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Herbert Dingle Was Correct! Part IV

I.J. Good's Failed Attempt The Prove Dingle's Arguments Fallacious

By Harry H. Ricker III email: kc3mx@yahoo.com

1.0 Introduction

The paper deals with the series of papers on the self-consistency of relativity by I.J. Good, which appeared in Physics Essays and purported to show that Dingle's claims of an inconsistency in the kinematics of special relativity were fallacious. This topic was briefly addressed in the first paper in this series, and the purpose of this paper is to delve more deeply into the polemic series of papers in which Good attempted to show that any person who claims that the special theory of relativity is mathematically inconsistent is wrong, without having to examine the argument. This is an extremely callous and arrogant argument to make. It reveals an attitude totally unsuited to scientific endeavor. But, Good, who is a mathematician, is probably not cognizant of an open minded approach to science. Being a mathematician he probably believes he is infallible, because he deals in the truth of symbolic manipulation, and thinks that this is real physics.

1.1 Background

Good's polemic against Dingle and his followers, who he calls Dinglians or Dinglophiles, was a response to a modest paper by Ian McCausland in which McCausland repeated Dingle's viewpoint. Then noting that Dingle's claims of inconsistency of the special theory had "not been satisfactorily resolved", he offered a new argument against the view that "What Einstein really said was that each clock would appear to run slow to an observer moving with the other". McCausland pointed to Einstein's' famous example from his first relativity paper, which claimed "that a clock at the equator would work more slowly than an exactly similar clock at one of the poles". this was followed by a new example of an inconsistency based on a modification of Einstein's example. McCausland's conclusion was that "In other words, if Einstein's prediction…is valid…then each of two clocks in uniform motion must work more slowly than the other. This supports earlier claims that the special theory of relativity contains an internal inconsistency." Here, earlier claims refers to Dingle's publications, which demonstrated that the special theory of relativity is untenable.

Rising to McCausland's challenge, the first paper in Good's series dealt specifically with Dingle's fallacies, in order to make clear that Dingle's original claims were false, and then dealt only briefly and rather vaguely with McCausland's new example. This was followed by a very short rejoinder by McCausland who refused Good's attempted

refutation, and with good reason. Good did not really say anything relevant to the issue. This seems to have provoked Good to initiate a long, tedious, and acrimonious debate in reply, which ran into five long papers (the last one part V became a two part paper). In these papers, Good expanded his purview to refute other critics of relativity. Along the way he occasionally revisited some of his arguments against Dingle and his purported followers. These were mainly directed against Ian McClausland, who was brave enough to stand up to his browbeating tactics.

After McCausland published his initial rebuttal to Good's initial attacks on Dingle, Good returned to his original objective of proving that Herbert Dingle's criticisms of the special relativity theory were fallacious by a direct attack on McCausland's new example (In Part I). Good took the view that his refutation of McCausland, also refuted Dingle and all the other critics of relativity. Good saw this as proving that relativity was consistent by proving all the criticisms fallacious. However, this was not a positive constructive mathematical proof of consistency, as usually offered by mathematicians in consistency proofs of a mathematical system. It was merely negative, negating the proofs of critics.

After Good's initial paper in the official series titled "The Self-Consistency of the Kinematics of Special Relativity", McCausland published a second rejoinder, officially in reply to Good's belated attack on his first paper. This offered a new formulation of his example, which purported to make his case stronger in response to Good's criticism. Good's next two papers, Parts II, and III, dealt with other critics of relativity. In Part IV he issued his rebuttal to McCausland's revised example of an inconsistency, and renewed his attacks on Dingle. McCausland issued a long reply which caused Good to publish a long Part V in two parts (A and B) again in rebuttal to McCausland.

1.2 Summary

The papers considered as constituting Good's series, include a total of seven papers all published in Physics Essays. The first paper specifically addressed Dingle's inconsistency arguments. This was followed by a five part series on the self-consistency of the kinematics of relativity. The last paper in the series consisted of two parts V(A) and V(B), giving a total of seven papers, when the first paper on Dingle's fallacies is taken into consideration. McCausland published three papers in Physics Essays in rebuttal to Good's. Two papers in the series, Parts II and III, do not specifically address Dingle's and McCausland's viewpoints, and they will not be considered here.

2.0 Purpose and Objectives

The main purpose will be to examine the basis of Good's thesis and his purported proofs that all arguments critical of relativity are fallacious. The main emphasis will be on his criticism of Dingle's arguments, and his claim that they are fallacious. It will be shown that Good's refutations of Dingle's claims do not stand up under close examination and should not be accepted. The acrimonious debate between McCausland and Good is not the main interest of this paper. That is a topic for another paper and the problems raised

by this debate will be bypassed in order to simplify the discussion and focus attention on the core of Good's arguments against Dingle.

Good's thesis is that all refutations of special relativity are false, because relativity is "true". This constitutes the basis or content of Good's repetitive, long winded, tedious, and largely uninformative, series of papers. Essentially it is a polemic, disguised as a mathematical argument. The only arguments that Good offers reduce to the fact that relativity is true, because its mathematics is correct, and its mathematics is correct because the theory is "true". Therefore, all attempts to show that its mathematics is inconsistent are incorrect. Since, all the arguments offered to prove that relativity is incorrect have been refuted, therefore the theory is correct. For good measure, the more of these arguments that can be shown are incorrect, based on the reasoning that they are wrong because relativity is true, the more it is required of the reader to agree that relativity is correct. This is the essence of Good's polemic, and one objective will be to unmask this rhetorical method and show why it is false science and mistaken.

Good uses a long standing method of dealing with relativity critics. A second objective will be to discover the main principles utilized by this method and why they are essentially false science, being little more than rhetorical tricks of the trade in relativity arguments.

When all of Good's arguments are reduced to their core principles, they reduce to this: Dingle's interpretation of the special relativity theory is different from mine. Since, I am correct in my interpretation, his arguments are fallacious. Keeping this in mind the reader is invited to delve into the quagmire of debating the truth of relativity

3.0 The Rules Used In Debating Relativity

Before we begin the discussion, it is important that we have a copy of the rule book that is used in debating relativity. The first rule is that the critic is not allowed to see the rule book. The second rule is that the critic is allowed to publish his dissenting views in order to show how foolish he is, as an example for others to avoid. Rule three is that any criticism must be followed by a refutation of the claims offered, even if the argument is really stupid. Rule four is that the refutation should never address the actual point raised by the critic, and that the argument addresses its refutation to a point which had nothing to do with the issue at hand. Rule five, is that it is really good if the refutation rehashes the fundamentals of the subject so the critic is lectured to, as if he didn't understand that two plus two equals four. Rule six, if the dissident is really bold and has the temerity to refute the refutation, then a second refutation must be published that adds nothing to the first one, but which makes it really clear that the critic is a hunk head for writing a rejoinder. The rejoinder to the rejoinder, makes it clear by restating what was said before, that if you can't understand that two plus two equals four, then "God help you". Usually, the first rejoinder by the critic is that you didn't address the issue I raised, so your refutation is irrelevant. Rule seven is that that this must never be addressed. The main point at issue is never to be admitted into the discussion. Rule eight is that, if the debate

was a lively one, which sold a lot of journal copies, a disinterested expert will be invited to explain the argument and decide who is really right after all. In every case, this third party finds against the relativity critic. Then the debate is closed and further attempts to renew it are rebuffed.

