# Herbert Dingle and "Science at the Crossroads"

Taha Sochi (Contact: ResearchGate)
London, United Kingdom

**Abstract**: In this article we pay tribute to Herbert Dingle for his early call to re-assess special relativity from philosophical and logical perspectives.[1] However, we disagree with Dingle about a number of issues particularly his failure to distinguish between the scientific essence of special relativity (as represented by the experimentally-supported Lorentz transformations and their formal implications and consequences which we call "the mechanics of Lorentz transformations") and the logically inconsistent interpretation of Einstein (which is largely based on the philosophical and epistemological views of Poincare). We also disagree with him about his manner and attitude which he adopted in his campaign against special relativity although we generally agree with him about the necessity of impartiality of the scientific community and the scientific press towards scientific theories and opinions as well as the necessity of total respect to the ethics of science and the rules of moral conduct in general.

**Keywords**: Special relativity, Herbert Dingle, Lorentz transformations, relativistic mechanics.

[1] This tribute (which was originally a collection of notes) was due to be published in 2022 which is the jubilee of Dingle's book "Science at the Crossroads" [1]. However, there were delays in editing and finalizing this article (due to my busy schedule in the last two years).

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# 1 Introduction

The controversy about the theory of special relativity dates back to the early days of its appearance, where these controversies took initially the form of "paradoxes" (e.g. the twin paradox, the barn-pole paradox and the twirling pole paradox). Most of these controversies (as mostly formulated and embedded in "paradoxes" and similar arguments) were targeting the logical foundations and epistemological implications of special relativity. The essence of most of these arguments and paradoxes against the theory is the apparent contradiction between the requirement of the principle of relativity which denies the existence of any privileged frame of reference (in uniform relative motion) and the requirement of certain effects and implications of the theory to have such a privileged frame of reference.

Although the majority of scientists (representing the mainstream physics) accepted special relativity with many of them advocating it vigorously and enthusiastically, there were a few prominent scientists who opposed it or expressed their discomfort and doubt about it due to the aforementioned logical and epistemological issues. One of these opponents to special relativity was the English physicist and philosopher of science Herbert Dingle who dedicated his last years trying to convince the scientific world that special relativity is logically inconsistent and hence it is scientifically wrong (and even dangerous). His effort (which is vividly documented in his book "Science at the Crossroads" [1]) mostly took the form of communicating with fellow scientists (either directly or indirectly through publication of articles in scientific journals) trying to convince them of his views and convictions which were largely based on the famous clock (or twin) paradox.

In this article we try (within our tribute to Herbert Dingle) to highlight the main points and issues (or concerns) of Dingle in his vigorous campaign against special relativity where we also present our assessment and position towards the two sides of this dispute (or debate) noting that we agree with Dingle on certain issues and disagree with him on other issues although we generally sympathize with his views and campaign against special relativity (which should explain our desire to pay tribute to him). In fact, we believe that Dingle was not fairly treated and his views on certain issues deserve better attention and reception from the scientific community of his time (as well as the next generations of scientists including our present generation).

Our view about special relativity is outlined in our paper [2] and discussed in detail in our book "The Mechanics of Lorentz Transformations" [3]. So, we have no intention to go through these details in the present paper (i.e. we advise the interested readers to refer to these documents for details). However, we briefly summarize our view in the following

paragraph. Our main point against both parties (i.e. the proponents and the opponents of special relativity) is that they both fail to distinguish between the formalism of the theory (which is its real scientific essence represented by the Lorentz transformations with their formal consequences and implications) and the Einsteinian interpretation (which essentially represents the philosophical and epistemological views of Poincare which Einstein adopted possibly with some modifications that resulted in these logical inconsistencies).

In brief, we distinguish between the logically inconsistent theory of special relativity as an epistemological interpretation of the scientifically sound formalism of Lorentz transformations (which is the authentic scientific essence of the so-called "special relativity"). So, while we accept the formalism of the theory (which in our view is no more than the experimentally supported Lorentz transformations) we reject the epistemological and philosophical content of the theory since we regard it as an interpretation to the formalism. In this regard, we compare special relativity to the interpretations of quantum mechanics (such as the Copenhagen interpretation and the hidden-variable interpretation), and compare Lorentz transformations (with all their implications and consequences which form the formalism of the so-called "special relativity") to the formalism of quantum mechanics.[2] In fact, this is the motive behind our labeling of "special relativity" as "the mechanics of Lorentz transformations" (which is the title of our book that we referred to earlier).

