite rate of change at the beginning ? There is only one mathematical form that can so change and fit all of the circumstances and requirements of the situation: the $\pm[1-\mathrm{Cos}(2\pi ft)]$ function [the ± for the two equal but opposite components that maintain conservation]. The infinite series of derivatives of the function make for the smooth transition.

The development[1] from that event, a logical and mathematical derivation of all of the fundamental laws of physics (Coulomb's Law, Ampere's Law, Newton's Laws of Motion, Newton's Law of Gravitation, relativity, radiation, fields, photons, atomic structure, nuclear structure, ..., all of the physics of the contemporary universe) from the necessary conditions and nature of that origin, shows that our universe is the joint operation of the something and the un-something, which together result in the universe's fundamental particles.

Thus was the origin of the universe. As for Davison's "how it will disappear again," it is in a long-term exponential decay that began with the "big bang" and never completely ends. However, just as the area under the curve $\varepsilon^{-t} = 1$, so the material universe is finite.

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Reference

[1] Ellman R., *The Origin and Its Meaning*, The-Origin Foundation, Inc., 1996, see http://www.The-Origin.org for where, how available.

Response to Ellman: "Nothing can be made out of nothing" (King Lear)

In *Apeiron* Vol No. 7 I argued that it is rational to regard the Universe as infinite in both size lifespan. Roger Ellman`s reply made the traditional finite -universe case. At least we have agreement as far as the choices are concerned. Either the Universe is limited in size and lifespan, appearing from nothing and in due course, after its finite existence ends, disappearing again into nothing. Also there is nothing beyond the limits of a finite-size Universe. Or, the alternative which is a universe if infinite-size and lifespan.

One of Ellman`s initial comments clearly demonstrates the finite mindset, saying that the infinite view is somehow positioning the components of the Universe at "the

beginning."Moreover, those who take this view must "account for" these components and that a state of nothing does not need to be accounted for. His second paragraph ends in a true statement: "*the only alternative to a beginning of nothing is no beginning at all"*

The Universe had no beginning, because nothing does not have the ingredients to make something. In other words something must always have been here, because the Universe is something and something needs to be made out of something. Ellman quoted Shakespeare's King Lear," *Shakespeare has King Lear say: "Nothing can be made out of nothing."* Shakespeare was wise to have King Lear make this true statement.

The letter goes on further to mention the admitted difficulty in taking the infinite view: "*the infinite that this line of reasoning requires has problems as severe as does the universe arising from nothing. Further, the universe arising from nothing is not so insuperable a problem as it has appeared.*" The Gordian Knot, (a simple solution to a difficult problem) is used to "prove" that the Universe "must have arisen out of nothing.

I cannot see why this was used, the cut Gordian Knot then consisted of two pieces of "something" both pieces having been made out of something. Literally, (according to the finite way of thinking), there was nothing to cut in the pre universe state of nothing. Nothing cut in two is still nothing and there is no simple solution to reverse this.

I share Ellman`s difficulty which he goes on to mention understanding infinity in the same way which we can understand finite concepts. To quote Ellman again: "*So, for the universe to extend in space forever and for it to have existed forever is at least as troubling as for it to have arisen from nothing.*" Troubling it may be, but I do not understand the "so" in that last statement. No part of the preceding text has explained that infinite size and lifespan are as difficult to explain as making something out of nothing.Infinite size and lifespan are difficult indeed perhaps impossible to grasp; nevertheless to me and a few others it is the rational choice when faced with the alternative, that is: creating the Universe out of nothing and reversing this process.(making everything disappear again), also having a border beyond which not even a single atom or photon or anything else is to be found.

The next point is interesting: "*Furthermore something existing forever means that it is its own cause. But, that contradicts the essential requirement that a cause exist independently of what it causes, that the cause 'precede' in the causal sense that which it causes.*" The only rational assumption I can see is that the Universe did not have a cause. If you had a cause which preceded the Universe then the "cause" would have been "something" and could be described as being the Universe in an earlier form. Now you are saying that there was a "time" when there was nothing. A state of "nothing" cannot contain "something; moreover, that which has permanent existence cannot possibly have had a "cause." Looking for a cause for the universe is like looking for the largest possible number, it does not exist.

The expression "*the beginning it not being*" in the following paragraph, has no meaning for me except to reveal a "start and finish" mindset which in my view must be overcome. The state of absolute-nothing is mentioned as "*requiring no explanation nor accounting for its existence.*" To me a state of nothing does require a great deal of explanation if it is followed or preceded by all of the components of the Universe.

A true statement now appears "*conservation must be maintained*" (which supports the concept of a universe of infinite life span). This appears to be a reference to the well-known fundamental principle of classical physics, the law of conservation of mass, which of course states that matter cannot be created or destroyed). Ellman resolves this as follows: *"The resolution of the dilemma is: The primal nothing changed into something and a conservation-maintaining equal-but-opposite un-something*." At this point I am still looking for an explanation as to how nothing just changed into something.

