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# Herbert Dingle Was Correct! Part II

## An Investigation of the Second Refutation of Relativity

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### 1.0 Introduction

In the September 8, 1962 issue of Nature under the title "Special Theory of Relativity"[1]. Herbert Dingle published his first refutation of Einstein's special theory of relativity. This short note pointed out "what appears to be an inconsistency in the kinematical part of Einstein's special theory of relativity." In a previous paper, the author presented an analysis of the argument presented in this short article and the attempts to refute it that have been published by various authors. This paper addresses Dingle's second refutation of the theory published in "The British Journal for the Philosophy of Science" Vol. 15, No. 57 (May 1964), pages 41-61, with the title "Reason and Experiment in Relation to the Special Relativity Theory".

This paper by Dingle presents a second and different refutation of the special theory of relativity, while at the same time supplementing and improving upon the arguments presented in the Nature article. It presents a mathematical refutation, a philosophical explanation of the argument, and an analysis of experiments claimed to prove or disprove the theory. Essentially the argument is a philosophical one aimed at clarifying the reasons for the correctness of the arguments originally presented in the Nature article.

Unfortunately, Dingle's second refutation, presented in the BJPS paper, has been effectively ignored and forgotten. This demonstrates the callous and arrogant attitude of the scientific establishment. While numerous papers have been published which criticize and attempt to refute Dingle's arguments, none of them address the arguments presented in the BJPS paper. It is as if it were never published. No reference is made to it in the literature and, while numerous references cite the Nature article, none of Dingle's critics have ever referred to the BJPS paper. It therefore, stands as an unanswered refutation of Einstein's theory. Even critics of relativity, and Dingle supporters, seem to be unaware of this important paper.

### 2.0 Purpose and Objectives

The primary purpose of this paper is to make clear that attempted objections and refutations of Dingle's arguments are insufficient to save Einstein's theory of relativity from the logic of his refutation. This will be accomplished by reviewing Dingle's philosophical viewpoint with regard to the theory of relativity and analyzing the logic of his position. This entails a careful analysis of his viewpoint and details of his arguments. This will be preceded by a summary of the contents of his paper "Reason and Experiment

in Relation to the Special Relativity Theory". In addition we will consider other papers which shed light on Dingle's reasoning and philosophical position. An analysis of Dingle's philosophical viewpoint is important because it informs us about what Dingle demands of a scientific theory. Essentially, Dingle's criticisms go beyond a mere mathematical or logical refutation of relativity and seek to reach the deeper level of methods of determining the criteria of scientific truth.

The last objective will raise the question of belief with respect to scientific theory using relativity as an example. We will attempt to address the question: Why has the scientific establishment embraced a theory which has never been adequately confirmed experimentally, which is full of contradictions, and which fails to adhere to established principles of scientific validation, continue to command the belief of the scientific establishment in the face of severe criticism and controversy?

**3.0 Précis Of Dingle's Second Refutation Of Relativity**

The paper is divided into four sections: 1. Introduction, 2. Minkowskian Mathematics and Einsteinian Physics, 3. Relation of the Special Relativity Theory to Experiment, 4. Conclusion. The second section is divided into two parts: A. The Minkowski Form of the Special Relativity Theory, and B. The Role of mathematics in Physics. Section 3. is divided into four parts: A. The Origin of the theory, B. The Relevance of Experiment to the Theory, C. Experimental Tests of Einstein's second Postulate, and D. Kantor's Experiment. The following gives a brief outline of the contents of these sections.

The Introduction informs the reader that the purpose is to present further evidence to support his arguments that the theory of relativity "could not correctly describe the facts of nature". The revised arguments take into account the criticisms received which reveal "serious confusions" in the arguments of his critics. The objective is to present arguments "as little susceptible as possible to misunderstanding".

In section 2. Part A, it is demonstrated that a contradiction arises when the Minkowski form of the theory "favored by most correspondents" is used. This is then shown to confirm the contradiction derived in the article published in Nature. Section 2, Part B, addresses the problem of the "proper function of mathematics in physical research." Dingle says that "The moment mathematics assumes the primary instead of the secondary role in research, the research becomes unscientific and full of danger", and explains this view.

