

**Herbert Dingle Was Correct! Part VI**  
**The Dingle-McCrea Debate In Nature, October 14, 1967**  
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## 1.0 Introduction

This paper addresses the famous relativity debate between Herbert Dingle and W.H. McCrea, which appeared in the October 14, 1967 issue of the science journal Nature. This debate has generally been portrayed as having been conclusively “won” by McCrea. This paper will examine the arguments presented by McCrea, which purport to refute Dingle’s claims. These arguments have been repeated many times elsewhere, sometimes in a different form. In previous papers of this series, some of them have been examined and found to be erroneous. Here the original forms of the arguments are examined as given by McCrea.

## 2.0 Purpose and Objectives

Propaganda from the relativity establishment has produced a distorted version of Herbert Dingle’s criticism of relativity. A good example is the following:

**Herbert Dingle** (1890 – 1978) was an English astrophysicist. He claimed to have disproven the theory of special relativity formulated by Albert Einstein. However, his disproof was refuted, notably by astrophysicist Sir H. William McCrea during the 1950s.

Dingle's disproof was based on the twin paradox, claiming that it was in fact a contradiction. He argued that the theory must be false since it demands that each of two clocks works faster than the other.

Most modern astrophysicists hold that in fact it was Dingle's reasoning that was faulty; and that his disproof rested on a misunderstanding of the mathematics of special relativity.

This quotation contains a number of false statements, which are beyond the scope of this paper to correct. Our interest will be to focus on the nature of McCrea’s alleged refutation of Dingle.

We will ask, what was the nature of this refutation, why was it effective, and why the physics establishment accepted it. The answers to these questions are not as simple as they seem. When we arrive at the analysis of McCrea’s’ refutation, we will discover that it consists primarily of the following statements:

(1)“Dingle's assertion is obviously and demonstrably wrong. Using no more than the Lorentz transformation in his algebra, he claims to derive two different values for the

same quantity. But the transformation is linear and any result it gives can only be unique. It is trivially impossible for it to give two different answers to the same question. If Dingle obtains two different answers it must be because a) he has made a slip in the algebra, or b) his quantities are not well defined, or c) what he treats as the same quantity are two different quantities.”

(2)“About the first thing that relativity theory does is to deny any operational meaning to the notion of simultaneity at two different places. Naturally, this fundamental feature in the theory is not affected in the slightest by any arbitrary conventions we may adopt for the synchronization of clocks. The latter is merely a particular way of putting the readings of two relatively stationary clocks into 1-1 correspondence with each other.”

(3)“While Dingle's (3) and (4) are meaningless as they stand, the quantities involved can of course be assigned operational meanings in terms of readings of the relatively moving clocks A, B. The formulae do not then tell us about the "rates" of the clocks. They become simply two different ways of putting the readings of A, B into 1-1 correspondence with each other. There are infinitely many different ways of doing this! Being no more than ways of attaching labels, there can be no question of any two these ways being "contradictory.”

(4)“In his 1962 paper, Dingle started from equations (i), (ii) as we have written them (but in his earlier notation) and then derived precisely our equations (iii), (iv). He then asserted, "every symbol has exactly the same meaning in both cases," and he claimed to infer a contradiction. His assertion is false, because here he is not talking about the same thing, but two different things.”

The main problem with these statements, which will be investigated in the analysis, is that they are merely assertions with no mathematical proof behind them. Furthermore, they are based upon a fundamentally dishonest misinterpretation of both Dingle’s claims and the claims of special relativity. This problem will be addressed in the analysis of the polemical methods to discredit Dingle’s contradictions rather than facing them squarely and presenting a clear, rigorous and believable mathematical argument with a real proof behind it. Ultimately, we will discover that no refutation of Dingle’s claims has ever been produced, and it is unlikely that one ever will. The explanation of this fact will also be discussed.

It is recommended that the original papers in Nature be read, including the editorial on page 113. The editorial makes it clear that the debate was staged by Nature, since McCrea’s answer to Dingle was expected to “put to bed” the controversy. The documents can be found at:

<http://www.nationalism.org/russamos/dingle/Appendix.html>.

A condensed version of McCrea’s paper appears at:

<http://www.heretical.com/science/dingle2.html>

Dingle’s book Science At the Crossroads can be found at:

<http://www.nationalism.org/russamos/dingle/>

### 3.0 Background

Herbert Dingle's long running battle with the relativity establishment began in the late 1930s and continued until his death in 1978. The standard relativist image of Dingle is basically as follows: "There have perennially been a few physicists who have refused for philosophical reasons to accept this easily derived result (time dilation). Herbert Dingle for one, carried on this controversy for decades until he finally realized that this prediction regarding clocks (or twins) did indeed follow from special relativity, at which point he decided that special relativity itself must be rejected". This is a deliberate misrepresentation of the facts. Dingle never refused to accept time dilation, that claim is flatly a false and dishonest one.