It is very important to read the next statement from Ellman: "*That initial event was*

so unstable that it exploded too immediately for the two opposites to recombine and cancel. That explosion was an immense shower of matter particles and energy now referred to as the 'big bang'." What is "it"? What exploded? Where did it come from? Was the tiny object that contained the seed of all the components of the Universe, created from nothing at this point?

Ellman goes on to quote a formula showing mathematically all of the components of the Universe smoothly appearing from nothing, a number of scientific laws are mentioned, Newton`s Laws of motion, *etc*., a list of fundamental physics not connected with this discussion. To me the law of conservation of mass is central to this discussion together with the rational assumption that the Universe had no cause.

My question: how it will disappear again? Receives the reply*: "it is in a long-term exponential decay that began with the 'big bang' and never completely ends."*

This appears to be saying that the Universe indeed has an infinite amount of time to go now that it has been created out of nothing, but is "decaying." "*It is in a long-term exponential decay that began with the "big bang" and never completely ends.*" But, where does this material go? (Where does it decay to?) if it cannot be destroyed as in the most fundamental law of physics. If something decays it merely changes form leaving all of its components in existence, Ellman is using decay to mean disappear.

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Farewell, the SRT with the LT

From I.J. Good's "Bingo" refutations [1], the Apeiron readers clearly see that those refutations are invalid and the LT's absurdity is incorrigible. This letter confirms the LT's self-inconsistency, clearing up confusion stirred by Good.

Concerning "STONE and EGG"

So far the discussion about the STONE and EGG has been made over and over [2]. Unfortunately, Good still did all he can to disregard the crucial issue that the so-called 4-D (dimension) invariant equation is worth nothing, because and only because *meaningless* STONE and EGG can equally make the LT satisfy it. He continues repeating his "Bingo refutation" by arguing that "stones and eggs are not measures of length or time" [1a]. Good did *make* a fresh-discovery that suffices to prove his intellectual level, despite his failure to make a distinction between STONE and stones, EGG and eggs.

Regarding "implicit assumption"

In my argument, clearly, $y'/c = y/c$ (or $y'/u = y/u$) is mathematically derived by using c (or u) to divide two sides of the identity $y' = y$ that is one of the LT equations. Then, what has this to do with "path," P or P′? Where is the "implicit assumption" [1a]? Obviously, it is fabricated by Good to impose on my head.

Good is very good at following Einstein, who is well known to be used to shift point at issue due to lack of solid knowledge in mathematics, physics and logic *etc.* When Logic-boy within his theory-family is sick he sends for Mathematics-doctors, if Math-girl is ill he consults Physics-doctors, or the like.

It sounds as if Good is arguing with me not about the truth but books of Einstein's theory, when he, reveling in his own "standard usage," said "Xu's … physical interpretation of the LT differs from that in the books" [1a].

Regarding "*physical* meaning"

"It is necessary to discuss its *physical* meaning or interpretation. The LT is not *merely* algebra"[1a], Good said. "Necessary," of course! Unfortunately, however, the same Good did his utmost to disregard physical meaning of (say) y or y', so as to need a futile appeal to "beating about the bush" through "paths P and P'"or so. What is it meant by the coordinate (say) y? Is *physical* meaning of its absolute value, $|y|$, a *length*? And, what does y/c (or y/u) mean? Before having correct answers to these

questions, it seems only too early for Good to mention the LT's "physical meaning or interpretation."

As is well known, the LT rests on Einstein's physical model. As a result, before the physical model is made clear, one cannot have a clear idea about LT's "physical meaning." Yet, besides disregarding the physical meaning of y or y' as shown above, Good did his effort to evade a consideration of Einstein's physical model, where the speed v is referred to the relative speed between two frames, not *merely* "the velocity of O′ relative to O" [1a].

Moreover, if the LT "cannot be applied to two distinct events" [1b] or *any* event, "each and every" or not, as Good believes, then it should be thrown away with need of no reason more. If Good still disagrees, he'd better gain a clear idea about coordinate representation and its application.