In section 3. Part A, the experimental support for relativity is shown to be nonexistent, and this view is explained with an historical discussion. In section 3, Part B, Dingle discusses the necessary criteria for an experimental confirmation of relativity, and shows that no experiments have fulfilled the requirements. Section 3, Part C, discusses recent experimental tests of Einstein's second postulate, and shows that they are inconclusive. In section 2, Part D, Kantor's experiment which provides a proof "of the invalidity of the special theory of relativity" is briefly described.

The conclusion states "that the special relativity theory can no longer be maintained…because it requires measuring instruments to behave in impossible ways…and second because it violates experiment." The failure to address this problem is explained by as follows "Unfortunately, the dogma that a refusal to accept special relativity theory is necessarily based on a misunderstanding of it has become so powerful that it is impossible for serious criticism to be read with sufficient care to evoke the awareness that it merits attention." A call to action follows which ends the paper: "…it is the compelling duty of physicists to put such examination in the forefront of their activity. All I can hope to do is,…to weaken the force of the dogma and restore the attitude,… of complete submission to the demands of reason and renunciation of all attempts to ignore or misrepresent considerations whose consequences would be unpalatable."

The above discussion is too brief to give a clear understanding of the mathematical, logical and philosophical content of Dingle's argument. This will be addressed in the following sections, which will concentrate upon the essential aspects of the arguments to be analyzed in this paper.

### 3.1 Refutation of Dingle's "Inconsistency"

Dingle's Introduction introduces the reader to the main problem addressed by the BJPS paper. This is the failure to accept Dingle's "inconsistency argument" presented in Nature and reasons for resistance to his conclusion that relativity "can no longer be maintained". We recall that Dingle pointed to an inconsistency in the Nature article, and did not claim a contradiction or falsification at that time. His approach was to gain acceptance of his views and not to provoke resistance with extreme claims. Clearly this tactful approach failed, and he revised this approach in the BJPS paper, which stated the claims in more forceful language.

Dingle restates the conclusion of the Nature article this way "Einstein deduced…that a moving clock works slower than a stationary one. By a similar line of reasoning I deduced, from the same basic ideas, that the same moving clock works faster than the same stationary one. Hence the theory, since it entails with equal validity two incompatible conclusions, must be false. … The only way to save it is to show that Einstein's deduction is genuine and mine not, and this…no-one has even attempted." The explanation of this is clear, as Dingle knew, since the two contradictory deductions employed the same method or procedure, based on the same reasoning, the disproof of Dingle's deduction must entail also the disproof of Einstein's' deduction. This being impossible, no disproof could be forthcoming, and predictably no one submitted an attempt to do this.

Dingle divides his correspondence of attempted refutations of his views into two groups. According to Dingle, the first group simply asserts, "Einstein's deduction must be right, and conclude that mine, since it differs therefrom, must be wrong. This of course, presupposes that the theory, being necessarily right, cannot have false implications, which

is the point at issue." The second group of critics "…assume that I have made one of the elementary errors to which beginners in relativity theory are so prone (and which in fact, I learned to avoid before many of them were born), and so blind themselves to the actual point. It is no doubt for this reason that the specific questions which I have put--which, if truly faced, would have made clear the nature of my argument--have been universally ignored."

### 3.2 Dingle's Inconsistency Proved Via The Minkowski Form Of Relativity

The essence of the BJPS paper is the proof of inconsistency using the Minkowski mathematical formalism. Here the purpose is to close the loophole used by Born to apparently refute Dingle's claim. Since Dingle had used Einstein's old obsolete formalism, while Born having used the more modern formalism preferred by relativity experts, there was an implication that Dingle was wrong, because he failed to use the modern, more powerful method. The difference was purely one of appearance, as Dingle, clearly understood, however, he endeavored to close the loophole with a proof using the Minkowski method. An abridgement is presented here.

Dingle bases his argument on equation 1, which is the standard Minkowski invariant interval where the speed of light is defined in units which give the result c=1. Hence, c does not appear in the equations.

(1) $ds^2 = dt^2 - dx^2 = d\tau^2 - d\xi^2$

Equation 2 is obtained by dividing by $d\tau$.

(2) $(dt/d\tau)^2 = 1 - (d\xi/d\tau)^2 + (dx/d\tau)^2$

Dingle sets $d\xi=0$, and then solves for $(dt/d\tau)^2$ and obtains equation 3.