Dingle's crime was that he criticized some of the philosophically weak and unsupportable beliefs of the standard version of scientific truth as taught by the relativity textbooks. Previous papers in this series have examined some of the issues that Dingle raised and the ensuing controversies. We discovered that in all cases, Dingle's position was correct, and that the relativity establishment's response was to portray his views in a dishonest manner. They were never able to admit that Dingle might be correct. The prevailing attitude was that Einstein's theory was so beautiful and philosophically well founded, that they could not conceive that any part of it could possibly be in error. Therefore, all criticism, actual, implied, or merely just perceived was reacted to with vociferous attacks on the perpetrator.

While many critics could be easily dealt with because they lacked scientific stature, or because they could be safely ignored, for other reasons, Dingle became a thorn in the side of the relativity establishment. They couldn't shut him up, and he was persistent. As time went on, Dingle's tenacious criticisms escalated from disagreement over the philosophical interpretation of the basic meaning of relativity, to criticism of the interpretation of the twins paradox, and finally to open and widely public rejection of the theory. This created a big problem. A prominent scientist, one who had written books on relativity, and who clearly understood the mathematical and philosophical details of the theory, was openly declaring that it was false in prominent scientific journals. A crisis had developed. The problem had to be dealt with. Dingle demanded an answer to his claim that the special theory of relativity was untenable. The problem could no longer be resolved by merely ignoring it. The culmination was the publication of a debate between Dingle and W. H. McCrea in the journal *Nature*.

The debate was staged to give McCrea all the advantages. The editor ran an editorial which basically implied that McCrea's answer to Dingle's incorrect claims, should put to bed Dingle's long standing erroneous claims. The plan was to then suppress all criticism and terminate the embarrassing episode with a victory for the scientific establishment, leaving relativity intact as its premier example of a twentieth century scientific achievement. Unfortunately things did not go according to the plan. This paper will examine the poor effort by McCrea to counter Dingle's claims.

Although the editor of Nature declared that McCrea was the winner, Dingle did not view it that way. Nature refused to print any more of Dingle's letters claiming that the special theory of relativity was untenable, effectively terminating the discussion. Dingle felt injured by this action. He did not shut up, and continued his crusade in other venues. Essentially the plan had failed. Although the relativity establishment was apparently unscathed by the encounter, Dingle was not forced to concede defeat and cease publication of criticisms. That was only accomplished by his death on September 4, 1978.

#### **4.0 Précis of Dingle's Claims**

Dingle's paper appeared with the title "The Case Against Special Relativity". Since the present paper is not concerned with a detailed analysis of Dingle's claim that relativity is untenable, it will be discussed very briefly. The reader should consult the internet references for more details. Dingle's paper opens with a discussion of the background for the debate, and a statement regarding the need to resolve the issue. This is followed by the mathematical argument, which uses an example of relatively moving clocks, calculates their relative rates using the standard interpretation of Lorentz transforms, and concludes that the comparison of clock rates results in a contradiction. He says referring to the equations comparing the clock rates: "Equations 3 and 4 are contradictory: hence the theory requiring them must be false...I regard this as conclusive proof that the special relativity theory is untenable." The mathematical part was followed by a discussion of typical misconceptions used in failed attempts to refute his claim and summarizing why it must be accepted.

The core of Dingle's proof is the solution to the Lorentz transformation equations for the time intervals between three events which he defines as  $E_0$ ,  $E_1$ , and  $E_2$ . Dingle defines the times of these events in two different ways. The time interval between events  $E_0$  and  $E_1$  in coordinate system  $k$ , is defined in terms of time in coordinate system  $K$  using Einstein's 1905 Lorentz transformation solution, resulting in Dingle's equation 3. The time interval between events  $E_1$  and  $E_2$  in coordinate system  $K$ , is defined in terms of time in coordinate  $k$ , using the reciprocal solution for the Lorentz transformation specified by Einstein in his 1907 paper on relativity, resulting in Dingle's equation 4. Dingle shows that the two different solutions given by his equations 3 and 4, result in a contradiction. It is clear that all that is required to refuse Dingle's claim is to show that his solution to the problem given in his equations 3 and 4 is incorrect.

#### **5.0 Précis Of McCrea's Response**

McCrea's response is titled "Why The Special Theory of Relativity is Correct". It begins with a standard definition of two relatively moving coordinate systems with rigid rods having "similar clocks...fixed to the rod at points along the rod, and let them be synchronized by a standard procedure (that described by Dingle)." he then defines events in a standard way with particular care. The primary assumption he uses is contained in the

following statement: “The theory then asserts that  $E, E'$  are one and the same event if and only if the parameters satisfy the relations.

$$at' = t - vx/c^2 \text{ (I)}$$

$$at = t' + vx'/c^2 \text{ (II)}$$

where  $a = (1 - v^2/c^2)^{1/2}$ , supposing  $0 < a < 1$  and supposing the zero points of the various quantities are suitably chosen. This is one way of writing the Lorentz transformation (being the one used by Dingle in his earlier paper<sup>1</sup>.)” This is essentially the foundation of his argument. He accepts the Lorentz transformation equations as long as they meet the above definition of the “one and the same event”. This definition requires that the Lorentz transformations be bijective, because he states if and only if, in the definition. The important point is that by requiring that the transformations be bijective, they are one-to-one and onto. Hence there is one and only one “same event” in each reference frame. As we will see later, this distinction is the basis for his refutation argument.

