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Herbert Dingle Was Correct! Part V

"What Happened To Dingle?" Examined

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1.0 Introduction

This paper examines an internet published article with the title "What happened To Dingle?", at:http://www.mathpages.com/home/kmath024/kmath024.htm This expostulates the opinion that Dingle's criticisms of special relativity were mistaken, the tone is derogatory, and disparaging. The author attributes Dingle's defection from the accepted orthodoxy of relativity physics to "the onset of Dingle's dementia".

The polemical character of this article is hidden behind a mathematical presentation which purports to demonstrate that Dingle's arguments were mathematically mistaken. This paper will examine the validity of the mathematical arguments, which are different from those previously examined. But, keeping to mind that the articles primary objective is polemical, it will not be a surprise to discover that the mathematical arguments also have no substance.

A second version of this article appears at: http://sixfingeredman.net/ref/mathpages--notes/albro/albro24.htm, under the same title. It is has more extreme polemical tone than the above referenced one. This version is more honest in making clear that it is primarily a polemical diatribe. It begins with the following characterization of Dingle's argument :"It's the same "proof" that every anti-relativity crackpot puts forward, in one form or another." The mathematical arguments in the second version are more precise, because they contain fewer typographical errors and are more rigorous, since the notation being used in cleaned up in the second version, eliminating a source of confusion in the first one. Essentially the mathematical argument is the same for both. The underlying assumption in both cases is that Dingle's argument is fallacious and that it is not to be taken seriously because it is either a joke, or the addlebrained raving of a demented old man who "He could not, in his old age, accept the idea that in fact relativity had a perfectly simple objective model, and that his views on this subject, to which he had devoted much of his life, had always been fundamentally flawed and misguided. To contemplate such a possibility is not within the capacity of old men (as is demonstrated daily in internet newsgroups)."

2.0 Objective

The objective is to show that the mathematical argument, while appearing cogent on the surface, is seriously flawed, and lacks the depth of understanding that is needed to refute Dingle's arguments. A second objective will be to demonstrate that the primary goal was

polemical and that no real attempt was made to mathematically prove that Dingle's arguments are mathematically fallacious.

The analysis will be divided into two parts, an examination of the mathematical part and an analysis of the polemical part.

3.0 Précis of "What happened to Dingle?"

Since there are important differences in the two versions, they will be considered separately.

3.1 Précis Of First Version of "What happened To Dingle?"

The article begins with a version of Dingle's problem from the Times. It is different from previous versions as it was Dingle's habit of always stating the problem in a different way:

"Suppose clocks A and B move along the same straight line at uniform speeds differing by 161,000 miles a second: we call A 'stationary' and B 'moving', but that is merely nominal. At the instant at which B passes A both read noon. Then, according to special relativity, at the instants when B reads 1 and 2 o'clock, A reads 2 and 4 o'clock respectively. Of course, A is not at B to allow a direct comparison, but Einstein's theory is based on a particular process for finding a clock-reading for a distant event, and it demands these values. Einstein himself made just this calculation, but using general symbols instead of these numerical values, and concluded that since B recorded a smaller interval than A between the same events, it was working more slowly."

"But if he had similarly calculated the reading of B (still 'moving') for the readings 1 and 2 o'clock of A (still 'stationary') he would have got 2 and 4 o'clock respectively, and must have reached the opposite conclusion: he did not do this, so missed the contradiction. I invite Ray to fault these calculations, or convince your [readers] that each of two clocks can work faster than the other. I do hope he will not disappoint them."

