THE DINGLE AFFAIR

An Unresolved Scientific Controversy

Ian McCausland

Professor of Electrical Engineering
University of Toronto
Toronto, Canada M5S 1A4
1977 June 8

Preface

"This is not a scholarly work but a complaint". This sentence, with which John Maddox began the preface of his book The Doomsday Syndrome, is also a fitting description of this essay, which is a protest against the present unsatisfactory state of the debate on Einstein's special theory of relativity, and the response of the scientific world to Professor Herbert Dingle's criticisms of that theory.

There have been a number of attempts, by various members of the scientific community, to defend the special theory of relativity against Professor Dingle's criticism. Some of those that have been published are discussed in this essay, and I quote from them in order to draw attention to some of the inconsistencies they contain. I believe that this action is justified if one accepts as valid the following sentence from a Nature editorial which is reproduced as an appendix in Professor Dingle's book Science at the Crossroads: "The man who first spots an inconsistency has a duty to bring it to the attention of others, if necessary with vigour." While I do not claim to be the first to spot the inconsistencies mentioned in this essay, most of those who have noticed them seem to have almost completely disregarded them; in these circumstances, there still seems to be a need to bring them to the attention of others.

The present essay does not claim to be a definitive account of the way the scientific world has responded to Professor Dingle; it is merely an interim report, and is based entirely on information that has already been published elsewhere, information which the interested reader can easily verify. I believe that this information has been ignored or neglected, and that it needs to be made known to scientists and others who may be concerned with the way the scientific community responds to criticism and to unorthodox views; that is why I have written this essay.

And science, we should insist, better than any other discipline, can hold up to its students and followers an ideal of patient devotion to the search for objective truth, with vision unclouded by personal or political motive, not tolerating any lapse from precision or neglect of any anomaly, fearing only prejudice and preconception, accepting nature's answers humbly and with courage, and giving them to the world with an unflinching fidelity. The world cannot afford to lose such a contribution to the moral framework of its civilisation.

Henry Hallett Dale
(As quoted by Herbert Dingle in
Science at the Crossroads)

THE DINGLE AFFAIR

Professor Herbert Dingle is a distinguished scientist who believes that Einstein's special theory of relativity, though mathematically consistent, is physically impossible and should be abandoned. Since about 1960 he has been trying to persuade the scientific world to repudiate the theory, and in 1972 he published a book, Science at the Crossroads [1], giving a detailed story of some of the problems he has encountered in presenting his arguments to the scientific community and in trying to obtain a satisfactory answer to his criticisms. In the Introduction to his book he states that his claimed disproof of special relativity has been "ignored, evaded, suppressed and, indeed, treated in every possible way except that of answering it" by the whole world of physical science.

Although most scientists still seem to be confident that the special theory is valid, their confidence seems to be based on so many illogical and mutually-contradictory arguments that the situation seems to be, at the time of writing, highly unsatisfactory. The purpose of this essay is to point out some of the inconsistencies in the arguments, and some of the rather strange treatment that Professor Dingle and his criticisms have received, concentrating mainly on events that have occurred since the publication of his book. The reader is invited to judge whether the present situation is satisfactory, in the light of the very high standards that science claims for itself in what Dingle calls "its unqualified devotion to the discovery of truth at whatever cost to its expectations and tentative assumptions".

Among the various subjects covered by Professor Dingle in his book are descriptions of how various scientific journals have treated his criticisms of special relativity. For example, a paper submitted to the Royal Society for publication was rejected, and an anonymous referee stated, as a reason for recommending rejection, that the paper contained an elementary fallacy; yet Dingle was unable to obtain from the Society a statement of what the fallacy was. A letter that was submitted by Dingle to Science in 1969 was rejected on the ground that it added little to a discussion in Science in 1957-58; yet, as Dingle points out, the earlier discussion had dealt with the clock paradox without questioning the validity of special relativity, whereas his 1969 letter related only to the validity of the theory. However, my favourite example of this kind comes from another book [2], in which Professor Dingle describes how The Philosophical Magazine sent back a critical paper by return mail with a statement that subjects of a polemical nature were not suited to that journal! After describing this rejection, Dingle went on to say: "One of the leading scientific journals will not publish anything 'of a polemical nature', which can only mean that, in science itself, it will not publish any criticism of orthodox views. Accept them, and your paper will be considered for publication; question them, and it will not." One is reminded of George Orwell's comment [3]: "At any given moment there is an orthodoxy, a body of ideas which it is assumed that all right-thinking people will accept without question.... Anyone who challenges the prevailing orthodoxy finds himself silenced with surprising effectiveness."