(3) $(dt/d\tau)^2 = 1 + (dx/d\tau)^2 > 1$

Now from equation 3 Dingle deduces that "it is readily seen from the Lorentz transformation that this quantity has the value $(1-v^2/c^2)^{-1}$ at which he (Einstein) arrived. This requires the $\tau$ ('moving clocks') clocks to work slower than he t ('stationary') clocks." to show a contradiction Dingle now sets dx=0 and obtains equation 4.

(4) $(dt/d\tau)^2 = 1 - (d\xi/d\tau)^2 < 1$

Dingle shows that this is the same as his result in the Nature article. He says "it is readily seen from the Lorentz transform that this quantity has the value $(1-v^2/c^2)$ at which I arrived. This requires the $\tau$ ('moving') clocks to work faster than the t ('stationary') clocks." The contradiction is proved since it has been shown using the method of the Minkowski formalism that it is equally true hat the clocks run fast as that they run slow. There is no way within the formalism or from the postulates of relativity to determine

which of these statements is really true, since both must be deemed equally valid deductions of the theory. This situation is the same as I have shown in other papers using the traditional formalism. For every true statement deduced using the theory, there is another true statement which contradicts it. Dingle therefore has shown this is true also for deductions using the Minkowski formalism.

### 3.3 Dingle's Discussion Of His Proof

In his follow up comments Dingle says "I do nothing different from Einstein except that I choose a different pair of events for determining the ratio of the clock rates.…Hence the only way of saving the theory is to show that a pair of events on a clock stationary in one, and not the other of the co-ordinate systems in question is uniquely valid for calculating the ratio of clock rates; and this of course is impossible because it is an essential part of Einstein's (unlike Lorentz's) theory that all inertial co-ordinate systems are equivalent in every respect. It cannot be held that this general process is not a legitimate one for finding the ratio of the clock-rates, because it is the one which Einstein used, and I simply follow his lead." This is followed by Dingle's concluding statement which states the essence of the refutation: "I therefore assert that this proves conclusively that the special relativity theory, though mathematically self-consistent, requires clocks to behave in an impossible manner, for one set of synchronised clocks must concomitantly go both faster and slower than another set, and this is impossible." This last statement became the source of misunderstanding, which Dingle should have anticipated. The statement doesn't go far enough, and his holding back or pulling his punches negated its effectiveness. A modern approach makes it clear that the theory fails. Equation 3 gives the solution $dt=\beta d\tau$, while equation 4 gives the solution $dt=\beta^{-1}d\tau$. Hence, we have that $\beta d\tau=\beta^{-1}d\tau$, which is clearly a false result indicating a contradiction inherent to the mathematics.

Having proved his argument mathematically, Dingle addresses two of the arguments used to refuse his previous proof given in the Nature article. The first is the obvious misconception, which however is a prominent weapon in the arsenal of relativists, that the results are not contradictory, because they "represent the view of the matter taken by an observer in a particular co-ordinate system, and that therefore these results are no more contradictory than the observations of two persons of equal size, at a distance from one another, that to each the other appears smaller than himself." Dingle painstakingly shows that this is not the interpretation presented by Einstein in his 1905 paper, and that it is not the interpretation of textbooks, and it is not the view of proponents of asymmetric aging as a solution of the twins paradox. Dingle concludes by saying "While, therefore, it is quite true that the theory requires observers in relative motion to draw opposite conclusions regarding the relative rates of clocks, it does not regard those observations as having equal objective validity in relation to observation, and it would become ineffective if it did."

The second argument addresses Born's criticism: "The simple fact that all relations between space and time expressed by the Lorentz transformations can be represented geometrically by Minkowski diagrams should suffice to show that there can be no logical

contradiction." Dingle avoids the obvious rejoinder that if this were indeed the case, then mathematicians would only have to draw diagrams to prove their theorems, while in actual practice they eschew the use of diagrams as part of their proofs, because the use of diagrams to prove an argument is not considered a rigorous or convincing method of mathematical proof. Instead, Dingle takes a philosophical approach to Born's objection. He says "This argument well illustrates the extent to which the role of mathematics in physics is misconceived…it has no bearing at all on the question whether the diagrams or the equations represent what occurs in nature." With this new theme, Dingle transitions to the philosophical problem of Section 2, Part B, The role of Mathematics in physics.