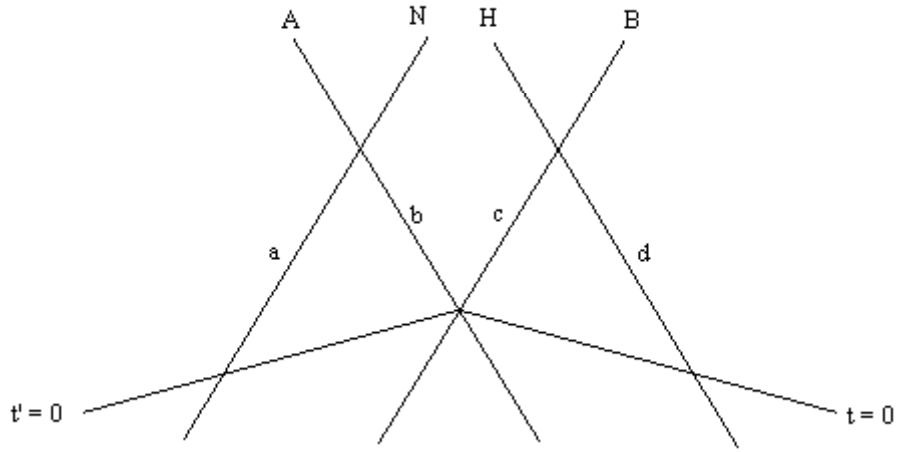
3.1.1 Mathematical Part

The mathematical argument proceeds as follows. An attempt is made to establish an analogy between Dingle's argument and the validity of Euclidian geometry, by claiming that "In a more familiar context, Dingle's "proof" can just as well be applied to show that Euclidean geometry is logically inconsistent." Then the equations for the transformation of a two dimensional coordinate system are presented. It is then explained that "Dingle's confusion is due to the fact that (like some befuddled freshman calculus students) he imagines $\partial x'/\partial x$ and $\partial x/\partial x'$ are algebraic reciprocals of each other, which would imply that $1/[\partial x'/\partial x] = \partial x/\partial x'$, and therefore $\cos(q) = 1/\cos(q)$, which is impossible for any q other than 0. Does this prove that Euclidean geometry (and linear algebra) is inconsistent? Of course not, because Dingle's argument is obviously specious; the partial derivatives

∂x'/∂x and ∂x/∂x' are not the algebraic reciprocals of each other."

This argument is then left hanging in the air and we are presented with the usual formulation of the Lorentz transforms. Then we are told that "In this case we have the two partial derivatives ∂t'/∂t = g and ∂t/∂t' = g. Dingle erroneously assumed that 1/∂t'/∂t] = ∂t/∂t', and so he arrived at 1/g = g, which is impossible for any v other than 0. Again the fallacy is the erroneous assumption that partial derivatives can be algebraically inverted." This should have ended the argument, although unclear and vague as it was, it really ends here, but the author continues on in a different direction which apparently negates what he just concluded.

The argument continues: "Of course, we *can* invert *total* derivatives, so let's see what happens if we take the absolute differentials (for any constant v) of the time transformation equations. The Lorentz transformation equations are now repeated in a differential form. These are solved using the technique of evaluation in the traditional manner by first setting dx/dt=0 in the Lorentz transform and then setting dx/dt=v, solving it a second time. Two different and contradictory equations are obtained: dt'/dt=g and dt'/dt=1/g. (Note that in this notation g is the same as the symbols β or γ, which are traditionally used in the Lorentz transform equations.) these two contradictory equations are then used to solve for the familiar velocity addition law equation, followed by the statement "Needless to say, there's nothing inconsistent or self-contradictory here. Dingle was simply making an elementary error. Pictorially, his claim was that the segment ratios a/b and c/d in the figure below must be equal, whereas special relativity claims they are reciprocal." The figure follows.



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This completes the mathematical part.

3.1.2 Polemical Part

In this part the headline question is answered. The problem posed is this. Why did dingle change his mind about the validity of the theory of relativity? This is couched in a different way by asking What Happened To Dingle? Phrased as if he got drunk and by

falling off the relativity bandwagon, went from enlightened truth into abject error. Dingle's life work is portrayed as follows: "For most of his life he wrote approvingly about relativity, beginning with an article in 1922. He even wrote a text book on special relativity (1940) in which he carefully explained the relativity of simultaneity, and so on. But then in his later years (apparently beginning around 1959) he embarked on a passionate anti-relativity crusade, and exhibited a complete inability to grasp the relativity of simultaneity. This culminated in his 1972 book entitled "Science at the Crossroads". The obvious question is, how could he explain a concept for years, and then later demonstrate a complete failure to grasp that same concept?"