One of the more rational replies by an editor, in response to an attempt by Professor Dingle to publish a letter appealing for a satisfactory answer to his criticism of special relativity, is a letter from Dr. David Davies, editor of Nature, to Professor Dingle in February 1974 [4]. Among

the editor's reasons for refusal to publish is the statement: "Many scientists, Born, McCrea, Ziman, and Roxburgh amongst them, have done you the courtesy of discussing your question, and yet I see no demonstration by you of why their answers are not acceptable." In order to assess the validity of this statement, let us see what these scientists have said.

In Born's reply to Dingle [5], we find the following sentences:

"Dingle's objections are just a matter of superficial formulation and confusion. The simple fact that all relations between space co-ordinates and time expressed by the Lorentz transformation can be represented geometrically by Minkowski diagrams should suffice to show that there can be no logical contradiction in the theory."

The interesting thing about the second sentence above is that it contains an elementary logical fallacy, in that it claims a property of part of the special theory (the Lorentz transformation) to be a sufficient condition for the validity of the whole theory. Yet, according to Dingle [1], Born was so convinced of the soundness of his own reasoning that he refused even to read Dingle's reply, claiming his own argument to be irrefutable. In view of the fact that Dingle had issued a challenge to the integrity of scientists, one might have hoped for a more open-minded attitude from a man who wrote in his autobiography [6] that "the belief that there is only one truth and that oneself is in possession of it, seems to me the deepest root of all that is evil in the world."

The high opinion in which Dr. Davies seems to hold Born's reply is not universally shared; here is what Marder [7] had to say about it:

"In a sense, it was a pity that Born then took up the challenge, because a satisfactory reply to Dingle needed more time than Born wished to devote to the matter. His brief reply, in Nature, consisted largely of a 'correction' to Dingle's question (hardly likely to produce the desired

effect) and a partially explained space-time diagram."

In view of Marder's lack of enthusiasm about Born's reply, it is interesting to note that even he makes no reference to Born's illogical statement, quoted above. It also seems astounding to me that it should be thought a pity that an eminent scientist should attempt to defend a fundamental scientific theory from a criticism which, if valid, is fatal to the theory. The pity is rather that Born's reply has been subjected to so little criticism.

In answer to Dingle's question, about which of two clocks in uniform relative motion the theory requires to work faster than the other, Ziman [8] replied as follows: "In fact, the answer to Dingle's 'question' is simple: the fastest working clock between any two events is one that travels between them by free fall." This is like answering the question "Which flies faster, a Boeing 707 or a 747?" by saying "The fastest airliner is the Concorde." Since Dingle's question asked for a distinction to be made between two clocks, rather than a choice among all possible clocks, Ziman's answer is obviously unsatisfactory.

McCrea and Roxburgh both attempted to reply to Dingle's claim that, if there are two clocks A and B in uniform relative motion, the theory requires that A runs faster than B and that B runs faster than A. McCrea replied as follows [9]:

"The false step [in Dingle's argument] is that Dingle regards the situation treated by relativity as the symmetric comparison of one single clock with another identical single clock (in relative motion). This is not the situation."

This statement may be compared with the following quotation from Einstein's original paper on special relativity [10], which it clearly contradicts:

"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."

Roxburgh [11] replied to Dingle's argument by saying that Dingle does not even discuss what he means by "faster", and then went on to say:

"Secondly, why is it impossible for A to go faster than B and B to go faster than A? This depends on the definition of faster. To illustrate this, consider the following two statements:

The Moon is bigger than the Sun.