The equations (I) and (II) are the usual Lorentz transformation equations where the constant  $a$  on the left, is equal to  $\beta^{-1}$ . Normally, the equations are written with  $\beta$  on the right hand side. The first one, the Lorentz transformation, transforms events defined in the unprimed frame into events in the primed frame. The second one, the inverse Lorentz transformation, transforms events defined in the primed frame into ones defined in the unprimed frame.

In the next step, McCrea derives the transformation going from the primed moving frame into the unprimed rest frame, by using equation (II). He says: “Consider in  $k$  the particular clock  $B$  permanently fixed at  $O'$ , so that every event at  $B$  has  $x' = 0$ . Then from (II) for every such event

$$at = t' \text{ (III)}$$

[Take, for example, the case  $a = 1/2$ . Equation (III) means that if clock  $B$  reads  $t'$  then that  $K$ -clock past which  $B$  is moving reads  $2t'$ ; at 1 o'clock by  $B$  it passes a  $K$ -clock reading 2 o'clock, at 2 o'clock by  $B$  it passes a  $K$ -clock (a different one, naturally) reading 4 o'clock, and so on. ]”

“In the immediate operational interpretation of (III), as just illustrated,  $t'$  is the reading of one and only one clock and  $t$  is the reading of a different clock for each different value of  $t$ . I repeat that, so far as our discussion is concerned, every event to which (III) applies happens to clock  $B$ .”

The result of this step is that the moving clock is twice as slow as the rest clock. The above statement being the key proviso in what follows. It is the source of the fallacy in McCrea’s argument. He requires that a measurement of the clock  $B$  in the rest frame

occur at two different clocks.

“If we next consider in  $K$  the particular clock  $A$  permanently fixed at  $0$ , then every event at  $A$  has  $x=0$  and from (I) we have for every such event.

$$at'=t \text{ (IV)}$$

This is obviously what we expect from (III) because now  $K, k$  have exchanged roles. In (IV),  $t$  is now the reading of one and only one clock, and  $t'$  is now the reading of a different clock for each different value of  $t'$ . Manifestly the parameters  $t, t'$  do not have the same meanings in (III), (IV). Every event to which (III) applies happens to the clock  $5$ ; every event to which (IV) applies happens to the clock  $A$ .”

Here McCrea uses the restrictive definition of an event, to claim that the symbols  $t$  and  $t'$  do not have the same meaning, because they refer to different events. He then argues that this means that because of this equations (III) and (IV) do not produce a contradiction. Then he says the following which essentially confirms Dingle’s argument that the equations are contradictory. “If we do require both (III) and (IV) to hold good we get simply  $t=0=t'$ , since  $a^2 \neq 1$ . That is, (III), (IV) are both satisfied for the unique event that happens to both clock  $A$  and clock  $B$ , namely their single mutual encounter. This is obviously entirely consistent with what has just been said.]”

We are now in a position to assess whether McCrea’s argument is fails or not. Above the fallacy was alluded to, and now it will be explained in detail so it will be clear that McCrea’s conclusion is wrong.

Referring to the Lorentz transform equations given in (I) and (II). We see that the independent variables are the coordinates  $x, t$  and  $x', t'$ . the dependent coordinates are just  $t$  and  $t'$ . The correct interpretation of (III) is that two events which occur at the same  $x'$  coordinates with time difference  $t'$ , transform into any  $x$  coordinates with a time difference of  $at$ , by equation (III). Likewise for any two events which occur at the same  $x$  coordinates with time difference  $t$ , transform into any  $x'$  coordinates with a time difference of  $at'$ , by equation (IV). McCrea says that the second assertion is meaningless, because he argues that the events involved must be restricted by the one to one and onto definition of a “same event”. This is false.

Notice that the equation (III) transforms to any place one chooses in the unprimed frame so any clock there can receive the events. We pick two at the same place and they are then used to transform back into the primed frame using the Lorentz transform. The one to one requirement only applies to the two transformations in composition, and not each one taken individually. Hence, the simultaneity of events argument does not invalidate the contradiction as McCrea attempted to argue. The contradiction arises from a different cause and Dingle’s argument is not invalidated.

To summarize. McCrea argues that, because Dingle failed to consider the relativity of

simultaneity, his claim of contradiction is invalid. This interpretation does not survive close examination. Hence, there must be some other reason for the contradiction, which implies that the theory of relativity is untenable.

McCrea's argument sets up a restrictive model that requires the moving B clock to only record an event, when it passes next to a clock at rest. Then when the A clock passes clocks at rest in in the unprimed frame, he claims that there is a different event involved so that the symbols  $t$  and  $t'$  used in the equations can be assigned different meanings in the two different events, so that the claim of contradiction can be invalidated. Unfortunately for McCrea, this argument is invalid. The contradiction arises from a deficiency in the theory as Dingle asserted.

## 6.0 McCrea's Thesis

The basis of McCrea's refutation lies in the thesis that the special theory of relativity is primarily concerned with objects called events, and that Dingle uses the theory improperly to define events in a way which does not conform to the specific definitions and interpretations prescribed by his restricted interpretation. Dingle, in his rebuttal, succinctly deals with this argument as follows: "Professor McCrea's reply to my disproof of special relativity is both gratifying and disappointing. It is good that, at long last, some comment has appeared; regrettable that this one contains nothing to the point." Here we consider why Dingle responded in this manner.