While the above was written in a lighthearted vein, there is a serious and nasty aspect to it as well. This aspect is present in Good's series of papers, and shows up in other well documented debates on relativity, several of which involved Dingle in debates with different opponents. Some of the more well known examples of these debates are: (1) The famous disagreement between Ehrenfest and Varicek, in which Einstein issued an opinion ending the discussion by clearly supporting Ehrenfest. (2) The series of exchanges between Henri Bergson and Andre Metz, in which Metz browbeat Bergson into submission. (3) The unjustified attack upon Dingle's book the Special Theory of Relativity, following its publication, by Paul S. Epstein, in which L. Infield was invited to resolve the dispute. (4) The famous phony dispute engineered by the editor of Nature in which Dingle debated H. W. McCrea, while the editor ran an editorial in which McCrae was declared the winner. A study of these debates shows there are several consistent ways that defenders of relativity treat the arguments of relativity dissidents. Good uses these same methods. The primary one is to confuse the actual interpretation of the theory which is being used. The critics use one interpretation and the refutations are based upon another different one.

4.0 The Kinematics of Special Relativity and Dingle's Fallacies

This section discusses the paper by I. J. Good with the above title, which appeared in Physics Essays, Vol. 4, No. 4, 1991, page 591. The abstract says that "Dingle produced several arguments claiming that the special theory of relativity leads to logical contradictions. Whether his conclusion is true or not, this paper is intended to show that his main arguments were fallacious. Some discussion of the clock paradox is necessarily included." This is a bit unclear. If Dingle's arguments are fallacious, then they must not be true, but Good seems to say that they could be true even though they are fallacious. Here is the explanation.

Good consistently claimed that he was not addressing the physical truth of Dingle's claims, because he was not a physicist but merely a mathematician. So he could not say whether Dingle's claims were true or not, merely whether they were mathematically correct. This is a bit too much too believe, and it stretches the limits of belief to accept that this is what was intended by Good's long series of papers.

If we take Good at his word, then his paper is irrelevant to the issue. The reason is that Dingle never claimed there was a mathematical inconsistency. He claimed there was an inconsistency in the physical interpretation of the mathematics. Good, who is a mathematician, writes a paper which claims Dingle's arguments are fallacious based on a mathematical argument which attempts to show that Dingle's arguments are fallacious, without considering Dingle's major claim that the inconsistency was in the physical

interpretation. Hence, Good's arguments never address the main point of Dingle's criticism, but they are called fallacious anyway. Hence Good's paper is in accordance with rules three and four of section 3.0.

4.1 Dingle's Question

At the end of the introduction Good sets up a dirty trick, which is slipped in and forms the entire basis of Good's purported refutations. Good's trick is this. He says Dingle "…assumes the kinematics of the special theory, essentially in the form stated by Einstein in 1905...Therefore, I too, will assume the theory in the same form." But Good doesn't carry through with this. He actually assumes the form of the theory given by Einstein in 1907, which is different from the 1905 form of the theory and is inconsistent with Dingle's assumed use of the 1905 theory. So Good is fundamentally dishonest in his approach. Throughout his entire series of papers, Good uses the 1907 version of relativity and then dishonestly pretends that this is actually Einstein's 1905 version of relativity. This dishonesty is compounded by the fact that he deliberately obscures the differences in interpretation that arise from the two different versions. (Many readers probably don't know that there were three fundamental papers published by Einstein on special relativity, and that the second two don't agree with the first one, because of subtle differences in the presentations.)

The paper begins with a section titled "Reminders Concerning The Kinematics Of The Special Theory". In accordance with rule 5. Then in section 4.0 Good addresses "Dingle's Question" from 1971. Here a very interesting and important mathematical discussion is presented, which is at the center of the entire problem of the interpretation of the special theory of relativity. The argument is difficult to understand and has very important ramifications, which Good ignores. Before discussing it in detail, the main conclusion will be given and discussed.

Good makes the claim that Dingle's question is fallacious because Good has discovered a way to avoid the contradiction, which Dingle claims is the reason that the special relativity theory is untenable. The procedure that Good devises, has the apparent effect of negating Dingle's contradiction, and relativity is saved. This is the objective, so Good stops here, but there is more to it than this. If Good's argument is correct, it does more than merely refute Dingle's criticism, it saves relativity from all of its paradoxes, and solves the twin paradox as well. This is a really big thing to have discovered. The refutation of Dingle is a minor accomplishment compared to resolving all of the paradoxes of relativity. This would have been one of the most important discoveries in relativity since Einstein's general relativity was formulated. But, Good did not see the rough diamond he had uncovered, and we must ask, why?

To recapitulate. Good claims that Dingle's argument is fallacious, because he has discovered a way to demonstrate that the mathematical procedure of Dingle can be modified so that the contradiction is avoided and does not arise. However, if correct, this discovery can save relativity from all of its paradoxes and we seek to know if this is really

possible. To do this, we must delve into some very difficult mathematical concepts.

4.2 Evaluation Of Lorentz Transforms

The mathematical procedure that is essence of the problem does not have an official name. Here it is called evaluation, because the procedure is similar to other procedures with this name. The evaluation problem in relativity is to solve for the space or time interval defined by a Lorentz transformation. Dingle's question is a problem in the mathematics of evaluation in relativity. The problem has two components: the mathematical part, and the physical part. Here the physical part refers to the physical interpretation that is imposed upon the mathematical solution by the physical postulates assumed by the theory. Essentially there is no difficulty in the mathematical part, once the correct interpretation of the physical part has been determined. The problem is to determine the correct physical interpretation that is to be imposed upon the mathematical part. This is the subject of Dingle's question. Dingle gives an evaluation problem and then describes the official answer which is demanded by the physical interpretation which the postulates of relativity impose on the mathematical solution. This physical interpretation has traditionally led to the mathematical solution which involves a contradiction. Dingle then says that unless it can be shown that this contradiction can be avoided, by finding a mistake in either the mathematical or physical parts of the problem, then the theory of relativity must be abandoned.