Concerning the LT's "self-consistency"

To refute Good's defense for the "self-consistency," consider and compare two *distinct* events P_x and P_r that lie in the same plain Q normal to x-x′-axis as shown in Fig.1, where primed inertial reference frame (IRF) moves along the x-x′-axis at a speed v relatively to unprimed IRF. Clearly, the two events have the same value of x-coordinate, x_1, but one is in x-x′-axis and another not, so that

$$P_x : (x_1, 0, 0, t_x); \tag{1}$$

$$P_r : (x_1, y_1, z_1, t_r), \tag{2}$$

where $y_1 \neq 0$ and $z_1 \neq 0$, and t_x or t_r is time interval taken by the sphere-light emitted from origin O (or O') to reach P_x or P_r, as Einstein's physical model demands (*cf.* Fig.1), viz.,

$$t_x = x_1/c; \tag{3}$$

$$t_r = r/c = \sqrt{x_1^2 + y_1^2 + z_1^2}/c. \tag{4}$$

That is, the sphere-light will reach P_x and P_r at different times due to $x_1 \neq r$:

$$t_x \neq t_r . \tag{5}$$

Putting $(x_1, 0, 0, t_x)$ and (x_1, y_1, z_1, t_r) of (1) and (2) into *one* of the LT equations, gets x′-coordinate for point P_x and P_r, respectively, as

$$x'_x = \gamma(x_1 - v t_x); \tag{6}$$

$$x'_r = \gamma(x_1 - v t_r). \tag{7}$$

That is, the said one of the LT equations requires, noting (5),

$$x'_x \neq x'_r, \tag{8}$$

which means that points P_x and P_r are no longer allowed to lie in the same plain Q. This comes into conflict with Einstein's physical model, where the primed IRF has a translational motion only (see Fig.1), so that both points P_x and P_r should always keep in plain Q.

To keep P_x and P_r in plain Q as they should, (8) has to be replaced by

$$x'_x = x'_r, \tag{9}$$

which in turn, however, will force (6) and (7) to have the result

$$t_x = t_r = t_1 . \tag{10}$$

In this case, (1)-(4) can be re-written as

$$P_x : (x_1, 0, 0, t_1); \tag{11}$$

$$P_r : (x_1, y_1, z_1, t_1); \tag{12}$$

$$t_1 = x_1/c; \tag{13}$$

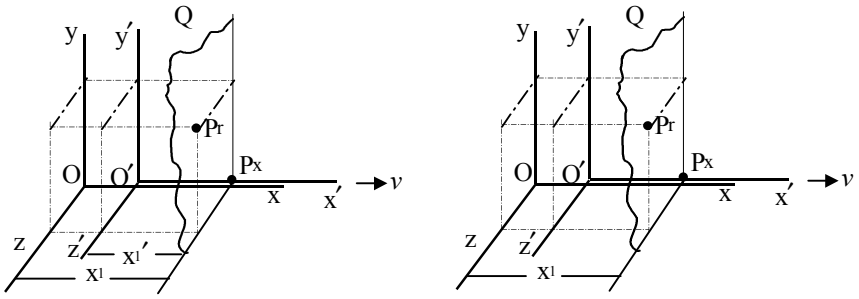

Fig.1

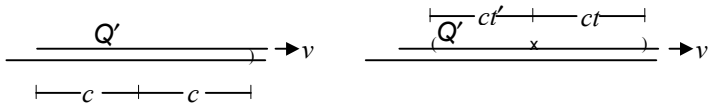

Fig.2

$$t_1 = \sqrt{x_1^2 + y_1^2 + z_1^2}\,/c. \qquad (14)$$

From (13) and (14) one attains

$$x_1/c = \sqrt{x_1^2 + y_1^2 + z_1^2}\,/c,$$

which can, deleting the subscripts without loss of generality, be rewritten as

$$\sqrt{x^2 + y^2 + z^2} = x.$$

Here, then, is an absurd result, a blatant and explicit one, unless

$$y = y' = z = z' \equiv 0. \qquad (15)$$

Clearly, however, (15) is incompatible with the two of the LT equations

$$y = y' \text{ and } z = z'$$

that are not necessarily equal to zero.

Undoubtedly, there is inconsistency between purpose and capability of the LT. The LT purports to describe any event in the so-called 4-D space-time world except space-like region, but in fact it is radically *impotent* to. This inconsistency is incurable, unless giving up the fabricated Einstein's physical model. Eq.(10) says the sphere-light from the origin should reach P_r and P_x at the same time t_1. That is, the originally *supposed spherical* wave-front suddenly melts into a *plane* wave-front in plain Q (see Fig.1). How explicitly absurd!

Eq.(15) implies that the relativistic 4-D space-time world Einstein attempts to construct suddenly melts into a poor **1**-D filiform-hole!

From the above (or *cf*., [2]-[5]), few fails to see that the LT proves itself invalid and meaningless, physically or mathematically, without help of any assumption beyond the SRT frame, implicit or not, of mine or not.

About Einstein's light-speed postulate

Einstein's light-speed postulate, *i.e.*, the principle of invariance of the velocity of light (PIVL), is the hallmark of the SRT, and Einstein's physical model predicates on it. The PIVL is, however, stated in many ways that are not necessarily consistent with each other. Most of those statements known to me are ambiguous or incorrect, having terribly misled most physicists.