### 3.4 The Role of Mathematics in Physics

In Section 2, Part B, Dingle addresses the philosophical problems of science raised by the theory of relativity. These were for Dingle the main problems posed by relativity. He says "The general fallacy of which these arguments are particular examples is one of the greatest dangers in current physical science, and needs to be brought clearly to light. The proper function of mathematics in physical research…is to enable one to see all that is contained in and implied by any particular idea which one may form about the metrical relations existing in the world; but mathematics can pass no judgment whatever on the rightness or wrongness of that idea except in so far as the implications which it revels may serve, by comparison with experience, to make such judgment possible. The moment mathematics assumes the primary instead of the secondary role in research, the research becomes unscientific and full of danger…Often…the mathematical machinery employed…yields results both valid and invalid in relation to experience….In the case of co-ordinate transformations, we are without sufficient experience to decide between at least two possibilities--the Galilean and the Lorentz transformations. Mathematically they both preserve the relativity principle. We know only one of them can correspond to the actual behavior of clocks and measuring rods in relative motion, but we have no experience at sufficiently high velocities to decide experimentally between them."

One of Dingle's most persistent criticisms of modern scientific practice was its neglect of inquiry into nature through the inductive method by experiment as exemplified by Faraday, and its relegation of experiment to a role subservient to theoretical mathematics. For him the theory of relativity was a primary example of this kind of scientific practice. Having set the stage for his final criticism, Dingle now addressed the problem of experimental confirmation of relativity.

### 3.5 Relation of the Special Relativity Theory to Experiment

Dingle begins with the stunning statement "It is generally held that Einstein's special theory has received a large amount of experimental support: in fact, it has received none at all… All that electromagnetic experiments could show was whether the theory, if it was correct, achieved its purpose: in other words, they could show that either Newtonian mechanics was wrong and the classical electromagnetic equations right, or the classical electromagnetic equations were wrong and the Lorentz transformation was…the true

correcting factor, but they could not possibly decide between these alternatives. But all experiments so far performed on this matter have been electromagnetic in character, and therefore afford no information concerning the validity of Einstein's theory." This introductory statement was general and vague so he made it more specific. "Einstein's and Lorentz's theories correspond respectively, to the two alternatives just mentioned…There were thus two theories, essentially different in the physical sense, but identical in the mathematical machinery employed…Thus a state of complete confusion was generated, in which we are still involved, which exhibits an indeterminate mixture of conflicting physical conceptions associated with a single set of equations." Dingle's inference is clear. Unless we can perform experiments that clearly distinguish between the theories of Einstein and Lorentz, we can not state that Einstein's is the true theory proved by experiment. However, as Dingle says, no experiments have ever been done which conclusively demonstrate this.

At the beginning of Part B, Dingle asks, "What, then, in the light of these considerations, must be a sine qua non of any experiment designed to decide between classical (Maxwell-Lorentz) and classical (Newtonian) mechanics? Clearly there must be no presupposition that either is necessarily right, and so the experiment must be described in terms not involving such presupposition…Yet, incredible as it may seem, the best known of such experiments--that of Michelson and Morley--as it is universally understood, fails to meet this condition.…the foregoing considerations show that the primary , and quite inescapable, condition is that he experiment must not in any way, directly or indirectly, involve an appeal to electromagnetic theory; otherwise any argument from the experiment leading to the conclusion that the theory is correct must inevitably be circular." A simplified version of this argument is that any experiment to test a theory must not be the basis upon which the theory rests. Since relativity seeks to explain the Michelson-Morley and related experiments by the introduction of two new postulates, we can not expect the experiments to be put forward as proof of these postulates. Hence, any proposed tests of relativity can not appeal to the Michelson-Morley type of experiment as proof.

In Part C, Dingle addresses independent experimental tests of Einstein's second postulate. He concludes "The net result, therefore, is that Einstein's second postulate is still untested experimentally…It is now necessary to point out , however, that a confirmation of the postulate would be anything but conclusive regarding the special theory as a whole." Here Dingle is pointing out that confirmation requires that all the postulates as well as the procedure for synchronizing clocks would have to be proved experimentally.

Finally in Part D, Dingle discusses an experiment which constitutes "an experimental proof of the invalidity of the special relativity theory." He concludes that "We are not dependent, therefore, on a decision concerning the relation of the second postulate: we can conclude, independently of that, that special relativity is untenable because it does not fulfill its purpose of accrediting classical electromagnetic theory, which is its sole claim to acceptance."