Good's solution is this. He finds a mathematical method that avoids a contradiction without taking into consideration the physical interpretation of the problem. Based on this, he makes the claim that Dingle's argument is fallacious, and hence relativity is saved. As I discussed above, this would be a major discovery in physics if it were true. But since Good never considered the consistency of his solution with the postulates of relativity, there is no reason to believe his claim. Hence, we have the following problem: determine if Good's solution is consistent with the postulates of relativity. The answer is that it is not consistent with the principle of relativity which is Einstein's first postulate. Hence, Good's refutation of Dingle does nothing to save relativity, because his interpretation is not physically consistent with that theory.

According to the physical interpretation of the principle of relativity, an observer in each and every inertial reference frame is entitled to the interpretation that he is "at rest", and all physical laws are interpreted for him as if he is the rest observer. From the point of view of evaluation of the Lorentz transformations applied to time, the mathematical evaluation procedure demanded by this physical interpretation is to set x=0 in the Lorentz transform equation and x'=0 in the inverse Lorentz transformation equation. The first yields the solution t'=8t and the second yields t=8t'. These are the well known reciprocal equations for time dilation that lead to the famous result that moving clocks run slow. But, Good gives the following solution. For the first case, t=8t', and in the second case, t' =8t . He then says that we can't have both x=0 and x'=0 for a "single pair of events", Hence, the two equations given do not both apply at the same time, "Thus no contradiction is reached".

But this was not Dingle's question (See rule four). Dingle asked, how to determine which observer would measure the longer interval "because the theory requires each clock to give a longer interval between the same pair of events". Clearly, if we assume one observer is the rest observer, then using Good's method we find which interval is the longer, but if we change to the opposite or reciprocal rest frame, we get the opposite answer to the previous one, and Good neglects to note this in his refutation. His procedure is incomplete, so his conclusion is false. He doesn't really prove anything at all. But if it were true, his solution would certainly be wonderful towards solving 100 years of acrimonious debate about relativity. (See section 8.1 for a detailed refutation of Good's argument.)

If Good were correct, consider the following implication. An experiment could be performed in which the temporal separation would be measured between a pair of events, by observers in all possible inertial frames. When the reported measurements are compared, the shortest interval would be the absolute rest frame. Hence, if true the procedure would violate the principle of relativity. Hence, it must be admitted, that if relativity is true, it is impossible to perform this kind of experiment. In Dingle's question, if the observers could detect the longer interval, the principle of relativity would be violated. Hence, Good's solution does not really evade the contradiction, it negates the theory in a different way.

4.2 "A Fallacy In Coordinate Geometry"

This is the title of the section where Good takes up Dingle's 1962 inconsistency argument, which was addressed by the author in the first paper of the series, Herbert Dingle Was Correct!. Good's argument is the same as the one previously given to refute Dingle by McCrae. The problem posed by Dingle is this. Given two clocks in two relatively moving reference frames, he gives Einstein's 1905 derivation of the time dilation and then gives a second derivation for the same problem. The two problems should have given the same answer that the clock at rest in S' marking time t' should be slow relative to the clock at rest in S, marking the time t. Einstein's solution was the following equation: $t'=8^{-1}t$, from which he deduced that the time, t', marked by the clock at rest in S' was slow relative to the time t marked by the clock at rest in S. In obtaining this result, Einstein used the Lorentz transform going backwards. This means he started with a clock in S" and then tried to find the rate as viewed in S, using the Lorentz transform. Dingle solved the same problem, using the inverse Lorentz transform, so he didn't have to solve the problem going backwards. He obtained $t=8^{-1}t'$. The result was that the two solutions, which should have given the same solution that the clock in S' was slow, gave different answers instead. Dingle asked the question. Since the principles of the theory used were the same in both cases, then why was there a difference?

This request produced no answers, and Dingle insisted that the failure to produce an acceptable answer indicated that the theory was untenable. This produced some belated answers which didn't solve the riddle, but declared that the problem was incorrectly

posed by Dingle, and that a correct formulation would resolve the problem. Dingle refused this answer and eventually McCrae produced the answer given by Good.

The essence of this answer is that the two solutions represent a fallacy because they can't both be true simultaneously. The two solutions are represented by two linear equations modeled by two straight lines. These intersect at the solution t=t'=0. Hence, they can't both be true and Dingle's claim is false. But that is exactly what Dingle was saying to begin with. So the answer didn't answer anything at all, it merely appeared to be an answer. (See rules 4 and 7 above) But the ruse was clever. It turned Dingle's assertion of a contradiction in the special theory of relativity into what seemed to be a contradiction in Dingle's argument. This was a pretty dishonest thing to do, but lacking a real argument, what else could be done to defend relativity?

The reader should notice that the same ruse was used to refute Dingle's question and then again to refute Dingle's 1962 "inconsistency". The ruse is to claim that the two different solutions can not be true simultaneously. Clearly if there is an inconsistency, then this should result in a failure to obtain a unique solution. McCrae and Good claim exactly this, so they are actually confirming that the theory is inconsistent by showing that there can not be two simultaneous solutions, which is what relativity claims to be true. Hence this proof refutes relativity, thereby supporting Dingle's claim. It is a dishonest dirty trick to turn the problem around and claim that it refutes Dingle.

4.3 Dingle's Basic Thesis and The Circular Clock Paradox

The title of this section is also the title of Good's final section of the paper. This section forms the actual substance of the paper. It is here that Good reveals his actual reasons for his claim that Dingle's views are fallacious. The reason is as follows. He disagrees with Dingle's physical interpretation of the mathematics of special relativity. Hence, the argument reduces to the following. Good maintains that Dingle uses an incorrect interpretation of relativity, and therefore, Dingle's arguments are fallacious. Good gives some very valid arguments to support his opinion that Dingle's physical interpretation is incorrect, but before addressing them we must try to make clear the different physical interpretations that are involved in the difference of opinion which Good asserts.

Simply explained, Dingle asserts Einstein's 1905 version of the theory of relativity, and Good asserts the 1907 version of Einstein's theory of relativity. This is a major cause of the debate over relativity. There are at least two different physical interpretations of relativity, which Einstein gave in his fundamental papers. To compound the difficulty, he never attempted to clarify the differences or state which version of the theory was the correct one. Up until about 1950, the prevailing opinion was that the 1905 interpretation was the correct one. But, after 1950, the prevailing opinion became that the 1907 version was the correct one. This was compounded by the fact that this view applied mainly to the mathematical formalism, not the interpretation of the physical implications of the theory. The result was very confusing.