Unfortunately, Good's understanding of the PIVL is not correct either. He made an address as [1a]: "that c is an invariant is of course one of Einstein's assumptions." Obviously, the statement that "c is an invariant" can exactly be understood as c = constant = 2.99792458×10^{10} cm, to which none but fools contrived by Good or Einstein would object. Here, once more Good proves himself a fresh-discovery maker, dyed-in-the-wool.

About the PIVL, although Einstein stated [6] that the speed of light is independent of the velocity of the source, he really purports to mean that the speed of light from any source *is isotropic* in *all* IRFs. In the case of two IRFs as shown in Fig.2a, where a source at origin O of unprimed system that at $t = 0$ coincides origin O' of (moving) primed system emits a sphere-light, and at $t \neq 0$ the spherical wave-front reaches points P, P', Q and Q', the PIVL demands that those points should be in one and the same spherical wave-front and have

$$OQ = OP \text{ and } O'Q' = O'P'.$$

Clearly, the PIVL concept contains two contradicting connotations, the "isotropic propagation" and a single sphere-light. In other words, the PIVL requires a single sphere (of light) to possess two centers O and O' — or even an infinitude of centers if taking account of the general case of *all* IRFs. Here, then, is a blatant and absolute absurdity! The LT, in the final analysis, purports to "transform" or turn such absurdity into a marvel.

Yet, it is simply impossible! In fact, the wave-front to the left of origin O' appears at point Q', not coincided with point Q, as shown in Fig.2a. That is, if "isotropic" works, two, instead of one, wave fronts must coexist.

Similarly, in the case when the source is set at the origin of primed system, O', at $t' \neq 0$ two wave-fronts have to appear respectively at

points Q' and Q at the left hand as shown in Fig.2b, so that

$$OQ = OP \text{ and } O'Q' = O'P'.$$

Thus two wave fronts irresistibly arise, too, unless "isotropic" is abandoned.

In either case, two connotations implied by the PIVL are incompatible. That is, either a single light-sphere holds but "isotropic propagation" vanishes, or "isotropic" is possible but two (even up to an infinitude of) wave fronts emerge. This, "not with empirical evidence"[1b], suffices to conclude as: It is ridiculous to claim that the PIVL has been confirmed experimentally.

Pointless debates about the speed of light will never be ended among scientific community, until it is recognized that

A statement about the velocity of light has no meaning, unless it is clear and definite where the source of light lies and what the speed is with respect to;

A distinction should be made between (genuine) electrodynamics problems and "purely optical" phenomena such as Doppler and star aberration, for only the former involve interpretation via dynamic process of electromagnetic interactions. Thus, none of electrodynamics experiments can serve as evidence for the PIVL;

The zero-result of the Michelson-Morley (1887) experiment is nothing but a negation of various "ether" theories (*in vacuo*), and a proof that the velocity of light is isotropic and equal to *c only* with respect to the IFR the source lies in. That is, the source frame is a privileged one. Anyway, the experiment is no confirmation of the PIVL;

The de Sitter (1913) binary stars argument has a logical gap that escapes an attention of generations of scientists, and is hence unqualified as evidence for the speed of light independent of the source's speed (*cf.* [2c][4]);

There still are a great deal of wrongful verdicts and confusion more in the light-speed problem, to be cleared up or rectified (*cf.* [3]-[5]);

In fact, the ungrounded PIVL is just the root cause why the LT is self-inconsistent, and why the SRT has produced so many "paradoxes" that have not yet been settled. Good proves himself failure to grasp the PIVL concept. This perhaps is main reason why he finds no way to accept my irrefutable argument.

Concerning "messy notation"

The SRT is riddled with confusion misled by messy notation. Here I deal with confusion hidden in the so-called relativistic formula of speed addition, which is well known derived from the LT and has a form as

$$u + w = \frac{u + w}{1 + uw/c^2} . \qquad (16a)$$

Shifting the denominator in (16a) to the left-hand directly yields

$$(u + w)(1 + uw/c^2) = u + w, \text{ viz.},$$

$$u + w = (u + w)(1 + uw/c^2) \qquad (16b)$$

that conflicts with (16a). Then, which is the relativistic formula Einstein purports, (16a) or (16b)? Obviously, (16a) is an expression with serious confusion due to messy notation, and hence can never hold.