The answer is that Dingle did not consider McCrea's argument to be a valid refutation. Dingle pointed out exactly what was required to refute his conclusion and that McCrea had not met the requirement. Dingle's requirement was: "One simple thing only is needed to refute the disproof, and it is essential — to show an error in the derivation of my equation (4) that does not invalidate equation (3). This I showed with unmistakable clearness. McCrea's only contribution to it is the following: 'Dingle's (3) is meaningless. Correspondingly his (4) is meaningless.' This, if true (it is not), would merely kill the theory in another way, for (3) is Einstein's deduction and that of all his followers until now."

Dingle's statement should be carefully read and its significance fully appreciated. It is the basis for any attempt at refutation. Since McCrea did not base his refutation upon the terms stated by Dingle, we must ask, why did he attempt to refute Dingle in a way that was obviously not satisfactory. Put differently, why did he offer a claimed refutation, knowing that it would fail. The answer is clearly that he could not find error in the derivation of Dingle's equation (4) that did not invalidate equation (3). What McCrea did was to redefine the special theory in a narrow way, which claimed that it was a theory dealing only in the relations of events, and then McCrea produced an argument which purported to show that Dingle's definition of an event in his equation (3) was different from the definition used to define the same event in equation (4) so that equation (4) became meaningless. This reduces the disagreement between Dingle and McCrea to the following simple form. Dingle claimed that the physical quantities with which the theory

was concerned were the time scales in the two relatively moving reference frames, which McCrea claimed that the entities with which the theory dealt were events which occurred in space-time and the relations between these events. In both cases, the interpretations of the theory were reduced to specific physical predictions regarding the experience of physical time. Dingle showed that the reduction led to the conclusion that two clocks in relative motion must both run slower and faster than each other. McCrea's interpretation agreed with the traditional resolution of the twins paradox, which predicted asymmetrical aging such that the space traveling twin physically ages more slowly than his twin brother.

The basis of McCrea's assertion is that he specifically denies that the Lorentz transformation equations can be used to define simultaneous events in the relatively moving reference frames. Dingle's counter assertion is that this is the function of the Lorentz transform equations and that with out the claim that they do transform events in a way that transforms simultaneity, then the theory is falsified.

## **7.0 Einstein's Mistake**

This section discusses the nature of Einstein's mistake that led to the contradiction in the theory of relativity. There are two possible mistakes that can be attributed to statements found in Einstein's fundamental papers on relativity. The first one is the original statement, which leads to the contradictory state of the theory, was made in the 1905 paper. The statement is made in two parts, so that there are two versions, which will be called (A) and (B). Version (A) states:

“From this there ensues the following peculiar consequence. If at the points A and B of K there are stationary clocks which, viewed in the stationary system, are synchronous; and if the clock at A is moved with the velocity  $v$  along the line AB to B, then on its arrival at B the two clocks no longer synchronize, but the clock moved from A to B lags behind the other which has remained at B by  $\frac{1}{2} t v^2/c^2$  (up to magnitudes of fourth and higher order),  $t$  being the time occupied in the journey from A to B.”

This version is commonly referred to as the origin of the clock paradox.

The second version (B) immediately follows the above and states:

“It is at once apparent that this result still holds good if the clock moves from A to B in any polygonal line, and also when the points A and B coincide.”

“If we assume that the result proved for a polygonal line is also valid for a continuously curved line, we arrive at this result: If one of two synchronous clocks at A is moved in a closed curve with constant velocity until it returns to A, the journey lasting  $t$  seconds, then by the clock which has remained at rest the travelled clock on its arrival at A will be

$\frac{1}{2} t v^2/c^2$  seconds slow. Thence we conclude that a balance-clock at the equator must go more slowly, by a very small amount, than a precisely similar clock situated at one of the poles under otherwise identical conditions.”

This second version is associated with the twins paradox. The second is the more famous and well know statement, but both agree in claiming that the moving clock runs slow. These statements in themselves do not lead to a contradiction. The contradiction arises from the following which appears in Einstein’s 1907 paper:

“In general, according to the principle of relativity each correct relation between “primed” (defined with respect to  $S'$ ) and “unprimed” (defined with respect to  $S$ ) quantities or between quantities of only one of these kinds yields again a correct relation if the unprimed symbols are replaced by the corresponding primed symbols , or vice versa, and if  $v$  is replaced by  $-v$ .”

This is Einstein’s symmetry principle. It is derived from the principle of relativity as he states. Although Dingle does not cite this specific statement from Einstein, it is his specific reason for rejecting the traditional explanations of the clock or twins paradox, because that solution violates this statement. What Dingle pointed out in his argument was that either statements (A) and (B) must be judged as false, or the symmetry principle must be given up. In his early debates over the twins paradox, he seems to have favored giving up the statements in the 1905 paper, but in his later challenges to the theory it is apparent that he no longer advocated this solution. Something else was wrong.