The confusion was compounded by discussions of the twins paradox. Strictly speaking, according to the 1907 interpretation there was no twins paradox, because in this interpretation, the rest frame clocks in all inertial reference frames always run at the same rate. So according to this, there can be no asymmetrical aging of the twins, they both age at the same rate. According to the most famous and popular of Einstein's 1905 predictions, there is an asymmetrical aging of the twins. Since Einstein's most famous prediction was that there should be asymmetric aging, physicists faced a dilemma. Admit that Einstein had made a mistake or embrace the incorrect interpretation in order to preserve the most famous of Einstein's results, even though it was false according to the 1907 theory. The dilemma was removed, however, when it was realized that by using general relativity, the asymmetrical aging prediction could be maintained and the integrity of the theory saved from embarrassment. The problem was that many scientists, Dingle being the most well known, didn't accept this solution. They insisted that general relativity was irrelevant, and they were right. Over time, Dingle clung to the 1905 interpretation, but eventually decided that it was untenable. The relativity establishment switched to the 1907 version of relativity, and resented Dingle's continued criticism that this was not really consistent with what Einstein had intended. He was right about this too. In addition, many textbooks have continued up to today to discuss relativity as if the 1905 version was the correct one. (Readers who have seen the PBS television program NOVA, may recognize that the NOVA programs on relativity always present Einstein's 1905 interpretation which Good rejects.)

Another development also complicated the problem. As noted above, after 1950 the 1907 version with its Minkowski space mathematical formalism became dominate in the textbooks, but at the same time the experimental tests of the theory favored the 1905 version of the theory. This aggravated the dilemma. As the mathematicians continued to emphasize the Minkowski formalism, the experimental support for it evaporated. So the 1905 version had to be retained for this reason. The result is that textbooks discuss the 1907 formalism, which is not based on slowing of moving clocks in rest frames, and then proceed to claim that experiments, which demonstrate that moving clocks run slow in rest frames, proves relativity. This contradictory situation was an inviting target for critics, so it is not surprising that the theory has been severely criticized, with Herbert Dingle in the lead.

4.4 Summary and Conclusions regarding Good's Paper refuting Dingle's Fallacies

This section gives a concise summary of Good's viewpoint regarding Dingle's arguments that Einstein's special relativity theory is untenable. Good's claim is that Dingle's arguments are invalid because he uses an incorrect interpretation of the theory. Dingle is wrong because he based his arguments upon a misleading statement in Einstein's 1905 paper. Since Dingle's arguments address a physical interpretation which is based upon an erroneous interpretation of Einstein's theory, his refutations of that theory are obviously invalid. Good could have saved the reader a lot of time and confusion by saying this directly at the beginning, rather than at the end.

As we discovered in the analysis, Good's specific attempts to refute Dingle's arguments do not stand up as valid. They only appear to make sense, in terms of the arguments that Dingle is wrong because he misinterprets Einstein's theory. The specific arguments only serve to confuse the issue and lead to a peculiar irony. Dingle's arguments are directed to show that the 1905 interpretation of the theory is false, and this is exactly what Good argues in section 7 of his paper, where he agrees with Dingle. Where he disagrees is the important point. Dingle argues that the 1905 interpretation of Einstein's special relativity theory is false and that this is the only physically meaningful interpretation. Hence, the theory is untenable since the physically meaningful predictions of the theory lead to a contradiction.

In reading Good's paper this reviewer was confused by the obvious effort to prove that Dingle's arguments are fallacious, rather than use these arguments in support of his claim that Dingle's interpretation is based upon an error of interpretation. Dingle clearly proves that the specific physical interpretation given by Einstein in 1905 leads to contradictions and is therefore untenable. Good's argument is that Dingle is wrong in asserting the entire theory is contradictory, because he claims that there is another interpretation of the mathematics of the theory that is not contradictory. But, Good's paper is unclear upon this point and the unwary reader may gain the impression that Good is refuting Dingle's claims that the 1905 interpretation is contradictory, and that therefore this version of the theory is valid.

We will see in the next section how McClausland takes this viewpoint and forces Good to clearly state that Einstein made an error in his famous 1905 paper. (But notice that Good calls it a slip, and implies that Einstein didn't really mean it.)

5.0 The Self-Consistency of the Kinematics of Special Relativity

Here the second of Good's papers with the above title is analyzed. This is a response to the paper by McClausland which effectively reiterates Dingle's interpretation of the theory and presents an example of an inconsistency which, following Dingle's method, is an improved argument based upon the pendulum clock argument taken from Einstein's 1905 paper. McClausland's paradox is essentially an attempt to vindicate Einstein's argument given in 1905, while showing that as Dingle had argued, it leads to an inconsistency.

The theme of Good's paper is "to make more convincing the self-consistency of the kinematics of special relativity" by "refuting a recent argument by McClausland". "A secondary aim is to explain how a comment by Einstein when taken literally, seems to have led to serious misunderstandings and might well do so again." Here some clear progress is evident. Although Good stands by the mathematical consistency of the kinematics of relativity, he is grudgingly willing to admit that the theory is physically wrong when interpreted in the manner of Dingle and McClausland. But, he is unwilling to admit that this is a genuine interpretation of Einstein's theory, or to admit that this is a significant error. He continues to assert that the mistake is Dingle's and not Einstein's.

(Remember that Good is using the 1907 interpretation, while Dingle and McCausland use the 1905 interpretation.)

5.2 McClausland's Argument Refuted

The first part of Good's paper gives a long and tedious discussion which attempts to frame McClausland's argument is terms which makes it appear incorrect by reviewing the basics of the theory (see rules 4 and 5 above). The argument boils down to this. McClausland concludes that "B's clock must 'actually' run slower than A's if the special theory is correct". In the section titled The Fallacy, Good points to this statement, identifying it as the fallacy. He says "the effect is supposed to be "absolute"…but B's clock does not actually run slower than A's …that is. It is not an "absolute" inference…really the effect is only "relative" to a particular coordinate system." stripped of all the words, all this says is that the argument, which is based upon the 1905 version of relativity, contains a misleading "slip" by Einstein, and that since it addresses an incorrect interpretation of the theory, then it is a fallacious argument.