The author's proposed explaination is "It's clear that Dingle accepted relativity (prior to old age) as simply a collection of brute facts that need not yield any coherent picture of an objective external reality. His view was similar to the modern acceptance of quantum mechanics with the "measurement problem" unresolved, i.e., we can't think of a realistic model of an external reality that always yields the results of our measurements; we can only describe the patterns in those results as abstract brute facts that must be accepted. In other words, Dingle's attitude (in his early days) was that "one does not understand relativity, one merely gets used to it". This of course is a paraphrase of a famous remark concerning quantum mechanics, but the point is that Dingle was entirely mistaken in applying this "shut-up-and-calculate" approach to relativity, because in fact relativity (unlike quantum mechanics) is an entirely classical theory, and is firmly based on a perfectly coherent model of objective external reality. In retrospect we can see that the young Dingle never grasped this model - indeed his whole philosophy of science (in those years) was that relativity had rendered all such models unviable."

The author continues "Looking back at Dingle's early explanations of the twins paradox, we can see that he had *never* grasped this simple model. Instead he had simply told himself (like someone thinking about Schrodinger's cat) that when we make certain measurements we get certain results, despite the fact that he himself did not understand it. He accepted this because he believed that *no one* understood it, and in fact he believed that that was the whole point of relativity, i.e., that we must now believe things that cannot be "understood" in the classical sense of being manifestations of an external objective reality." Finally, delivering his imagined final blow he says referring to the famous debate with McCrea "Obviously McCrea was on the right side of the debate, but I think his rebuttals of Dingle's position weren't as clear and as direct as they could have been. Of course, any false premise can be refuted in infinitely many ways, so there is always a temptation to pile refutations on top of each other, but the effect of this is often to blunt rather than sharpen the refutation."

Summing up the case Dingle, the author says "He could not, in his old age, accept the idea that in fact relativity had a perfectly simple objective model, and that his views on this subject, to which he had devoted much of his life, had always been fundamentally flawed and misguided. To contemplate such a possibility is not within the capacity of old men." This explains why he makes the claim that Dingle defected because he had dementia.

3.2 Précis Of The Second Version

The second version is nearly identical to the first one. The mathematical part has some small improvements which will be noted, the polemical part is largely identical but the last two paragraphs were deleted along with Dingle‘s quotation from the Times.

The mathematical part is almost identical with the equations being rewritten. They appear in a form which makes the notation clearer than in the first version. The reader who finds the equations in the first version difficult, should consult the second version.

4.0 Analysis Of Mathematical Part

The mathematical argument boils down to two separate arguments which will be dealt with separately. The first argument will be called the Euclidean geometry argument and the second the velocity law argument. The Euclidean geometry argument will be considered first.

4.1 The Euclidean Geometry Argument

The logical approach is not very rigorous, and it is unclear what is meant by introducing the concept of coordinate transformations and partial derivatives. Lets examine the logical steps in sequence. We begin with Dingle’s statements. We have two clocks A and B with relative velocity 161,000 miles per second. This causes a time dilation factor of two so that when (1) B’s dial reads an elapsed time of one hour, or two hours, A’s clock reads twice this or two hours and four hours. (2) When A’s dial reads an elapsed time of one hour and two hours, B’s clock reads two hours and four hours. Dingle concludes from this that Einstein failed to notice a contradiction in his theory, because he did not make the second calculation.

In step (3) the writer makes the argument that in the transformation of a Euclidean space, the partial derivatives $\partial x'/\partial x$ and $\partial x/\partial x'$ can not be reciprocally related. (4) The writer claims that in statements (1) and (2) Dingle used the incorrect assumption proved false in step (3). He offers the following to justify this: “Dingle's argument is obviously specious; the partial derivatives $\partial x'/\partial x$ and $\partial x/\partial x'$ are not the algebraic reciprocals of each other.” This is followed by a redundant demonstration which derives the transformation equations for time from the Lorentz transforms by taking partial derivatives. The following result is obtained: (5) “In this case we have the two partial derivatives $\partial t'/\partial t = g$ and $\partial t/\partial t' = g$. Dingle erroneously assumed that $[1/\partial t'/\partial t] = \partial t/\partial t'$, and so he arrived at $1/g = g$, which is impossible for any v other than 0. Again the fallacy is the erroneous assumption that partial derivatives can be algebraically inverted.”