The solution given above, takes the later solution as it is consistent with experiment. However, relativists, such as McCrea were unwilling to disavowal the symmetry principle. This is the current situation. A non-contradictory solution exists to this contradictory situation yet the relativity establishment is unwilling to give up either of the causal statements that leads to its perpetuation.

## **8.0 Dishonest Aspects Of McCrea’s Presentation**

This section examines some of the dishonest aspects of McCrea’s method of presenting his argument. These could be politely termed as merely “dirty tricks“, but that assumes that debating relativity is a polite and honest scientific endeavor. The salient aspect of this is that McCrea’s dishonesty makes it extremely difficult to actually compare, in a simple direct manner, the mathematical arguments of Dingle and McCrea. The dishonesty begins with McCrea’s statement “So far as applicable, I use Dingle’s present notation ...” This statement is strictly true in only a very limited sense. (Such as statements made in TV and radio commercials or printed advertisements.) Dingle’s notation is used in terms of the definition of his parameter  $a$  in place of Einstein’s  $\beta^{-1}$ , and he uses the primed and unprimed coordinate definitions as well as the identifications  $K$  and  $k$  for the coordinate systems. But when writing and interpreting his equations he deviates from Dingle’s usage as much as is possible. This can be due to only two reasons. Either he didn’t take the time to actually study Dingle’s equations and his argument very carefully, or he deliberately

wrote his refutation in a manner which was designed to make it extremely difficult to analyze the two arguments, by comparing them side by side. Here are some examples.

Dingle writes his equation (1) as:  $t_1' = at_1$ . McCrea writes his corresponding equation (III) as:  $at = t'$ . Dingle writes his equation (2) as:  $t_2 = at_2'$ . McCrea writes his corresponding equation (IV) as:  $at' = t$ . Dingle obtains his equation (1) using the same procedure as Einstein used in his 1905 paper, while McCrea obtains his solution by a completely different method. Lets see what the difference is. Einstein substitutes  $x = vt$  into the Lorentz transform to obtain Dingle's (1). McCrea substitutes  $x = 0$  into the inverse Lorentz transformation to obtain his (III). Einstein exchanges the primed and unprimed symbols in Dingle's (1) to obtain Dingle's (2). (An alternative method is to substitute  $x' = -vt'$  into the inverse Lorentz transformation.) McCrea substitutes  $x' = 0$  into the Lorentz transform to obtain his corresponding equation. It should be obvious to the reader that it is not possible to compare Dingle's (1) and (2) with McCrea's (III) and (IV). This is indeed the case.

One big difference that results from McCrea's, dirty trick, is that it mixes up the independent and dependent variables when comparing his (III) and (IV) with Dingle's equations. Furthermore, McCrea analyses the problem backwards or exactly opposite to the way Dingle does. This reinforces the conclusion that it is a deliberately dishonest argument. Dingle defines the time interval between events  $E_0$  and  $E_1$  in terms of time defined by clock A. Hence, Dingle's (1) actually corresponds to McCrea's (IV) instead of his (III). Similarly, McCrea defines the time interval between events  $E_1$  and  $E_2$  opposite to Dingle. He defines it in terms of clock A, instead of Dingle who uses clock B. Hence, Dingle's (2) actually corresponds to McCrea's (III) instead of his (IV). Hence, McCrea could now safely and truly say that Dingle's equations were meaningless, because he redefined the problem to make this true. McCrea's refutation and objections to Dingle's arguments are just a simple matter of superficial reformulation with deliberate confusion.

## **9.0 McCrea's Dishonest Misrepresentation Of Dingle's Problem And Special Relativity**

The purpose of this section will be to discuss the specific dishonest techniques that McCrae uses to discredit Dingle's claim of a contradiction in the special theory of relativity. McCrea's method can be described as a masterpiece of deliberate obfuscation. Its purpose being to confuse the issues rather than to render the problem in a manner designed to bring understanding to the reader. The first example is McCrea's redefinition of the theory of relativity in a very restrictive manner which defines an event such that he can then justify the statement that "Dingle arrives at his conclusions because in practice he does not adhere to the standard concept of an event." What is this standard concept of an event? It is not in any of Einstein's papers.

At the beginning of his presentation, he implies that he will address Dingle's arguments. But, he does not do this. He proceeds to define what he will consider as the theory of relativity. It is a restrictive definition. He defines events as occurring only at the

coincidence of two clocks, each equipped with an observer. Unfortunately, this system has no relation to Dingle's examples, and it has no relation to any feasible physical concept. It is purely an ideal construction designed to facilitate his claim that Dingle is demonstrably wrong. After defining his version of the theory, he makes the following false statement which is the basis for his claim. "I now turn to Dingle's allegation that the theory used above "must be false"." But the theory, as McCrea defines it, isn't the same as Dingle's theory used in his example. So McCrea's refutation, only applies to McCrea's theory which isn't Einstein's and certainly not Dingle's. By McCrea's concept of the theory, most of Einstein's claims must be considered meaningless along with all of the purported experimental demonstrations that support the theory. These are all meaningless, because they do not conform to McCrea's definition of a standard event. Hence, McCrea's redefinition renders the theory meaningless and without experimental support, because the standard definition of an event, which he uses, is a practical impossibility. Its purpose is to refute Dingle, and beyond that it is useless as a physical theory.