This reasoning is not exactly correct. As noted above, if the interpretation is incorrect, then if it proves that the theory based upon it is false, then it can not be fallacious. It proves either that the interpretation based upon it is fallacious, or that the underlying mathematics is fallacious. Good takes the view that the argument which refutes the 1905 version is fallacious, and then says that the 1905 interpretation is false. These two positions are contradictory. This reviewer thinks that it would be better to agree that the 1905 interpretation is false as proved by Dingle, and then proceed to show that this does not prove that all other interpretations are false. But Good does not do this. He proves that Dingle's and McClausland's demonstrations that Einstein's 1905 version are wrong, based on his claim that their interpretations of the theory are wrong, because based on a very small mistake in Einstein's paper. But this seems to prove only that the 1905 interpretation is not false, not that it is false. The reader is probably confused by this, and will think that the 1905 theory is true when Good is saying it really is false.

Good tries to avoid all of this by making it appear that Dingle and Good are misrepresenting Einstein's theory, rather that correctly interpreting his statements given in the 1905 paper. This apparently preserves the correctness of the theory and lays the blame on Dingle and McCausland. But to do this, he argues that Einstein never really made the statement which he really made, and the resulting argument in Good's paper devolves into absurdity, because Einstein did say what he said and he meant it. Good absolves Einstein of any blame by saying he made a slip, and that Dingle and McCausland were wrong in the way that they interpreted this "slip".

5.3 Summary and Conclusions

This reviewer thinks that Good's second paper is unfair to Dingle and McClausland, and believes that Good's paper will be misunderstood by most of its readers. Here is why. The introduction announces that "the author was convinced in advance" of the correctness of

the theory, so he is clearly not being objective. His main aim is to refute McClausland, not to clarify what is the difficult problem to solve. This is to make clear that the most common and accepted physical interpretation of the special relativity theory is false. Good is dishonest in claiming that Dingle and McClausland are wrong and then agreeing with them. He agrees that the theory leads to inconsistencies when interpreted in the manner indicated by Einstein‘s 1905 paper. Hence, Good actually agrees that Einstein’s interpretation is false, but he hides this and minimizes the significance of this conclusion. Hence, many readers are allowed to believe that Dingle’s criticisms are false and that Einstein’s 1905 theory is true, because Good’s argument is unclear and ambiguous for the untrained reader not adept in the subtleties of the problem.

6.0 The Self-Consistency of the Kinematics of Special Relativity, IV

The section addresses the fifth paper of Good’s series, which includes his paper on Dingle’s fallacies. It is primarily an attempt to rebut a paper by McCausland published in Physics Essays as a rejoinder to Good’s first paper in this title series discussed in section 5.0 above. Good announces in the abstract that his purpose is to provide further support for his thesis “by reconsidering some arguments by Dingle and McCausland…by answering questions from a referee who thought McCausland had an absolute physical concept in mind, but which I claim is either metaphysical or Newtonian, or else incorrect…”

The paper takes on the flavor of a polemic rant against Dingle and McCausland, delving into accusations of metaphysics and Newtonian bias. However, all of this is beside the point, which is to demonstrate proof that the kinematics of special relativity is mathematically consistent despite the claims of opponents. This problem is not addressed and instead the reader is treated to a confused rambling discourse upon the basis of Einstein’s theory, and a confusing refutation of Einstein’s claim that moving clocks run slow made in his 1905 paper.

Ironically, Good blames Dingle and McCausland for accepting Einstein’s statements, and using his interpretation. Good claims Einstein made a “slip“, and that this led Dingle and McCausland astray. He then proceeds to explain why Dingle and McCausland are wrong in basing their interpretation upon Einstein’s 1905 paper, while at the same time absolving Einstein of any responsibility. This is a very good trick. But he doesn’t pull it off well. The reader is more likely to conclude that it is Einstein who is wrong in his claims. In order to avoid this, Good gives a confused presentation that concludes that Einstein was wrong, but not really, and that this preserved the correctness of his kinematics which remains absolutely true and inviolable.

If you are confused by all of this read on. You will see that it is largely deliberate. Good cannot admit that Einstein actually meant what he said. Good maintains it is wrong. Hence, Good tries to convince the reader that Einstein really meant to say something different, which (no surprise) is exactly the interpretation that avoids the inconsistencies pointed out by Dingle and reiterated by McCausland. To add to the confusion of the

reader, Good tries to make the claim that Dingle should never have taken Einstein at his word, but that because of a Newtonian bias, Dingle misrepresented what Einstein said.

6.1 Philosophical Issues

Following his introduction, Good addresses philosophical issues in section 2. Here he claims that "Einstein expressed his operational and antimetaphysical philosophy" because metaphysicians have had a harmful effect. This is Dingle's criticism of Einstein inverted. Dingle blames Einstein for the harmful influence of the metaphysics of relativity. Clearly this argument is one of perception. The author agrees with Dingle on this point. Relativity seems to be more a metaphysics than a real operational physics, which was intended. Somewhere something went wrong.

Good uses the discussion of philosophical issues to drag the argument about absolute time and space into the discussion. Here he disparages Newton's concept of absolute time, a standard argument in the relativistic bag of tricks. Having set the stage, he proceeds to tar Dingle and McCausland with the charge that their concepts are Newtonian. But the groundwork for why this is truly a bad thing is not really clear as we will see later.

6.2 Why Are There Intelligent Opponents?

In this section the polemical aspect of Good's papers becomes apparent. There is a simple answer to this question. It is because there is disagreement about the meaning and the physical interpretation of the theory. (These really boil down to the same thing.) Good gives a list of eleven reasons for "incorrect criticisms" of Einstein's relativity. Effectively the list attributes the errors to the critics, and implies that they are the source of the difficulty and not that the concepts of relativity may have some inherent flaws.

In Goods' opinion, people who persist in the incorrect opinion that relativity is inconsistent are committing a typical error in thinking, but of course Good applies none of these errors to his own thinking. He is clearly error free.

6.3 What Is The Basis Of Good's Arguments?

This section address what appears to be the main part of good's argument, but it is difficult to understand what this argument is, given the obscure nature of the discussion in sections 4, 5, 6 and 7. The discussion is rambling, vague, confusing and generally unclear. In the later sections of this paper some of the arguments will be shown to be false and misleading. But the main point at issue is not made clear to the reader. The discussion seems to imply that Good knows what he is saying, but it is couched in such a confusing presentation, that it is not clear to the reader what the point of the argument is all about. Good's main objective is not clarity of presentation but is to get the reader to agree that Einstein's theory is, after all, really true.

6.3.1 The Argument In Section 4

Good's argument in section 4 is a restatement of the argument from Good's first paper on Dingle's Fallacies. Nothing substantially new is introduced. The argument is reseated in a more forceful manner. Einstein's derivation of time dilation is restated. Followed by the assertion that "A and B have equal rights, each in his own NCS, to claim that the other's clock is running slow. There is no contradiction." But Good fails to clearly show that this is a necessary conclusion, and the reader may not be convinced, because Einstein gave a different interpretation in his 1905 paper. This forces Good to the position that Einstein didn't really mean to say that, or that he was misinterpreted by Dingle.