The Sun is bigger than the Moon.

Are these statements mutually contradictory? This depends on the meaning of bigger. For terrestrial beings the first statement is true, for Martians the second is true. The relative size depends upon the position of the observer. So it is with time and clocks."

If it is important to define "faster", it is also important to use other words precisely, yet it is clear from the quotation that Roxburgh does not literally mean "is" in the two contrasted statements, in which case any similarity between his argument and Dingle's disappears. Or, if he does intend his words to be taken literally, then he, as a terrestrial being, is defending special relativity by asserting that the moon is bigger than the sun. Although we are terrestrial beings, we know that the sun is bigger than the moon, and, what is more, we know it from observations that have been made from the earth.

It is disturbing to find that, even though the arguments of these scientists contain obvious faults, the editor of a leading scientific journal uses them in support of his decision to suspend further discussion of the subject. Furthermore, the editor weakens his case by mentioning that many scientists have discussed Dingle's question, and by giving the names

of four of them, because this makes it clear that there does not exist a single definitive answer to Dingle that is agreed upon by the whole scientific community; if there existed such an answer, it would have been easier and more convincing to have cited it alone. In fact, as Dingle and others have pointed out, there are many different answers to his question, and some of these are incompatible with one another; some of these incompatibilities are obvious in the selections quoted above, and the only thing that Dingle's critics seem to be firmly agreed upon is that Dingle is wrong.

Another disturbing feature of the controversy is the fact that some writers on the subject misrepresent Dingle's argument. A recent example is a book by Gardner [12], which contains the following sentence: "No physicist except Professor Dingle doubts that the astronaut's clock, when he returns, will be slightly out of phase with a nuclear clock that stayed at home."

The above sentence occurs at the end of a chapter on The Twin Paradox (sometimes called the clock paradox), and refers to the well-known prediction that, if an astronaut moves away from the earth at high speed and later returns, his clock will show a reading different from that of a clock that stayed on the earth (and, indeed, the astronaut will have aged by an amount different from his twin who stayed at home).

Although Gardner appends to the above-mentioned sentence a footnote which refers to Science at the Crossroads (and which also admits that Dingle is not quite alone in his beliefs) the views attributed to Dingle in the sentence quoted are quite contrary to those expressed by him in his book [1]. One has only to read the Preface of Science at the Crossroads to find the following statement, which was written in an earlier attempt to clear up Professor R.A. Lyttleton's misconception on this same point:

"Regarding the immeasurably less important clock paradox, Lyttleton

is again wrong in saying that I have denied asymmetrical ageing for many years. Fifteen years ago, when I believed special relativity true, I indeed thought it impossible, but I soon discovered my error, and for more than 13 years have held the question open."

A somewhat similar misconception appears in an unsigned editorial in Nature [13], which appeared shortly after the appearance of Science at the Crossroads, and whose author should also have been aware of the above sentences quoted from Dingle's Preface. Consider, for example, the following two quotations which are the first sentence and the last two sentences of the article:

"Everybody is fond of Professor Herbert Dingle, as well as of the clock paradox in special relativity which he has single-handedly nurtured since the early 1930s."

"And is there any hope that he will now be satisfied with the demonstration that moving clocks run at different speeds from clocks at rest which has been provided in the past few months by the experiments in which Hafele and Keating have flown caesium clocks in different directions around the world (Science, 177, 166; 1972, see also Nature, 238, 244; 1972)? It will be sad to see the clock paradox disappear, but this work is the last nail in the coffin."

The last two sentences would give the uninformed reader the impression that the results of that experiment refuted Dingle's case; however, the above quotation from Dingle's Preface, referring to Professor R.A. Lyttleton, makes it clear that the experimental results do not contradict Dingle's arguments, and also that his thesis is not primarily concerned with what is usually meant by the expression "clock paradox". It should also be clear, to anyone who has the slightest knowledge of the literature of the period mentioned, that the expression "single-handedly" in the first

sentence of the article is completely inappropriate.