To avoid such confusion, it is necessary to use (say) symbol $\oplus$ and $\varnothing$ to denote relativistic plus and minus, to distinguish between relativistic and ordinary addition. Then, (16a) should be written as

$$u \oplus w = \frac{u + w}{1 + uw/c^2} . \qquad (17)$$

From (17) one can arrive at

$$c \oplus v = c \varnothing v = c \oplus c = \ldots \equiv c, \qquad (18)$$

instead of

$$c + v = c - v = c + c = \ldots \equiv c. \qquad (19)$$

Since the SRT rejects the Galilean transformation, any form in Galilean speed-addition is not allowed to appear in any relativistic formula except for (17) only. In other words, all such forms as $(c + v)$ or $(c - v)$ appeared within the SRT should absolutely be replaced by $(c \oplus v)$ or $(c \varnothing v)$. Then, if doing so, all relativistic formulas are doomed to vanish. For example, the relativistic Doppler formula for the source receding from the observer, should be written as

$$\nu = \nu'[(1 \varnothing v/c)/(1 \oplus v/c)]^{1/2} = \nu'[(c \varnothing v)/(c \oplus v)]^{1/2},$$

which will, in view of (18), give

$$\nu = \nu'[c/c]^{1/2} = \nu' \qquad (20)$$

instead of

$$\nu = \nu'[(1 - v/c)/(1 + v/c)]^{1/2}.$$

Thus, clearly, it is Einstein and his followers in more or less degree including Good, instead of me, that were "misled by … messy notation "[1b].

"Life is short"[1a]. Since 1905 Einstein's theory has been ingurgitating thousands upon thousands lives of physicists and others. Relativists make a perfect fetish of it and defend it, while dissidents devote their lives to fight it.

It is time to end such a catastrophic situation in scientific history of mankind. Farewell, the SRT together with the LT! Now that Good has spent so much energy and time on defending the poor LT in past [1][7], he is hoped to spare a bit time more for re-recognizing it, and have somewhat a progress.

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Closing Argument with Xu: a Postscript

When I wrote my "closing argument" (Ref. 1), I intended to abandon my debate with Xu, but I don't want people to think I'm bonkers. On page 121, column i, of Ref. 2, Xu says that, in Ref. 3, p. 144, col. ii, I denied that y' is a length and he called that a *funny mistake*. Of course y' is a length. I said it refers, in the primed system, to the same event to which y refers in the unprimed system. I used the words *refers to* not *represents*. If someone says "big feet" referred to a penguin he doesn't mean that "big feet" represents a penguin unless he is using "big feet" as a nickname like "Goldilocks." My usage, combined with the context, would have made my meaning clear to English-speaking readers. Linguistic misunderstandings can have unfortunate repercussions.

Coming back again to the notorious STONE-EGGS argument, I think Xu should have it translated into proper English. As far as I can see at present he is saying that if stones and eggs satisfy the Lorentz equations then they (the stones and eggs) satisfy the invariance equation (the equality of "intervals"). The flaw is that they don't so they don't.

In Ref. 2, p. 121, Xu offers a new argument. In it he mentions a Fig. 1 but it was not printed so, in fairness to Xu, I will postpone my response although I think I know what it would be. It is possible, however, that someone else will respond first and save me the trouble.

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I.J. Good *Apeiron* **6**(1-2), 144-146 (1999).

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A response to Chappell's last word

Chappell (*Apeiron* 6, 251-253, 1999; in short 6, 251) correctly implies that the last word on record, on a given topic, is often given too much weight. This is especially true of those readers who want to agree with the 'last word'. But in our debate he has had two shots to my one, so I will now even the score. Any fair reader who is concerned with our debate should

read not just the latest arguments but the relevant earlier ones as well, especially 5, 242. In the present response I will on the whole restrict my attention to Chappell's insults, rather than to technical matters, until I have been able to study Chappell's references, and until one of my papers submitted to another journal has been accepted.

For me or my arguments, Chappell uses the following hyperbolic descriptions: 'preposterous'; 'severe insult'; 'arrogance'; 'dreary' [logic makes you sleepy when it refutes what you want to believe]; 'haughty'; 'contemptible' [as if I wasn't saying what I meant, — it would have been sufficient to have claimed that I had misunderstood him. Note that a good definition of *arrogance* is the expression of contempt. An example of an anonymous arrogant statement is "Half-baked ideas of people are better than ideas of half-baked people".]; 'overzealous'; 'so anxious to attack' [incorrect reasoning *should* be attacked]; 'concoctions and accusations' [I don't concoct anything in technical discussions, but of course I am not infallible]; 'strange assumption'; 'so typical'; 'carelessly assumes', 'look in the mirror Dr. Good. Study your own words more carefully'. I again beseech the reader to look at 5, 242.

Thirteen insults in two pages must be close to a record. "The lady doth protest too much, methinks". Thirteen eyes for an eye? Some of my best friends insult me but, to parody Churchill's remark about the pilots in the Battle of Britain, seldom have so many insults been hurled in so few words. This kind of 'dissentery' is apt to provoke dysentery.