[2] The duality of formalism-interpretation of scientific theories is fully investigated and discussed (within the context of quantum mechanics) in our book "The Epistemology of Quantum Physics" [5] which the interested readers should refer to.

# 2 The Concerns of Dingle

In the following subsections we outline the main concerns (which are mostly presented in the form of arguments, challenges, warnings, etc. or embedded within such forms) that Dingle presented in his campaign against special relativity (as depicted and outlined in his book "Science at the Crossroads" [1]).

## 2.1 The Clock (or Twin) Paradox

This is the most famous of all "paradoxes" that were invented and proposed to challenge the theory of special relativity. In fact, it was proposed (and actually was the subject of discussion and controversy in the scientific community which includes some of the most prominent physicists of their time) since the early days of the appearance of special relativity. This paradox is very well known and it is fully explained and discussed in many textbooks about the relativity theories (see for instance [3, 6]) and hence we are not going to present it or discuss it in this short paper.

However, this paradox is at the heart of Dingle's arguments against special relativity (as presented in detail in his book) and hence we should outline it from Dingle's perspective. The following excerpt from Dingle's book outlines this paradox (and should actually summarize his main challenge to special relativity):[3]

According to the theory, if you have two exactly similar clocks, A and B, and one is moving with respect to the other, they must work at different rates (a more detailed, but equally simple, statement is given on pp. 45-6, but this gives the full essence of the matter), i.e. one works more slowly than the other. But the theory also requires that you cannot distinguish which clock is the 'moving' one; it is equally true to say that A rests while B moves and that B rests while A moves. The question therefore arises: how does one determine, consistently with the theory, which clock works the more slowly? Unless this question is answerable, the theory unavoidably requires that A works more slowly than B and B more slowly than A --which it requires no super-intelligence to see is impossible. (End of quote)

We totally agree with Dingle about his challenge to special relativity from this perspective. In fact, we have discussed this in detail in our book [3]. However. this should be a challenge to the epistemological interpretation of special relativity and not to the formalism of Lorentz mechanics (as Dingle apparently wants). In fact, there is nothing in

[3] In fact, this excerpt is just a sample representing other similar excerpts that can be quoted to represent Dingle's argument and viewpoint.

the entire formalism of Lorenz mechanics (i.e. neither in the Lorentz transformations nor in their direct or indirect formal consequences and implications) that indicates such a logical absurdity or allows it. So in brief, although Dingle is completely right in his challenge to this logical and epistemological aspect of special relativity, he should be wrong in his seeming attempt to discredit the formalism of Lorentz mechanics (which is the scientific essence of what is called "special relativity"). Also see § 2.6.

## 2.2 The Role of Mathematics in Science

We quote in this regard the following excerpt from Dingle's book (referring the readers to his book for more quotes like this):

What I believe to be the basic misconception of modern mathematical physicists — evident, as I say, not only in this problem but conspicuously so throughout the welter of wild speculations concerning cosmology and other departments of physical science – is the idea that everything that is mathematically true must have a physical counterpart; and not only so, but must have the particular physical counterpart that happens to accord with the theory that the mathematician wishes to advocate. (End of quote)

We generally agree with Dingle's view about the role of mathematics in physical sciences and his opposition to the excessive mathematization of modern science.[4] Science, after all, is an observational-experimental enterprise and hence it should rely firstly and mostly on first hand observation of nature and experimenting on it. Yes, the behavior of nature can generally be mathematized through modeling and formulation but this does not mean that nature necessarily follow our mathematical models and formulations (at least in their entirety and with all their consequences). So, the right course of action is to observe and experiment first, and this should be followed by trying to put the results of our observations and experiments in mathematical models and forms (if possible).