There is another kind of misrepresentation that should also be mentioned. An example is contained in the Nature editorial mentioned above [13], in the following sentence:

"Professor Dingle goes on to complain that a promised leading article rounding off the correspondence has never appeared, apparently oblivious of the way in which his own scorn for prospective contestants and his promises to 'bring discredit on the journal' may have discouraged the judicious summing-up for which he asked."

The promised leading article mentioned in this quotation is discussed on pages 89-90 of Science at the Crossroads, where it is described how the then editor of Nature wrote to Professor Dingle on 24 November 1969, saying that he proposed to write a leading article summarizing the position, and that it would appear "before the end of the year". It did not appear before the end of that year, and the editor told Professor Dingle in late January 1970 that the article was then "almost ready". Another correspondent who inquired from the editor in March was told that it would be "a week or two" before the article was ready for publication; that same correspondent inquired again on 6 July but received no reply. In fact, no such article appeared prior to the appearance of the Nature editorial [13] now being considered, which was dated September 29, 1972.

The sentence quoted above, referring to the promised article, gives the impression that Dingle had asked for the leading article to be written, and also implies that, because of his alleged promise to "bring discredit on the journal", he is himself responsible for its non-appearance. Both of these suggestions are in fact false, as has been shown in the correspondence columns of Nature [14, 15], where it is made clear that the article had been spontaneously promised by the then editor, and also

that the letter in which Dingle allegedly promised to "bring discredit on the journal" was written six months before the editor's promise to write the leading article. However, the letter [15] in which the former editor admits the true chronology dismisses it as a small point whose relevance is debatable! It is also relevant to note that the former editor's reply [15] again mentions Dingle's promise to "bring discredit" on Nature, putting those two words in quotation marks, even though what Dingle wrote was a plea to the editor not to make it necessary for him to reflect (not bring) discredit [14].

Another item showing the way in which Professor Dingle has been treated is a suggestion by Ziman [8] that his book [1] is dishonest. The apology that was later published [16] may serve as a confirmation that the astonishing story of the treatment of the matter by Nature, as recorded in Science at the Crossroads, is true.

A careful reading of the literature will also reveal what seems to be a contradiction in one of Dingle's own statements, in a correspondence item in Nature [17]. Referring to time intervals measured by two clocks A and B, Dingle writes as follows:

"My question is: how does the theory indicate which clock gives the larger interval? If A has velocity 0 and B velocity v, the Lorentz transformation makes that clock A; if B has velocity 0 and A velocity v, it makes that clock B."

I believe that this statement is too general, because it refers to the intervals between two events "occurring at any ascertainable positions at any times", whereas Dingle has claimed elsewhere that the result depends on the pair of events chosen. To be more specific, if one considers the situation described by Dingle in an earlier paper [18], with clocks A and B corresponding to clocks A and B respectively of the 1973 letter [17],

then the time intervals measured by the two clocks, between the events E_0 and E_2 defined in the earlier paper [18], do not seem to correspond with the statement quoted above [17]. I believe that, in [17], Dingle was making a paraphrase of the claim by various advocates of the theory that "a moving clock runs slow", and inadvertently made a somewhat more sweeping statement than was justified.

Unsatisfactory statements, on one side or the other of the argument, do not in themselves prove that one side or the other is wrong. Some scientists, while continuing to support the special theory, have conceded that Einstein made some unsatisfactory statements in his original paper on the theory. For example, referring to Einstein's comparison of the rates of an equatorial clock and a polar clock, which has been mentioned above, Stadlen wrote as follows [19]:

"But the relative motion involved in this case, being circular, is non-uniform. I submit, therefore, that Einstein was wrong in saying that his prediction followed from the special theory, which deals only with the effects of uniform motion. This is not to say that the prediction was invalid."

I think that our attitude to these problems should be governed by T.H. Huxley's suggestion [20] that "the scientific spirit is of more value than its products, and irrationally held truths may be more harmful than reasoned errors". For example, if Einstein's prediction did not follow from the special theory, then its inclusion in his paper was irrational and, therefore, invalid.