Good takes the position that Dingle interpreted Einstein in a Newtonian manner, and that this is the reason that Dingle's arguments are fallacious. Good says that Dingle's mistake is "*assuming a Newtonian point of view*". (Here Good uses italics for emphasis.) He follows this by saying that in relativity "each inertial observer has his own "proper" time", but he fails to notice that this is an absolute, because all observers have the same absolute proper time, and without this absolute proper time, the same for all observers, the theory is impotent.

6.3.2 Good's Argument In Section 5

This section attempts to give a philosophical argument that Einstein didn't really mean what he said in his 1905 paper, when he stated that a clock at the equator runs more slowly than a clock at the poles. Since Einstein said what he said, in two different ways, in order to make clear what he meant, this argument is rather peculiar, and inevitably confusing. It would have been better to have admitted that his examples do lead to a contradiction, and then suggest that Einstein proposed a second interpretation in his 1907 paper, which avoided the problem. This would have then required that critics, such as McCausland, to refute that interpretation, which Dingle never directly addressed.

6.4 McCausland's New Attack On KSTR

This is the title of Good's section 8. The purpose is to refute McCausland's newly revised proof that relativity is inconsistent. Good says "McCausland makes four statements , which on a first reading seem succinctly to refute KSTR ' It is one of the better of such fallacies that I have seen. It is good enough that many people who are opposed to STR would be unlikely even to look for the fallacy. Similarly, for pinpointing the fallacy it helps to be confidant in advance that there is one. Here is McCausland's argument, which is brief lucid, subtle, but wrong." Unfortunately, the fallacy that Good is certain must be there doesn't get very easily pinpointed by Good's refutation. In fact he never pinpoints it at all. As a result, it is clear that there really isn't a fallacy to pinpoint, and Good's confusing and rambling discussion, in which he argues with a referee, fails to make the case that McCausland's argument is false.

6.5 Good's Conclusion

Good's conclusion makes it clear that his argument is merely polemical and has no mathematical or physical substance. He says "I have complete faith in the self-consistency of KSTR. When I see an argument to the contrary, I know it is wrong without reading it…Whether it is obviously wrong is another matter. To avoid fallacies, an argument against KSTR must be based on empirical evidence, not just on gedankenheit." This is an absurd argument. The reader is perfectly at liberty to think, well, I think exactly the opposite, when I read an argument supporting KSTR I know it is wrong without reading it. So there, take that, Mr. Good. Apparently wasting paper and ink is the objective of academic physicists and mathematicians. But, the reader wants to know more, he wants an answer, but Good doesn't have a real proof, merely faith that KSTR is true, it is purely a metaphysical viewpoint, because it is based on faith and not logical argument.

7.0 The Self-Consistency of the Kinematics of Special Relativity, V

The section considers the last installment, which was published in two parts. Essentially this is a rejoinder or rebuttal to McCausland's rejoinder published in Physics Essays, No. 12, 1999. It contains nothing new which significantly changes the nature of the arguments. It basically repeats all the previously published arguments with some changes and improvements in the presentation. Some of the improvements in the presentation do make more clear Good's points which were vague and obscure in the earlier papers. Here these improved arguments will be briefly discussed. This will avoid having to rehash the same old arguments again.

7.1 Dingle's Question

In section 3, Good makes another attempt to answer Dingle's question, in a way that does not lead to the recognition that there is an inconsistency in the kinematics of special relativity. It is curious that he is doing this again, after having previously claimed to have satisfactorily answered Dingle's question.

The answer is again the same as before: "Thus the simple answer to Dingle's question, perhaps obvious to most modern physicists, is that in KSTR each clock in the symmetrical setup runs slow in the NCS of the other". He goes on adding more polemic: "Dingle very belatedly recognized that answer on pages 43 to 46 of his book, but said, I think in desperate rationalization and without saying why, that that answer would make STR useless." This is the only really valid criticism that Good has managed to produce. Essentially Dingle overlooked the fact that the readers of his book might not be sufficiently knowledgeable concerning the theory of relativity, that they would not already know why this statement is obviously true. But, it is useful that Good, who doesn't' know this, demands an explanation. This will be forthcoming in a later section of this paper. The answer is obvious to most modern physicists familiar with relativity physics.

Good rehashes the same old ground. He re-derives the time dilation equations and gives

the interpretation that the rate of a clock moving through an inertial rest frame appears slow to an observer in the rest frame. But, he claims that the lock doesn't really run slow at all, it merely appears to do so. That is the essence of his overly long, tedious and boring argument.

7.2 Simultaneity and Synchronicity

In this section, Good addresses the second major issue that needs to be cleared up. There is a disagreement concerning the interpretation of what this concept means in special relativity. Good attacks Dingle's view and claims to prove that it is wrong. The argument appears convincing, but on deeper analysis, it is flawed. This will be discussed in a later section. The essence of the debate is a semantic one concerning the meaning of words.

7.3 Einstein's Slip

Good argues that Einstein made a slip when he said "more slowly" in his 1905 paper. He says Einstein should have reworded this. In fact Einstein did do this in his 1912 paper. But the rewording doesn't fit Goods interpretation of what Einstein should have said. This will be discussed in more detail in a later section.

7.4 Whose Onus?

In this section Good demands that McCausland produce a proof that in his interpretation 'Einstein's slip does follow from KSTR." this is not necessary. Einstein himself provides this proof in his 1905 paper. But, if Good thinks that is not sufficient, he should consult Einstein's 1912 paper. If that is not sufficient he should see Clifford Will's proof given in his book Was Einstein Right, page 253. Good implies that the interpretation which Dingle uses does not follow from Einstein's theory. In fact it does. Any textbook on relativity has this proof. The real problem is the reverse one of proving that Good's interpretation is consistent with the mathematics of special relativity. In a later section it will be shown that this is not possible, hence Good's thesis will be refuted.

7.5 Summary

The essence of Good's claims can be reduced to the above four items of disagreement. They are the interpretation of Dingle's question, Einstein's slip, the interpretation of the relativity of simultaneity, and the question of whether the interpretation of Dingle/McCausland, or the interpretation of Good, follows from the Lorentz transform equations. These are the issues that will be addressed in the remaining sections.