It would take too much spacetime (joke) to reply to all of Chappell's diatribe. I have already apologized (5, p. 243, col. ii, first para.) for describing some dissidents as 'flat-earthers'. Do I have to apologize repeatedly? I think I copied this expression 'flat-earther' from another writer who probably had in mind those who don't believe in curved spacetime. The analogy is strengthened by the fact that *world* also means *universe*. But my efforts concern the self-consistency of KSTR, not that of the General Theory of Relativity.

Chappell (6, p. 251i) thinks that my frequent appeals to my adversaries to 'admit errors' is arrogant. I consider it merely blunt. I will now emphasize that *everybody*, not just dissidents, should confess to their errors and should acknowledge the people, if any, who have pointed out those errors. I have set a good example in Good (1999), and also in at least two places concerning non-physics topics. (In the physics example, the error is easily corrected.) Dingle (1972, 42-46) considered that it was a 'moral issue' for members of the establishment to admit error. What's moral for the goose is moral for the gander. Does Chappell think that Dissident Dingle was arrogant?

Dissident Campbell (4, p. 132, col. iii) is 'absolutely certain' of the LT and is therefore equally certain that all arguments to the contrary, past, present, or future, including every one of those of Dissident Xu Shaozhi, are fallacious; but Xu S. [6, 249] heads his arguments to the contrary with the description "Sciences Confronting a Revolution". Neither of them have said explicitly that the other is wrong. Xu Shaozhi hasn't withdrawn his comment (4, p. 86i) "It cannot be said too often that … Campbell's *disproof* [of the LT] is as ingenious, direct and clear, succinct and effective as we have ever seen" [my italics]. The argument of Campbell's was indeed inconsistent with the LT and Campbell called his argument obvious. When I questioned its obviousness, Campbell replied that things are obvious only according to one's ability.

Perhaps it is time to stop casting asparagus and other vegetables at each other. (There *are* gentlemanly discussants on both sides.) We should try to explain, with the utmost lucidity, why various arguments are right or wrong or partly wrong, or too vague ("not even wrong"), whether those arguments are our own or not. Can anyone cite places where my opponents J.O. Campbell, J.E. Chappell, Jr., H. Dingle, G. Galeczki, I. McCausland, S. Mooney, P.F. Ofner, Xu Shaozhi, L. Szego, G. Walton, Xu Xiengun have admitted error in relation to KSTR? I know of an admission by T.E. Phipps Jr. (4, 128). He and Galeczki are formidable

dissidents, and deserve much respect. But, as far as I know, Galeczki hasn't yet confessed to an error that I pointed out in Good (1995 and 1997).

References

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I.J. Good

Personal Motives and Remarks in Scientific Debate: I.J. Good *vs*. Objective Time

I agree with editor Roy Keys that space in scientific journals is best devoted to science itself, and that personal remarks, insults, and quarrels tend to detract from the progress of science. Yet with the great proliferation of sociological studies of science that followed upon Thomas Kuhn's enormously influential *The Structure of Scientific Revolutions* (1962)—the most crucial idea in which was that scientific paradigms are often chosen for non-scientific motives that may not be consistent with data from nature—it has became obvious that science is very much a cultural and personal endeavor, in which science *per se* is often very difficult to separate from the human element.

In line with Kuhn's thought, the multidisciplinary critical movement known as sociol or cultural *constructivism* has clearly demonstrated, despite straying off base in some instances, that what scientists promote as objective truth often reflects more of the cultural, social, or personal biases of the scientists, than of what rationally interpreted data from external nature requires. The Edinburgh school of history of science has even argued that scientists strongly tend to endorse those ideas that best enhance their own power structure. Underlying such analyses is the very important and well supported claim, advanced frequently by social scientists, once in a while by life scientists, and yet very rarely by physical sefentists—beguiled as they are by the supposition that they more than any other scholars deal in precisely computed certainties—that "all facts are theory-laden:" *i.e.*, that a meaning cannot be attached to any empirical data without adopting a particular theoretical viewpoint in the interpretation of said data.

To illustrate this point, take the case of relativistic "time dilation." Several kinds of 20th-century experiments have shown that various kinds of clocks will change their rates when the forces impressed upon them vary (and much earlier, the same was shown to hold for pendulum clocks). Einstein was credited with an ingenious "leap of faith" in claiming that in such cases, not merely the rate of the clock but even that of time itself is varying. Soon nearly all physicists, enthused over the concept that they could transcend common sense and show that nature does behave in what previously were judged irrational ways, joyously embraced and promoted the concept of "time dilation." Yet to this day there has been not one single scientific demonstration, nor even a claim of any, that what the "hands" of a clock do is also what time itself does—and I suspect there never can be any. The onlyy basis far such a claim remains a philosophical one: the acceptance of the hyper-operationalist view that there is nothing to time itself except what the clock reveals. This implies the highly illogical claim that a measuring device has been built to meausure only itself; but then, modern physicists have never shown much respect for logic, imagining it is inferior to what they call "science."