**3.6 Dingle's Conclusion**

"We reach the conclusion, then, that the special relativity theory can no longer be maintained--first , because it requires measuring instruments to behave in impossible ways, and second (if Kantor's result is confirmed), because it violates experiment. Since it was devised to avoid an apparent breakdown of electromagnetic theory, we are left with the alternatives that the theory is in fact untenable or that some supplementary theory is possible that can redeem it. The only such theory yet proposed is that of Lorentz, which is highly unlikely since the postulated changes accompanying motion through the ether…are entirely ad hoc…The alternative, that the laws of electromagnetism need reformulation, thus appears almost inescapable…But it is not my purpose to attempt a re-construction of electromagnetic theory…"

## 4.0 Analysis of Dingle's Refutation of the Special Relativity Theory

Dingle's argument takes a classical form. He presents a mathematical refutation and an experimental refutation. Clearly, mathematical reasons are the basis for his argument, while the experimental part of his argument is to negate the simple minded rejoinder that: The special theory has been extensively proved by experiments, every day it is demonstrated in the operation of high energy accelerator experiments. This simple minded conception of experimental validation of relativity, has become inculcated and ingrained to such an extent that physicists actually believe, it despite the fact that it is wrong. All of the experiments claimed to prove relativity are as equally valid as proof of the Lorentz theory. Dingle clearly is trying to make this clear in his experimental discussion. Since Dingle's mathematical contradiction is the basis for his conclusion that special relativity is untenable, it will be addressed first.

### 4.1 Dingle's Mathematical Contradiction

It is clear that Dingle has discovered a problem in the algebraic structure of the Lorentz transformations. The difficulty has been to understand this inconsistency. The reason is simply stated: there are four solutions to the Lorentz transform equations instead of the assumed two.

Relativity assumes that there are two solutions for the ratio of clock rates. This follows from the fact that when two observers are in relative motion, there are two viewpoints: A's view of B, and B's view of A. Now relativity asserts that when A views the B clock, it is slow, and when B views the A clock it is slow. Hence, there are two clock ratios to determine. But, Dingle discovered, without clearly understanding it, that there are other solutions. Hence, when we solve for A's view of the B clock, there are two solutions, one that the clock is slow and another that the clock is fast. Likewise, when B views, A's clock there are also two solutions, one that it is slow and another that it is fast. The result is that for every true deduction that a clock is slow there is also another one that deduces that the same clock is fast. It is important to note that Dingle did not recognize that there are four instead of two solutions, but he did notice that the procedure generated two contradictory solutions and for this reason he decided that the theory was untenable. He

had good reason to do this. A physical theory is meaningless when it produces two equally valid contradictory predictions.

To see how the four different solutions are obtained lets return to the discussion of section 3.2. We start with equation 1. Dingle proceeds to equation 2 and then places evaluation conditions on it. But it is simpler to evaluate equation 1. Taking equation 1, we evaluate with the condition $d\xi=0$. The result is:

(5) $dt^2- dx^2= d\tau^2$

This equation can generate two solutions. The first is obtained by dividing by $d\tau^2$. The result is equation 3: $(dt/d\tau)^2=1 + (dx/d\tau)^2 >1$. The substitution $dx=vdt$, is used to obtain: $(dt/d\tau)^2=1 + (vdt/d\tau)^2$ . Rearranging gives: $(dt/d\tau)^2(1-v^2)=1$. Remember that $c^2=1$. So we have that $dt=(1-v^2/c^2)^{-1/2}d\tau$, just as Dingle obtains. The other solution arises by dividing by $dt^2$. Hence, $d\tau^2/dt^2=(1-dx^2/dt^2)$. Using $dx=vdt$ as before: $d\tau=(1-v^2/c^2)^{½}dt$. This we recognize as Einstein's solution from his 1905 paper.