8.0 Transformations of Time and Space Coordinate Systems

We will start with the last issue, since this is the most difficult of the problems and the others follow from its solution. We define KSTR as Good calls it this way: KSTR is the

mathematical problem of the transformation of the time and space coordinates of inertial reference frames. The transformation problem is solved by the Lorentz transformation equations interpreted as linear transformations of coordinate systems represented as vector spaces of space and time coordinates, with fixed basis. What this means is that we establish a vector space basis, called in physics standards of measurement. These are used to define coordinate systems. The objective of KSTR is to determine the equations of transformation based on the two postulates of relativity. The result is the Lorentz transformation equations.

Now the problems arise in the following manner. In 1905, Einstein used a flawed method to derive a Lorentz transformation of time from a rest frame into a moving frame. He assumed that a clock in the moving frame ran at the same rate as if at rest, by the principle of relativity. He then showed that when viewed in the rest frame this moving clock ran slow. In 1907 he changed the interpretation to say that the clock only appeared to run slow. In 1912 he returned to the original interpretation of 1905 where he claimed the clock ran slow. Which one was the correct one. Einstein never said. To answer this we will solve all the transformations equations for time.

8.1 Evaluation Of Lorentz Equations For Time

The mathematical method used here is to first solve the system of Lorentz and inverse Lorentz equations for time simultaneously using a specified condition of evaluation. Here the term evaluation is used in the same sense as it is used when a polynomial equation is solved for its roots by setting the equation to equal zero and solving for the indeterminates. The procedure used here is similar. A selected variable is set to zero, and the resulting solutions are obtained. Solutions are obtained by setting one of the following four variables equal to zero, and then solving for the remaining three. The following variables are set equal to zero and the resulting solutions obtained by evaluation: $x=x'=0$, each taken in turn.

The Lorentz transformation equations in a simplified form are assumed as follows:
$x'=\beta(x-vt)$ $t'=\beta(t-vx/c^2)$ $x=\beta(x'+vt')$ $t=\beta(t'+vx/c^2)$ $\beta=(1-v^2/c^2)^{-1/2}$
Here there are four equations which express the simultaneous solutions for the transformation of coordinates. These equations are defined in the usual way in terms of two relatively moving reference frames S and S'. Where the origin of frame S' is in motion with velocity v in the positive x direction of S.

Notice that β is greater than unity when v is greater than zero, and that β^{-1} is less than unity when v is greater than zero. An equation of the form $t'=\beta t$ results in a dilation of the variable t' with respect to t because t' is greater than t The equation $t=\beta^{-1}t'$ results in a contraction of the variable t with respect to t' because t is less than t'. The definition of β implies that it is always equal to or greater than unity, and can never be less than unity.

The coordinate frames S and S' are assumed to be orthogonal coordinate systems with the requirement that time is defined such that $t=t'=0$ occurs when the origins coincide; i.e.

x=x'=y=y'=z=z'=0 at t=t'=0. The axes for the x, y, and z directions are assumed to be parallel, and the y and z coordinates are assumed to be identical and coincide when the origins coincide at t=t'=0. The purpose of the solutions is to determine the relations governing the transformation of the x and t coordinates according to the Lorentz transform equations.

8.1.1 Results for x=0 (Specification of an evaluation at the same place in S)

To consider the role of evaluation in at the same place in S, we determine the simultaneous solution of the four equations when we specify the condition that x=0. The results are as follows:

(1) $x'=\beta(x-vt)=-\beta vt$

(2) $t'=\beta(t-vx/c^2)=\beta t$

(3) $x=\beta(x'+vt')=0$, Therefore $x'=-vt'$

(4) $t=\beta(t'+vx'/c^2)=\beta t'(1-v^2/c^2)=\beta^{-1}t'$

8.1.2 Results for x'=0 (Specification of an evaluation at the same place in S')

To consider the role of evaluation at the same place in S', we determine the simultaneous solution of the four equations when we specify the condition that x'=0. The results are obtained as follows:

(5) $x'=\beta(x-vt)=0$, Hence $x=vt$

(6) $t'=\beta(t-vx/c^2)=\beta t(1-v^2/c^2)=\beta^{-1}t$

(7) $x=\beta(x'+vt')=\beta vt'$

(8) $t=\beta(t'+vx'/c^2)=\beta t'$.

8.2 Interpretation Of The Results

The traditional interpretation is that equations 8 and 2 are the transformation of time in special relativity. Some authors, however, think that 6 and 4 are the solutions. The first derives from Einstein's 1907/1910 papers and the second derives from the 1905 paper. The current consensus of textbooks appears to support the 1907/1910 version, which Good argues is the only unique correct interpretation. This interpretation proclaims equations 8 and 2 as the time dilation laws, and admits no others.

A major problem is that there are four transformation equations and the traditional theory only has room for two. The four transformation equations are 2, 4, 6 and 8. (The traditional theory gives only 8 and 2 or 6 and 4 but not all four at the same time.) Hence, we have more solutions than the traditional theory which insists there are only two.

8.2.1 Good's Answer to Dingle's Question Refuted

There is the problem of what to do about the extra equations. Suppose we claim that 8 is the equation which shows that a clock at rest in S' appears to run slow relative to one at

rest in the S observer's frame. All we have to do to refute this is to refer to equation 4. This says that a clock at rest in S' appears to run fast relative to one at rest in S. Similarly, equation 6 refutes equation 2. Hence, the claim that Dingle's question can be answered without contradiction is refuted. Why? Because we can't be certain whether the clock, is running fast or slow. So Good's attempted answer to this question fails unless he can clearly prove that 8 and not 4 is the unique solution, and that 6 and not 2 is the solution.

Good failed to answer Dingle's question because he understood it within the usual context of debating relativity. He invoked the threadbare trick of switching between the physical interpretations of relativity. But he failed to realize that Dingle's question applies to both interpretations, so that Good's answer does not lead to a negation of the contradiction. It exists in both versions of the theory. Essentially the problem is this one. In either interpretation I choose, either the one in which the moving clock runs more slowly, or the one in which it appears to run more slowly to an observer in the opposite frame, there exists the problem that there is an equally valid prediction of the same type which asserts that the clocks run fast. Since there is no principle contained within the theory, by which it can be determined which of these predictions is the true one, the theory contains a contradiction, just as Dingle said. Here the problem is that there are four solutions, which contradict each other in pairs. (Note: Asserting the solution which fits experiment is the only uniquely true one is not an acceptable answer, because it is an ad hoc solution.)

In addition to the above procedure, there is another way to produce contradictory predictions. Suppose the claim is that equations 6 and 4 demonstrate that moving clocks run slow according to the 1905 paper. Again it doesn't matter which interpretation is used. It can be shown that this result can be contradicted by changing the definition of time in the equations. Here is how.