In Feb. 2000, as spokesman for a delegation of four Natural Philosophy Alliance members, I made this same argument verbally to a group of about 16 establishment physicists holding the planning meeting for the Physics Section of the American Association for the Advancement of Science. At the same time, carefully phrasing my presentation to be as diplomatic as possible, I undermined two other commonly advanced supports for special relativity (SR), by pointing out that (1) the 1887 Michelson-Morley experiment can be interpreted in at least five different ways—or "four reasonable ways, plus

the SR way," as I quickly rephrased it—and that (2) working particle accelerators have been built wihout any recourse to SR in their design (It has often been .claimed that they would not work if SR were not true). Not a single word of protest or debate was voiced by these evidently dumbfounded physicists, whose two main leaders shook my hand as the meeting ended soon thereafter. Yet the proposal I soon thereafter submitted for an NPA symposium at the 2001 meeting was curtly rejected—for the fifth time since 1995, again without a single comment on the substance of the ideas we offered. At least one referee, as revealed in what he wrote, had been present at this Physics Section meeting.

All this shows that it is not enough to keep one's attention focused on science (and philosophy), and to advance sound arguments, if those in power hold personal biases that make them prefer to suppress such arguments. The personal element in scientific debate, especially where a challenge to a widely-held paradigm is involved, tends to overwhelm any motive of keeping the debate focused on science itself. Kuhn was correct to claim that defenders of the prevailing paradigm usually do all they can to keep it from being overthrown, and that even more than church, state, or any other constituency, scientists-in-power constitute the harshest opposition to fundamentally new ideas, and to "the advancement of science"—a phrase ironically embedded in the very name of the AAAS.

Turning now to the comparatively minor irritant represented by I.J. Good (*Apeiron*, in this issue and earlier), let me note that he does not, as he claims, have to answer me once more in order to even up the number of exchanges. My first criticism of him was in reply to a great number of previous attacks by him against the ideas of several critics of modern physics, aIl of whom happened to be members of our NPA.

Secondly, Good seems to have a lot of trouble distinguishing between a criticism and an insult. Criticisms abound in scientific literature; they are integral to the advancement of knowledge. As the dictionary reveals, they become insults only when they involve insolence and rudeness. Although all criticisms of a theory so wholly erroneous as is SR may appear to be insults to those who deeply revere it—as so many do—the "insults" Good accuses me of are basically no more than such crit icisms as are proper in scholarly debate; they are motivated not by personal hostility, but by a sincere wish to determine the truth, and in this case to defend the unjustly accused, Further, some remarks he cites—*e.g*., "so typical"—are so mild as to be non-insulting by any standard.

Evidently I need to repeat a point I made in my last communication (*Apeiron*, vol. 6 no. 3-4, July-Oct. 1999, pp. 251-53), which Good clearly has not yet understood: a major reason my remarks are not insults is that it is not insolent or rude to point out the objective fact that someone else has been rude—any more than to make the objective comment that a man is fat means that the commentator is fat.

Priority in the causal chain also helps to determine just who is guilty, or most guilty, of being insulting. Long before I entered the debate, Good was levelling real insults against critics of SR, such as calling them "flat-earthers." He now says he has apologiaed for this; yet I have already shown that he did nothing of the sort, but instead only lamely tried to characterize his obvious insults as non-insulting.

The harshest word Good cites from my text is "contemptible." Yes, I used this word, in conjunction with the words "arrogance" and "haughty," to describe his accusation, made without the slightest semblance of proof, that some of us dissidents are intellectually dishonest. All three af these words are worth reemphasizing, and it might be appropriate to add still more adjectives, such as "libelous," to provide a fully adequate objective description of this chronologï cally prior attack against honest scholars.

What stands out most clearly in Good's latest text is that at this point he has been so overwhelmed with the personal element in the debate that he refrains entirely from dealing with scientific or philosophical issues—hardly a constructive approach, and not necessary even when the personal element is heavily involved.

He claims that he must delay dealing with technical matters until he can explore certain references new to him. Yet my last communication concentrated mainly on a technical topic omnipresent in the literature, and by Good's own admission already familiar to him: Einstein's celebrated thought experiment that purports to prove that simultaneity is relative to motion.

If Good would successfully grasp my argument (a reformulation of that first advanced in 1962 by Melbourne Evans), he would realize that Einstein's claim is crucially flawed not only by disagreement with the second postulate of his own SR, but even beyond this, by violation of the most fundamental principle of logic: the law of non-contradiction. That so many physicists and others have endorsed and promoted this erroneous argument for so long boggles the mind, and illustrates once again that clear facts can easily be denied if the reader's cultural, social, or personal biases—in this case, evidently denial of the importance and validity of logic—are strong enough to swamp them out. Only what is in the minds of SR supporters, not what is in nature ot logic, argues against the objective fact that time flows evenly everywhere.