We obtain the other two solutions by setting $dx=0$ in equation 1. The result is 6:

(6) $dt^2= d\tau^2 - d\xi^2$

The first solution is obtained by dividing by $d\tau^2$ , and we obtain Dingle's equation 4. Using the procedure given previously with the substition $d\xi=vd\tau$, we obtain Dingle's solution: $dt=(1-v^2/c^2)^{½}d\tau$. The second solution is obtained by dividing by $dt^2$, and we obtain the result: $d\tau=(1-v^2/c^2)^{-½}dt$. We now have all four solutions:
(1) $dt=(1-v^2/c^2)^{-1/2}d\tau$, (2) $d\tau=(1-v^2/c^2)^{½}dt$, (3) $dt=(1-v^2/c^2)^{½}d\tau$ and (4) $d\tau=(1-v^2/c^2)^{-½}dt$. These correspond to the, more familiar, equations using the traditional notation introduced by Einstein in 1907, where $\beta=(1-v^2/c^2)^{-½}$ and $\beta^{-1}=(1-v^2/c^2)^{½}$, and we delete the differential symbols: (1) $t=\beta t'$, (2) $t'=\beta^{-1}t$, (3) $t=\beta^{-1}t'$, and (4) $t'=\beta t$.

When we examine these we see that equation 1 is Einstein's 1907 equation for time dilation and 2 is Einstein's 1905 equation for time dilation. Both obtained for the condition $d\xi=0$. Equations 3 and 4 arise for the condition $dx=0$. Now it is clear there are four and not two solutions as is assumed by the special relativity theory, so it is clearly untenable as Dingle maintains, unless we can assign some meaning or explanation to the additional equations.

### 4.2 Dingle's Dilemma

Dingle, when writing the BJPS paper, recognized that the proof of a mathematical contradiction was insufficient. The objections to his Nature presentation had shown that a mathematical presentation alone was not going to compel belief. But the reasons for this are difficult to pin down. Surely, one would think that a clear proof of a contradiction would be sufficient to compel acceptance of the point, but this is not the way things work

in the world of relativity physics.

Dingle was well versed in the controversy of the twins paradox, and had written two books on the theory of relativity. Dingle, however, did not accept establishment thinking with regard to relativity. He had been embroiled in controversy since the 1930's and his views were consistently rejected. To understand this, we must briefly delve into some history.

Einstein's theory was generally unknown, except to physicists and mathematicians up to about 1920 when it came into the public view in a big way. This caused considerable scrutiny by philosophers, who initially rejected it. The physicists used their specialized knowledge of mathematics and physics to run over this opposition. The tactic used was to answer criticism by treating the critics as ignorant and misinformed. The usual method was to recite the theory pretending to correct elementary errors. The idea was that a certain special knowledge was processed by the physical mathematicians, and they were obviously right and the critic obviously wrong. The success of this technique, resulted in its institutionalization. Critics were henceforth dismissed as having committed elementary errors of logic and since the theory was right, they were wrong. This has continued to this day. Given this environment, there was clearly no room for real criticism, and Dingle knew this. His objective was to formulate a proposition that could not be dismissed without a complete answer to the posed difficulty. Unfortunately this tactic didn't work.

It seems likely that his attempt to explain a contradiction in the Nature article caused him to reevaluate his approach. One result was clear, the criticisms he received showed that most of his critics didn't understand the theory which they so ardently claimed was right and Dingle wrong. Hence, the BJPS paper was designed to make a clear and effective argument against the theory. Dingle attacked both the mathematical structure and the experimental and philosophical basis of the theory. However, in doing this he made some errors in judgment, which negated his effort.

The main one was his failure to clearly state that the mathematics of relativity was contradictory. Instead, to avoid complications, he said in his nature article that there was an inconsistency. But his use of this term was not in the same sense that his readers interpreted it. They were sure he meant a mathematical inconsistency. But, since it was believed that the theory had been proved to be mathematically consistent, this word was misinterpreted. In the BJPS paper Dingle changed his approach. He claimed that the mathematics was consistent, but that the physical interpretation of the theory resulted in a contradiction. Dingle compromised. Although he knew that there was a problem in the mathematics, he was unable to pinpoint it exactly, so he attributed the difficulty to physical interpretation of the mathematics, instead of to a contradiction within the mathematics. This was a mistake.