The purpose of drawing attention to these unsatisfactory statements is to suggest that the scientific community's apparent satisfaction with the present state of affairs is contrary to the spirit and ideals of

science. If scientists are content to turn a blind eye to illogical arguments, and are concerned only that the "right" conclusion is reached but do not care how it is reached, then they are subscribing to dogma instead of searching for truth.

Quite apart from the desirability of seeking the truth for its own sake, the resolution of this controversy may have an enormous practical significance; this can be illustrated by reference to a letter written by Dr. L. Essen [21]. After stating that the scientific establishment has accepted relativity as a faith and refuses to consider any criticism of it, and that in consequence rational developments of electromagnetic theory have been hindered, Dr. Essen went on to say:

"There is some evidence that a new theoretical approach could break the stalemate in the development of nuclear fusion, which appears to offer the only source of energy that could prolong our civilisation far into the future."

As we approach the centenary of Einstein's birth (March 14, 1979) there is a new motivation to assess the value of his life's work, a value that would still be enormous even if the special theory had to be abandoned. If the scientific world commemorates this centenary without expressing any concern about the unsatisfactory way in which criticisms of special relativity have been treated, then I think it will be fair to suggest that the scientific world is more interested in hero-worship than in the objective pursuit of truth.

Ziman [8] described Dingle's question as "a perfectly reasonable question to which science should indeed give an answer". Since an authoritative and conclusive answer is still wanting, let us hope that science will fulfil its obligation to provide an answer, and that it will do it soon.

References

[1] H. Dingle: Science at the Crossroads, Martin Brian & O'Keeffe, London, 1972.

[2] Viscount Samuel and Professor Herbert Dingle: A Threefold Cord, Allen & Unwin, 1961.

[3] George Orwell: "The Freedom of the Press", The Times Literary Supplement, 15 September 1972.

[4] Published in The New-Church Magazine, Vol. 93, No. 670, October-December 1974, pp. 123-4.

[5] M. Born: "Special Theory of Relativity", Nature, Vol. 197, 1963, pp. 1287-8.

[6] M. Born: My Life and My Views, Charles Scribner's Sons, 1968.

[7] L. Marder: Time and the Space-Traveller, Allen & Unwin, 1971.

[8] J. Ziman: "Science in an Eccentric Mirror", Nature, Vol. 241, 1973, pp. 143-4.

[9] W.H. McCrea: "Definitions and Realities", The Listener, Vol. 82, 1969, p. 315.

[10] A. Einstein: "On the Electrodynamics of Moving Bodies", originally published in Annalen der Physik in 1905; English translation in: H.A. Lorentz, A. Einstein, H. Minkowski and H. Weyl: The Principle of Relativity, Methuen, 1923; Dover, 1952.

[11] I. Roxburgh: "Is Special Relativity Right or Wrong?", New Scientist, Vol. 55, 1972, p. 602.

[12] Martin Gardner: The Relativity Explosion, Vintage Books, 1976.

[13] "Dingle's Answer", Nature, Vol. 239, 1972, p. 242.

[14] H. Dingle: "Integrity in Science", Nature, Vol. 255, 1975, p. 519-520; Vol. 256, 1975, p. 162.

[15] J. Maddox: "Integrity in Science", Nature, Vol. 255, 1975, p. 520.

[16] "Professor Herbert Dingle: An Apology", Nature, Vol. 243, 1973, p. 315.

[17] H. Dingle: "Dingle's Question", Nature, Vol. 242, 1973, p. 423. (I am grateful to Stanley R. Drake for drawing my attention to this item.)

[18] H. Dingle: "The Case Against Special Relativity", Nature, Vol. 216, 1967, p. 119-122. (Reprinted in Ref. [1], pp. 228-239.)

[19] G. Stadlen: "Dingle's Challenge", The Listener, Vol. 88, No. 2270, 28 September 1972, pp. 411-412.

[20] T.H. Huxley: "The Coming of Age of 'The Origin of Species'", in Collected Essays, Vol. 2, Macmillan, 1894.

[21] L. Essen: "Einstein", The Economist, March 19, 1977, p. 4.