The argument in this five part form is too complicated to really grasp, so we will condense it further to its simplest form. Dingle says that the special theory of relativity

gives the following solutions to the Lorentz transforms for time as t'=2t and t=2t', where t' is the time on the A clock dial and t is the time on the B clock dial. Hence we have: (1) $t'/t=2$ and $(t'/t)^{-1/2}=½$ (2) Dingle stated that the statements in (1) are contradictory and hence are false, therefore the theory from which they are derived must be false. (3) The refutation argument obtains the result in step (1) and claims it is false, and concludes that Dingle's statement in (2) is false. Here there is a contradiction. Dingle says that the theory of relativity is false because it produces the contradictory statements given in (1), while the Euclidean geometry argument says that Dingle's statements are false, because they are contradictory. In both cases there is agreement that the statement in (1) is false. The difference lies in the attribution of the error. Dingle says it is Einstein's error, and the author of the article says that it is Dingle's error. Put into this form, it is clear the claimed refutation of Dingle is an invalid one, because you can not refute an argument by demonstrating that its statements are true. You must show that its statements are false.

4.2 The Velocity Law Argument

This part begins with the statement that total derivatives can be inverted. The Lorentz transform for time is solved by evaluation for the conditions dx/dt=0 and dx/dt=v. The result is the two equations: $dt'/dt =\beta$ and $dt'/dt=\beta^{-1}$. Because he has claimed that total derivatives can be inverted, the author proceeds to use these contradictory equations to derive the velocity transformation law of special relativity as follows: "This shows how we arrive at either one of the partials, depending on which direction in spacetime we are considering. Likewise for the second transformation equation we can consider the cases when dx'/dt' = 0 or -v, giving the results g and 1/g respectively."

"Also, since the total derivatives are reciprocals of each other, we can multiply them together to give unity, i.e.,

(1) $(dt'/dt)(dt/dt') = (1-vdx/dt)(1+vdx/dt)\beta^2=1$

Notice that dx/dt is the velocity of one worldline with respect to some arbitrary reference frame, and dx'/dt' is the velocity of the other worldline with respect to that same reference frame. Let us denote these velocities by u and w respectively."

There are two major mistakes which invalidate the procedure. The first one is that equation (1) is incorrect. We have the results $dt'/dt =\beta$ and $dt'/dt=\beta^{-1}$ from the previous step, hence equation (1) is really $(dt'/dt)(dt/dt')= (\beta)(\beta^{-1})^{-1}=\beta^2$. The second error is that the definitions of u and w are incorrect relative to the definition used by Einstein, but that is a small matter compared to the other blunders. All of this vitiates an argument that was not very convincing to begin with. It is not clear why the use of two contradictory statements to incorrectly derive the velocity addition law leads to the conclusion that "Dingle was simply making an elementary error." All of the errors are in the argument purporting to refute Dingle.

4.3 Summary

The mathematical part of the argument fails to support the claim that Dingle's proof is false. The first part of the argument agrees with Dingle that the statements which he derives from the theory are contradictory. The second part, seems to have been included for good measure, but it fails to establish a convincing case because of errors in the presentation. But, even without the errors, it is not clear that the argument has any relation to why Dingle's arguments must be considered false. Hence, this is another example of a failed attempt to mathematically prove that Dingle is wrong.

5.0 The Polemical Arguments

This section assesses the polemical argument. Essentially stated, the polemic thesis is that Dingle's criticism of the special theory of relativity was mistaken, and that his passionate anti-relativity crusade was due to his 'inability to grasp the relativity of simultaneity". No evidence to support this view is cited. It derives from criticism of Dingle by McCrae, who claimed exactly this. But McCrae never really proved his case.

The polemical argument is predicated upon the assumption that Dingle's criticism of relativity was false. This depended upon the validity of the mathematical argument, lending weight to the polemical one. But, since the mathematical argument is false, the polemical one no longer has any credibility. It is predicated upon the false assumption of the actual error of Dingle's views.

6.0 Summary and Conclusions

This paper has demonstrated that the polemical arguments presented in the internet article "What happened To Dingle?" are erroneous. They fail to demonstrate that Dingle's criticisms of special relativity are false, because you can not refute an argument by showing that its conclusions are correct, as the author of the internet article does. Ironically, in his attempt to disprove Dingle, the author offers additional proof that Dingle was correct. The mathematical argument employed demonstrates that Dingle's claim, that the theory of relativity produces contradictory results, is valid.