### 4.3 Schleichert's Attack

An apparently effective answer was immediately produced by Dr. Hubert Schleichert, published in BJPS, Vol. 15, No. 60 (Feb. 1965). The method used is clever and dishonest. It is an example of a phony refutation, typical of the relativity establishment. The real issue is ignored, and a red herring (or straw man) is used to show that Dingle's argument is wrong. The opening is provided by Dingle in his claim that the problem lies not in the mathematics, but in the physical interpretation of the mathematics. Schleichert proceeds to show this this can not be true and thus Dingle is wrong. The problem of the mathematical contradiction is avoided, and ignored. Hence it is never addressed. The argument becomes whether a mathematically consistent theory can have inconsistent physical interpretation. To prove this is impossible, Schliechert appeals to Born's argument, which was quoted by Dingle as given in section 3.3. Schleichert says "It would be very unusual if there exists a complete geometrical model for the STR (proving the consistency of the theory, provided that geometry itself is consistent), and at the same time there is another (empirical ) model leading to contradictions." Here he is saying that the traditional relativity model is correct, and therefore any different model must inevitably be wrong, since relativity is, of course, correct. One can imagine all the readers nodding in agreement with this. Now he delivers the final blows: " From the logical point of view it is impossible to find an inconsistent model of any theory whatsoever, because the mere existence of a model proves the consistency… What is maintained by professor Dingle is possible only if the physical interpretation of the formalism would be incorrect, i .e., if there were tacit changes of the meanings of terms. But this is not discussed in the paper." Again we see the heads nodding in agreement.

Schliechert's performance is perfect. He has defeated his opponent, and protected the faithful from Dingle's heresy. But, is this honest scientific method? I doubt it. The real problem is never addressed. Schleichert's paper, which illustrates the position of formal science, seems to say this: Come back to us later with a new paper, which discusses how the meanings of the terms have changed, and we will reconsider your application, maybe.

The failure to address the real problem, understanding why there are contradictory solutions which imply different physical meanings for the terms of the mathematics, is the reason for the charge of dishonesty in science. If the purpose of science is the understanding of nature, then the problem certainly deserves an answer, different from the one which Schliechert gives. For in his view, there can be nothing to investigate, Dingle is mistaken. But, this is not an answer unless he can say why this is true.

### 4.4 An Ironic Comment

It is an irony that Schliechert's comment --"What is maintained by professor Dingle is possible only if the physical interpretation of the formalism would be incorrect, i .e., if there were tacit changes of the meanings of terms. But this is not discussed in the paper"-- is exactly the point that Dingle was trying to make. However, because it was not discussed explicitly as an independent topic, it seems Schleichert missed the point. Dingle's idea was that while the mathematics could be consistent, it was possible for the

interpretation of the mathematics to be inconsistent. In Section 2, Part A, after deriving the inconsistency of equations 3 and 4 using the Minkowski formalism and demonstrating a contradiction based on Einstein's 1905 paper on relativity, Dingle discusses an alternative interpretation based on Einstein's 1907 paper on relativity. Dingle dismisses this second interpretation as not being what Einstein really meant.
Here, we have a curious ironic twist. Dingle tries to rule out this alternative inconsistent interpretation. Why? The answer must be this. Given two interpretations of relativity, any claim by Dingle that Einstein was wrong would be met by a counterclaim that Dingle was wrong based on the alternative 1907 interpretation. Cleary this is a fruitless task. Proving the 1905 version is inconsistent is met by a refutation based on the 1907 interpretation, and any demonstration of a contradiction based on the 1907 version, is then immediately countered by a reversion to the 1905 interpretation. It is an endless and pointless circle. Dingle tried to avoid this and stuck to one basic interpretation that could be used consistently to show a contradiction.

Dingle was clearly aware of the difficulties in demonstrating a contradiction. Hence, he avoided the use of this term. But inconsistency means basically the same thing to a mathematician. Here Dingle encountered a semantic problem. Was he trying to prove a mathematical inconsistency or a physical inconsistency? Clearly the latter, but many readers, such as Schleichert were unable to discern the difference. Dingle was trying to say that even though the mathematical formalism might be mathematically consistent, the physical interpretation of the meaning of the mathematical symbols and the way the resulting deductions were interpreted resulted in inconsistent physical conclusions. Hence the theory was faulty.

This conclusion seems obvious to a student of the paradoxes of relativity. These are clear evidence of inconsistent physical deductions based on the theory. So it was a puzzle to Dingle, and other critics, that this obvious point could not be understood by the scientific community. Dingle tried to make this point over and over again, but his audience resisted this conclusion. They chose to believe a theory that they didn't fully understand, and which produced confusing and absurd deductions. They clung to the belief that it must be right despite its obvious deficiencies.