The reader should understand that McCrea's version of relativity is different from Einstein's. In his 1905 paper, Einstein used the concept of two systems of relatively moving clocks in order to derive the Lorentz coordinate transformation laws. He then dropped the requirement for a clock at every point in space, and considered only two clocks and one observer. He did not define the clock dial readings in terms of McCrea's standard events. His idea was that the Lorentz transformation law, transformed the time scale of the moving clock so that when its dial readings were viewed by an observer at rest, the moving clock appeared to be running slow. In Einstein's solution, there was only one observer, who compared the time marked by the moving clock with the time marked by his reference rest clock. This does not conform to McCrea's theory and definition of a standard event, so Einstein's theory is rendered meaningless by McCrea's concept of relativity. Perhaps we should say that McCrea refutes Einstein's entire theory of 1905, because his predictions and examples, which lead to the clock and twins paradoxes are also rendered meaningless and thereby refuted, because they do not confirm to McCrea's definition of a standard event.

The reader should notice that Dingle's examples, used in his arguments, are designed to conform to Einstein's theory and if that deviates from McCrea's idea of what the theory should be, then that does not invalidate Dingle's arguments without also invalidating Einstein's version of the theory. However, it seems unlikely that McCrea or the relativity establishment would have acknowledged this awkward fact. What Einstein's theory actually asserts, which is the source of its significance and meaning for physics, is that the time scale of physics, or the unit of time measure, is changed for moving physical objects or systems. McCrea's example used his supposed refutation ignores this fundamental principle of the theory. Dingle points out that the time scales can not both be changed so that they are both changed relative to each other in the same way. In fact McCrea agrees with this and uses this very fact to support his claim that Dingle is wrong. (See point 1 in Section 2.0) But, you can not refute a claim by agreeing with it, so McCrea invented another approach to make it appear that Dingle's claims were false. This effectively nullifies McCrea's first, third and fourth claims of section 2.0.

The second example of a dishonest statement by McCrea, is his use of the claim that “About the first thing that relativity theory does is to deny any operational meaning to the notion of distant simultaneity at two different places.” While this statement is strictly true, it is a deliberately misleading statement, because the very first thing that Einstein does is to establish a Definition of Simultaneity in the first section of the Kinematical Part of his 1905 paper. Dingle specifically states in his statement of the case against relativity the procedure for the synchronization of his clocks, and that procedure is the one specified by Einstein’s 1905 paper. Hence, McCrea’s statement is very close to if not a deliberate lie. Dingle’s procedure is exactly correct and McCrea’s statements to the contrary are false. Hence, it follows that McCrea’s refutation is false, and that Dingle’s claim based on his presentation is valid. McCrea’s objections being nullified because he takes a false claim as the basis of his refutation. This effectively nullifies McCrea’s second claim of section 2.0.

All of this makes it perfectly clear that McCrea’s refutation is a sham. It is not the honest work of a mathematician, attempting to put right the errors of a colleague, but the dishonest work of a relativity partisan, designed to discredit Dingle’s claims at any cost, even if it involves an argument based on dishonest trickery.

### **10.0 Don’t Bring Back The Ether---The Editorial Coup de Grâce**

The primary thesis of this paper is that the rejection of Dingle’s claims, and the subsequent acceptance of the myth that McCrae had refuted Dingle’s claims, had nothing to do with the substance and logical effectiveness of McCrea’s attempted refutation, but depended upon the editorial “Don’t Bring Back The Ether”. That editorial is the basis for the rejection of Dingle’s claims, and it is purely a polemic, with no substantial scientific argument to back it up. McCrea’s role was merely to provide a straw man argument, which would allow the editor to claim that Dingle had been publicly refuted, and that this ended the debate, because Dingle had had his fair hearing on the matter, and been demonstrably shown to be wrong, in a scientific forum. Hence, Dingle should, openly and frankly admit that he was wrong. But, this was all a staged trick. McCrea’s refutation was basically a fraud, and the phony “open hearing” was clearly not fair or unbiased at all. The entire episode was a shameless and eventually embarrassing fraud, and Dingle knew it. This explains why he didn’t shut up. Instead, he continued on with his crusade, which eventually resulted in the publication of his book, “Science At The Crossroads“, which revealed the entire tawdry mess, and illustrated the way scientific facts and theories are really decided upon. Scientific integrity was diminished by the revelation.

We saw above that McCrea’s arguments were deliberately dishonest mixtures of falsehoods, misrepresentation, and deliberate confusion of the issues. He had little to fear by doing this, since the editor would support his conclusion, no matter what he said, (as long as it appeared to prove that Dingle was wrong) and no relativity expert would dare publish an expose of his errors and dishonesty. In any event, the editor of Nature would provide the actual coup de grace, and McCrae’s role was merely that of the supposed expert. He was there to give a “good appearance” to support the actual work of the

editor's polemic. Although McCrea could not refute Dingle's arguments, that did not matter, he was only required to pretend that he had refuted them. That is what he did.