Given equation 6

(6) $t'=\beta^{-1}t$

Where t is a time interval defined in the stationary frame, and t' is a time interval defined in the moving frame. We make the assumption that these time intervals physically represent oscillation periods of a harmonic oscillation. These harmonic oscillations being the basis for the measurement of time by clocks in the rest and moving frames, S and S' respectively. Hence, when time is converted to frequency, equation (6) transforms into the law for transformation of frequency of the clock oscillators used to measure time. Transforming equation (6) to frequency gives:

(9) $1/f'=\beta^{-1}1/f$ or $f=\beta^{-1}f'$. Therefore, $f'=\beta f$

This formula shows that the frequency of the clock oscillator in the stationary frame, f is less than the frequency of the clock oscillator in the moving frame, or that the clock in the moving frame is fast. This result contradicts the traditional interpretation of relativity.

In 1907 Einstein obtained a revised time dilation law given by equation (8):

(8) $t=\beta t'$

Converting to frequency we obtain the same result as in equation (9).

(10) $1/f=\beta 1/f'$ or $f'=\beta f$

This formula shows that the clock oscillator frequency in the moving frame f' is greater than clock oscillator frequency in the stationary frame. This result shows that the moving clock appears to run fast contrary to what is accepted physics taught in our universities.

Since the theory does not possess any principle to determine which definition of clock time is to be used to establish the true or correct predictions, there exists within the theory a contradictory definition of time, which leads to inconsistent predictions.

8.3 Why Dingle Said That The 1907 Version Of Relativity Is Useless

There is a simple and direct answer as follows. The principle of relativity says that the laws of nature are the same without regard to which of the coordinate systems moving uniformly (without acceleration) relative to each other they are referred. But in order for this postulate to be valid and useful in practice, the theory based upon it implies that there must be a real and not merely an apparent transformation of the coordinate systems into something different. This is called the covariance principle. Clearly, if the time dilation is only an effect with physical reality for an observer viewing a physical process from a relatively moving frame, then there is no need for a relativity postulate, since there is no actual difference in the physical processes in the relatively moving inertial reference frame. They are the same everywhere since the proper times and distances are absolute.

In Dingle's opinion, the postulate of relativity became ineffective or useless and the need for the theory disappeared.

There is also to be noticed, that in this interpretation, time and space are absolute. This, of course, follows if there is no longer a role for the principle of relativity.

8.4 Simultaneity and Synchronicity

This is probably the most misunderstood problem in relativity. The best way to deal with it is to erase it from the theory. It is an unnecessary concept. The purpose was to establish a basis for the derivation of the Lorentz transforms. This method has been superseded and it is only of historical interest today. But relativists seem to think that relativity of simultaneity is the essence of relativity. It can be dragged into an argument to refute any undesired result, and this is what Good does in section 6 of his first paper discussing Dingle's fallacies.

Dingle attempts, rather poorly, to make clear that once co-moving clocks at rest in an inertial frame have been synchronized, the relation of time in this reference frame relative to clocks synchronized in any other reference frame becomes fixed for all observers, irrespective of their motion. This pronouncement was intended to preclude arguments which used the relativity of simultaneity to explain the paradoxes of relativity away as merely the effects of simultaneity, which being mysterious to all but experts, somehow explained the unexplainable.

Good's abuse of the concept can not be ignored. He says that Dingle overlooked the relativity of simultaneity in his paper the Case Against Special Relativity. Good's claim is false. Dingle's argument has nothing to do with this. Good's claim is merely an easy way to appear to refute Dingle without having to do the actual work of refuting him. In any event, this refutation must fail, because Dingle uses different evaluation conditions as was done in sections 8.1 and 8.2 to demonstrate that the theory is inconsistent.

8.5 Einstein's Slip

Good's primary debating trick is to refuse Dingle's and McCausland's arguments upon the basis that they misinterpreted Einstein's 1905 paper. Because this is a particularly absurd argument that is easy to refute merely by quoting from Einstein's paper, Good produces the claim that Einstein made a "slip" and that this slip caused Dingle to misinterpret what he said. Although this is not a very believable argument, it seems more plausible than the first alternative.

But, Good fails to explain the following facts. (1) Einstein repeatedly stated that moving clocks run slow because the timescale is dilated in moving inertial frames in at least three different papers. The first in his 1905 paper, which Good claims was a slip. The second time in his 1912 review of relativity, and the third in his famous statement which is the basis of the twins paradox. Here he said in his 1911 paper "The Theory of Relativity ". Here Einstein says: "Were we, for example, to place a living organism in a box and make it perform the same to-and-fro motion as the clock discussed above, it would be possible to have this organism return to its original starting point after an arbitrarily long flight having undergone an arbitrarily small change, while identically constituted organisms that remained at rest at the point of origin have long since given way to new generations. The long time spent on the trip represented only an instant for the moving organism if the motion occurred with approximately the velocity of light!" This interpretation is also given in his book Relativity The Special and General Theory, page 87: "As a consequence of its motion the clock goes more slowly than when at rest." Which is basically what he said in 1905 which good calls a slip. Hence, it is obvious that Dingle and McCausland were correctly interpreting Einstein's theory.

(2) The interpretation used by Dingle and McCausland has consistently been taught in physics textbooks for the last 100 years. Numerous examples can be cited. A modern textbook example is Wolfgang Rindler's Essential Relativity, 2nd Ed, page 43: "a clock

moving uniformly with velocity v through an inertial frame S goes slow by a factor $(1-v^2/c^2)^{-½}$ relative to the stationary clocks in S."

(3) Most physicists interpret the results of experiments based on the interpretation used by Dingle and McCausland. If this interpretation is false then the experimental support for the theory disappears.

These facts conclusively demonstrate that Good's thesis is false.

9.0 Summary and Conclusion

Good's polemic series of papers is primarily directed towards the destruction of criticism of the special relativity theory. He directs his ire mostly against Herbert Dingle and his surrogate in the form of Ian McCausland. Good's primary arguments are not new or original. He takes the traditional approach to Dingle's criticisms by making it appear that they are mistaken and fallacious, because Dingle failed to correctly understand the mathematics of the special relativity theory. This is the standard method of dismissing critics of relativity. The formalism of the theory is restated in a way that implies that the critic didn't understand it. Then the restated theory, with wording suitably adjusted to fit the objective, is used to show that the critic is wrong by stating that his opinion is wrong, because it is not the standard textbook answer given by the (now restated and changed) theory. Good uses this method, but it is only a polemical trick. Dingle's and McCausland's arguments are not shown to be fallacious as a result of Good's papers.