His comment on my term "dreary" reveals that Good imagines that to argue in favor of SR is to promote "logic," which "refutes" the ideas of us dissidents. "Logic?" Hardly so. Instead SR is the very apotheosis of illogic, aimed not only against the sound physics of Newton, but also against the most important insight of ancient Greek scholarship in general: the idea that natural processes are rational processes, which can be understood rationally in the course of building an objective picture of the universe.

Good's concluding remarks about how dissidents striving for the best alternatives to SR often disagree with each other are entirely irrelevant to the issues I have raised. Of course we dissidents often disagree, and this situation reflects the very healthy degree of tolerance prevailing in our movement—never better displayed than at the international conference of the Natural Philosophy Alliance in Storrs, Connecticut this past June 5-9, at which 52 attending auhors from 10 different nations made important steps towards constructing the real and objective physics and cosmology of the new millenium (Good was invited, but remained aloof). All this stands in stark contrast to the conformity strictly enforced within the establishment whenever challenges to their mvst fundamental ideas is involved. I too disagree with some of the dissidents Good disagrees with, and admit that a few of them are rather weak thinkers. But of course I would never criticize themes harshly as he has, or for the motives he holds. I believe they all deserve considerable praise, at least for realizing that something is drastically wrong in contemporary physics and cosmology—not least the extreme intolerance of dissent.

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ERRATA

Vol. 6, No. 1-2

Cover and contents: The article by Dr. Jesudason was incorrectly identified. The correct title is "Time's Arrow, Detail Balance, Onsager Reciprocity and Mechanical Reversibility: II. Thermodynamical Illustrations"

Page 59, line above eq. (18): $F^i mU^i/dt$ should read $F^i=mU^i/dt$

Page 61, Ref. [19]: before the second Idem, [20] has been omitted.

Vol. 6, No. 3-4

Page 199, line 3 after eq. (3): should read "… that ϕ is the time component…"

" : line before Example: "*i.e.*" should read "*cf.*"

Page 243, left column, lines after eqs. (3) and (4): some anomalous marks.

Page 254, left column, line 3 of second paragraph after "Space is 3-dimensional'2": "flat'space'" should read "that 'space'."

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Page 98 line 7, equation (6.5): should read

"$w = \frac{c}{n} + \left(c\left[\sqrt{1 - \frac{v_s^{\,2}}{c^2}\sin^2 i} - 1 \right] + v_s \cos i \right)\left(\frac{1}{n^2} \right)$."

Page 101 line 21, equation (9.5): should read

"$l' = c_1 'T + \Delta c'\left(\frac{d}{c_2'} \right)$."

Page 102 line 2, equation: should read

"$l' = \frac{1}{8}at^2$, where t is the pulse duration

divided by frequency."

Corrigendum

In his reply to a critical article by G. Hunter in *Apeiron* Vol. 7 (1-2), M.W. Evans stated (p. 30) that Dr. Hunter "does not cite the replies [12] that clear up the confusion in [11]." Reference [11] is a publication by Dr. Hunter in *Chem. Phys.* 242, 331 (1999). Reference [12], the reply by Dr. Evans to reference [11], was in press at *Physica Scripta* at the time the issue of *Apeiron* appeared. This reply, therefore, could not have been cited by Dr. Hunter. Although a preprint of the reply was available on an Internet website maintained by the U.S. Department of Energy from June 1999 onwards, it cannot be assumed that Dr. Hunter was aware of the existence of this preprint.

Dr. Evans further writes that "In ref. [11] Hunter adopts the same method of citing criticisms, but not citing replies." While Dr. Evans is technically correct in pointing out lacunae in the citation of replies to criticisms referenced by Dr. Hunter in his two publications, it is preferable for authors to avoid such statements in scientific debate. In future, every effort will be made by the editors to prevent the recurrence of such incidents, in particular by ensuring that replies to criticisms are subjected to the same scrutiny as the critical articles themselves.

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Change of Format

Effective in 2001, *Apeiron* will cease to appear in a paper format, and will be available online only via the Internet at http://redshift.vif.com without charge to individuals. The @ Issue (correspondence) section of the journal will be discontinued, while submitted manuscripts will be posted to an "Under Review" area. The change of format will allow greater frequency of publication, and is to be accompanied by new requirements for authors. Henceforth, all manuscripts shall be submitted by electronic mail or on diskette in Microsoft Word format. Manuscripts should be prepared using the document template available from *Apeiron* or Manuscript Authoring Toolkit available from the American Institute of Physics http://www.aip.org/pubservs/compuscript.html. All mathematical expressions must be properly created and formatted using either the Microsoft Equation module or the Mathtype program. Authors wishing to obtain further information about preparing manuscripts may send an enquiry to apeiron@vif.com.

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