### 4.5 Dingle's Failure

It is clear that although, Dingle had identified the difficulty within the special relativity theory, he was unable to clearly communicate what this problem was, and how it could be eliminated. For the remainder of his life, he was stuck with the problem of simply finding a way to communicate what he had discovered. He eventually published a book describing his efforts. The problem of working out a new theory, which would remove the difficulty, was not his goal. One reason for this was that Dingle, as a philosopher of science, was primarily concerned with the problem of scientific truth. Put differently, Dingle was interested in the problem of what his inconsistency implied regarding the validity of the fundamental theories of physics. In this regard, in the conclusion section, he advanced this conclusion: "Since it [special relativity] was devised to avoid an

apparent breakdown of electromagnetic theory, we are left with the alternatives that that theory is in fact untenable or that some supplementary theory is possible that can redeem it." So Dingle was looking to replace or modify classical electromagnetic theory and not relativity. He was certainly not looking to develop a new kind of relativity theory or a different version of relativity that might be both mathematically and physically consistent. In the event, neither goal was successful. Classical electromagnetism remains unchanged as well as special relativity.

### 4.6 Dingle's Refutation of Experimental Proof

Dingle bases his claim that experiment invalidates relativity on Kantor's experiment. This experiment is rather unknown today, so it appears that it was a weak result. But there are other relevant experiments available today. One, the Haefle-Keating experiment is particularly relevant. This experiment has been widely acclaimed as proof of the special relativity theory. Actually, it is only a partial confirmation, like all experiments in relativity. They are consistent with the theory, but they are also consistent with the Lorentz ether theory. This experiment does not prove relativity and disprove Lorentz's theory, it supports both of them. Dingle does not go far enough in this respect. All the experiments that purport to prove relativity by experiment, fail to rule out the alternative Lorentz theory, and this is a major problem. A second example is the particle decay experiment. Many of these have been performed. They are however, consistent with both special relativity and the Lorentz theory.

Essentially the problem is not much different today than in 1964. There are a large number of experiments which are consistent with relativity, but there are no experiments which confirm relativity while ruling out the alternative Lorentz theory.

## 5.0 Summary and Conclusions

This paper has analyzed the arguments given by Dingle in his 1964 paper published in the BJPS. As pointed out, this paper has been neglected and the proof of a contradiction contained in it has never been answered. The obscurity of this paper is surely the reason. In 1991, I.J. Good published a paper titled "The Kinematics of Special Relativity and Dingle's Fallacies", Physics Essays, Vol. 4. No. 4, 1991, pages 591-595. This was the first in a series of papers in which Good purported to prove the self-consistency of the kinematics of special relativity. In his Physics Essays paper, Good addressed what he called "Dingle's fallacies", however, while Good attempted to refute some of the other of Dingle's published proofs of a contradiction, he failed to address the 1964 BJPS paper discussed here. Hence Dingle's proof of refutation discussed here stands.

The analysis given here supported Dingle's claim of a proof of an inconsistency in the special relativity theory. The problem arises from the fact shown here, that there are four possible solutions, while the special relativity theory acknowledges only two solutions. The two unacknowledged solutions contradict the solutions claimed in the special theory. Hence there is definitely a contradiction that needs to be addressed.

Schleichert's commentary can not really be considered a refutation, of Dingle's proof, because it offers nothing new. He merely repeats Born's apparent refutation which is based on the thesis that Dingle is wrong because the theory is correct, and his proof that the theory is correct is to point to a diagram. Schleichert seems to accept that this means that the probability that Dingle is correct is low. But this is not a refutation, or a proof of anything at all, it merely is opinion.

In his book "Science at the Crossroads" published in 1971, Dingle admits that he made an error in his attempts to gain acceptance of his refutation of relativity. He says Being a poor psychologist, I did not realize that scientists, like other people, are far more ready to search for flaws in other people's reasoning than to eliminate prejudices from their own, and I remained in a state of bewilderment at my inability to make clear to others what seemed obvious to me." This state of affairs has not changed. The main contribution of this paper is to point out that there is mathematical evidence which supports the idea that the special relativity theory is incomplete, and that there, indeed, are some mathematical as well as physical errors that need to be addressed in order to perfect the theory. Dingle should be thanked for pointing out problems that lead to these needed revisions.