The primary purpose of the staged debate was to justify a conclusion that the editor had in mind from the beginning. The purpose was to justify the editors commentary, designed to bury Dingle and his challenge to orthodoxy once and for all. The scheme was unprofessional, but anything seemed to justify the defense of a pillar of scientific achievement, as relativity was envisioned. So the editor employed all the tricks of his trade, and his pen was ruthlessly employed in the work of preserving scientific orthodoxy. No limit was placed on the bounds of the editors desire to destroy Dingle's offending ideas. He wanted to win at any cost.

The editorial displays a great range of unsavory qualities. It is mean, nasty, cruel, skeptical, dishonest, mendacious, malicious, misleading, About the only qualities in which it is deficient are fairness and objectivity.

To illustrate these points consider the following excerpts. For example. Mean: "It is probably too much to hope that the exchange of views between Professor Herbert Dingle and Professor W. H. McCrea which appears in this issue will put an end to a long standing argument in special relativity." Nasty: "By now there is all too much evidence to show that issues like these have a habit of springing to life long after the stuffing seems to have been knocked out of them by the force of pure reason." Cruel: "McCrea's commentary on this argument will bring the controversy to an end for most people. It is earnestly to be hoped that it will also satisfy Dingle." Callous: "Dingle's criticism of special relativity is, of course, pretty radical as these things go." Smug: "Defining limits for the length of the diagonal of a square is Childs play compared with the process of synchronizing clocks in special relativity, which means that nobody should be surprised or alarmed that distinguished people occasionally pay close attention to these matters." Disingenuous: "He (Dingle) seems quite genuinely convinced that the theory of special relativity is seriously in error, and that there is some kind of conspiracy to hide this supposedly self-evident and presumably unpalatable truth." Cryptic: "He has been concerned not so much to twist the tail of orthodoxy as to draw attention to what he has for years considered to be a serious defect in the accepted doctrine." Mendacious: "In other words, McCrea argues that Dingle has thrown to the winds some of the quite elementary precautions which should be taken by those who choose to venture into this important field. In the circumstances it is no great surprise that he is able to establish a *reductio ad absurdum*."

The quality of irony is not missing, as some of the editors statements reveal its presence very well. For example the editor, who seems to have decided his opinion on the facts of the case without reading either paper very carefully, tells us that; "Dingle constructs an argument by which he claims to show that this reciprocity of time dilation implies a contradiction." Didn't he read McCrea's paper, before saying this. McCrea says that this is an impossibility in agreement with Dingle. Dingle's entire point is that this is an impossibility, yet the editor doesn't seem to understand what the argument was really all

about. McCrea said Dingle's claims were wrong because he didn't make his claims about events but instead made his assertions about the time scale of physics.

The editor is so convinced of the rightness of the scientific establishment that his brain has ceased to function. It never occurs to him that Dingle's argument is not something that he invented, but that it is indeed a legitimate prediction of the special theory of relativity, and that the entire controversy is about the attempt of the relativity establishment to disown this embarrassment. In any event, the editor is not interested in the actual truth of the debate, but in making sure that the science establishment is protected from any further difficulties that may arise from Dingle's efforts to expose the truth about relativity.

### **11.0 The Correct Solution To Dingle's Problem**

This section presents the correct solution to the problem posed by Dingle in the 1967 debate with McCrea. The details will not be repeated. The reader should consult one of the references for a detailed presentation of Dingle's problem.

The key steps are as follows:

(A) Dingle calculates the clock dial readings for the time interval between events  $E_0$  and  $E_1$  based upon Einstein's solution to the Lorentz transformation equations from his 1905 paper as:  $t_1' = \beta^{-1}t_1$ , which he calls equation (1).

(B) Dingle calculates the clock dial readings for the time interval between events  $E_1$  and  $E_2$ , based upon the traditional assertion of the symmetry of Einstein's solutions from his 1907 paper as:  $t_2 = \beta^{-1}t_2'$ , which he calls equation (2).

(C) Based on equation (1) he defines the ratio of dial readings as:  $t_1' / t_1 = \beta$ ,

(D) And based on equation (2) he defines the ratio of dial readings as:  $t_2 / t_2' = \beta^{-1}$

(E) Noting that the results of steps (C) and (D) are contradictory, he concludes that the "theory from which they are derived must be invalid."

McCrea challenged his conclusion, and asserted Dingle was "demonstrably wrong", but he never demonstrated the correct solution to the problem posed, or exactly pinpointed the error. Here that omission will be corrected.

The error and the correction are simple. The mistake is using the solution to the Lorentz transform as given in equation (2). The correct equation is:  $t_2 = \beta t_2'$  not  $t_2 = \beta^{-1}t_2'$ . However, there is a problem, the theory of relativity as correctly stated by Dingle requires the incorrect solution given in equation (2).

### **12.0 Pinpointing the Cause Of The Problem**

The basic flaw in Dingle's argument was that he used a *reductio ad absurdum* type argument to produce a contradiction. This type of argument had the disadvantage that it could be countered by a chain of reasoning different from the claimed one, and disputing the conclusion. Here the approach will be to positively pinpoint the fallacy in the standard reasoning found in the relativity textbooks. The error lies in the fundamental statement which McCrea gives in his paper. It is repeated here: "The theory then asserts that  $E, E'$  are one and the same event if and only if the parameters satisfy the relations.

$$at' = t - vx/c^2 \text{ (I)}$$

$$at = t' + vx'/c^2 \text{ (II)}$$

where  $a = (1 - v^2/c^2)^{1/2}$ , supposing  $0 < a < 1$  and supposing the zero points of the various quantities are suitably chosen." This fundamental assumption is erroneous and false. The Lorentz transform equations do not transform events  $E$  and  $E'$  between reference frames in the manner assumed by relativity. This mistake is the source of all the confusion and disagreement.

In the mathematical interpretation of special relativity, the Lorentz transformations are obtained as solutions which satisfy the requirement that the speed of light is the same in frames  $S$  and  $S'$ . (Here we use a different notation returning to Einstein's notation of 1907 and 1910.) This results in the following equations based upon the assumption that the speed of light "has the same constant value  $c$  in systems  $S$  and  $S'$ ,":

$$(1) \quad x^2 + y^2 + z^2 - c^2 t^2 = 0$$

$$(2) \quad x'^2 + y'^2 + z'^2 - c^2 t'^2 = 0$$

Here the principle of relativity establishes that the law of light propagation is of the same form in both  $S$  and  $S'$  and the constancy of light velocity postulate is used to justify that the constant of light velocity  $c$  has the same numerical value in the same units of measure in both frames. These equations form the basis of the theory of relativity and we will see that the interpretation of the Lorentz transform equations is inconsistent with their mathematics and correct physical interpretation. (This is not new, critics have been saying this for nearly 100 years.)

Einstein mistakenly assumed that the Lorentz transformation solutions to these equations were reciprocal so that the replacement of the unprimed variables with primed ones and vice versa gave the inverse or reciprocal transformation equation. This was based on the relativity postulate and has thus been unquestioned, even by Dingle. Unfortunately, it turns out that in a space of quadratic forms, there are two transformations going from  $S'$  into  $S$  instead of the assumed one. Similarly there are two transformations going from  $S$  into  $S'$ , instead of the assumed one. Hence, the Lorentz transformations are not unique as claimed by the theory of relativity.

Since this is all a bit confusing for the beginner, we will refer the reader to the mathematics textbooks and request that he look up the concepts of adjoint operator and dual space (or Google search the internet). The essential ambiguity arises from the fact that the Lorentz transformations are self adjoint transformations. In the case of self adjoint transformations, the basis transformation from  $S$  to  $S'$  coincides with the inverse coordinate transformation from  $S$  to  $S'$ . Likewise, the coordinate transformation from  $S'$  to  $S$  coincides with the inverse basis transformation from  $S'$  to  $S$ . That is why there are four instead of only two transformations.

In the theory of relativity, only two transformations of “events” are assumed. The first going from  $S$  into  $S'$  and its inverse from  $S'$  into  $S$ . But, because these coincide with adjoint transformations going in the same direction, the quantities being transformed are different from those assumed in relativity.

Hence, the theory was unable to correctly assign the correct meanings to the Lorentz transformation equations, because of the inherent ambiguity of self adjoint transformations. This property means that the difference between transformations of the time scale or units of time measure becomes confused with the transformation of the clock dial readings. The first is a basis transformation, and the second is a coordinate transformation dual to the basis transformation. In the particular case of the equations given above, equation I transforms the time scale or the unit of time measure, while the second equation transforms the dial readings of clocks. Hence, if we specify that the two equations transform clock dial readings as events bijectively, we are making a fundamental mistake that causes the theory to produce contradictions and inconsistencies, just as Dingle claimed. (McCrea tried to remove this embarrassment by claiming that Dingle didn't use “the standard definition of an event”.)

A complete explanation with mathematical references is provided in the author's paper at the following internet address: <http://www.wbabin.net/physics/ricker3.pdf> Self adjoint transformations are briefly explained at: <http://eom.springer.de/S/s083880.htm>. Dual spaces are discussed at: <http://planetmath.org/encyclopedia/DualSpace.html>.

The alert reader has probably discerned why this difficulty has not been previously resolved by the physics establishment. The fundamental idea of special relativity is founded on the concept of an “event“, and the Lorentz transformations are clearly unsuitable for transformation of events as traditionally defined. Hence, acceptance of the correct explanation given here undercuts the foundation of the theory. (That is also why Dingle's claims had to be refuted, at all costs. His arguments undercut the foundations of the theory. However, McCrea's argument also undercuts the foundations of the theory rendering that interpretation meaningless.)

### **13.0 Summary and Conclusions**

The traditional view that McCrea won the debate is probably correct, but that is because most people didn't look at the facts very carefully. The editor declared McCrea the winner and that was the point of the whole debate from the beginning. There never was a fair hearing. McCrea's refutation however, doesn't stand up to close examination. It was a sham and a fraud. That is why others have attempted to improve it, or modify it in other ways. Fundamentally, it is a scientific fraud. McCrea's solution doesn't preserve the theory it also renders it meaningless.

The reader is urged to study sections 11.0 and 12.0 so that he can see that there really is a mathematical mistake in the theory of relativity that needs to be corrected. Herbert Dingle was, again, correct.