The danger of excessive mathematization of science is that it leads to illusions and fantasies since mathematics is full of artifacts and abstract objects that do not correspond to physical reality (e.g. we have imaginary solutions, singularities, infinities, senselessly-negative quantities, etc.). In fact, the obsession of modern scientists with mathematics and mathematization has led to some disastrous consequences such as wasting huge resources on investigating trivial or illusory things and the emergence of bogus branches of science and scientific thinking. The theories of relativity (especially general relativity) should take part of the blame for these dangerous trends in modern science since they are over-

[4] In fact, we disagree with Dingle about some details with regard to this issue.

mathematized or require excessive mathematization to digest some of their nonsensical consequences and implications.[5]

## 2.3 The General Attitude of Scientific Community

This is another concern of Dingle that we generally agree with. In brief, there is a considerable amount of prejudice and discrimination among the scientific community when it comes to the assessment and treatment of scientific theories and opinions where some are favored on the basis of non-scientific criteria and non-scholar grounds, and this is particularly true with regard to the relativity theories which enjoy special treatment in which the scientific and professional standards and rules (including some ethical codes and principles) are generally ignored or marginalized or sidelined due to the magic influence of Einstein and the huge propaganda in favor of him and his theories and views (which sometimes lead even to intimidation and bullying as well as other forms of thuggish behavior).[6]

In fact, the episode of Dingle in his campaign against special relativity should highlight the dogmatic attitude of the supposedly enlightened scientific community towards certain "untouchable" elements in science (or "holy" beliefs) which makes discussion or opposition to these elements a "taboo" and could lead to the "excommunication" of whoever dares to challenge them. This "religious" component in modern science is one of the many disgraces and shames of modern science and should be addressed. This dogmatic attitude is reflected in many aspects and activities of science and scientists, e.g. in the choice of teaching and research topics, in the determination of what should and should not be accepted for publication in the scientific press, in the giving of grants and awards, in the allocation of honors and prestige, and so on. Although this unscientific attitude is not

[5] We refer the readers to our books about the relativity theories (see [3] and [4]) for more details.

[6] The following extract from Dingle's book outlines this issue: The fact that, nevertheless, a request for assistance in restoring integrity in science can be read as a request to 'try to distinguish between the two sides' on a particular scientific point I can only regard as one more example of the evil spell cast by the word 'relativity' — a word that immediately reduces the mental power of even leading physicists to impotence and is the greatest stumbling-block to my efforts to bring home to them the extreme seriousness of the state to which we have been reduced. Apart from that word-magic, there is nothing in the whole course of events which I related which might not have happened if 'crystallography' had been substituted for 'relativity': it is just a historical accident that Einstein's theory caused, or showed up, the corruption. (End of quote)
We also quote the following extract: Science no longer refuses to tolerate the neglect of any anomaly; it refuses to tolerate anything but neglect of a most outstanding anomaly. It no longer fears only prejudice and preconception; it fears to the point of terror a particular threat to its prejudices and preconceptions, and does everything in its power to suppress such a threat. Its criteria of truth — if that word can still be used in connection with it — are no longer reason and experience, but strict conformity to a theory ... etc.

limited to special relativity, special relativity is one of the prominent examples of "holy" elements that enjoy special treatment in modern science (since it has a "special place" in the heart of the mainstream scientists).

However, we should note that the situation has improved in modern times (compared to the time of Dingle) with the emergence of more theories, experiments, observations, individual scientists, opinions (... etc.) which are not in favor of special relativity and its principles and propositions. For instance, the emergence of Bell's theorem in quantum mechanics (and what followed of quantum entanglement experiments) shook some of the foundations of special relativity. Also, novel experiments and observations related to the speed of light put some question marks on the dogmatic belief of special relativity about the speed of light as the ultimate and invariant physical speed.

## 2.4 The General Attitude of Scientific Press

This is another concern of Dingle that we generally agree with. Scientific press (especially the prestigious ones) generally welcomes only certain types of papers which are supportive of the mainstream (or orthodox) theories and opinions and rejects (generally without consideration) any paper that advocates or sympathizes with opposite (or non-orthodox) theories and opinions, and this is particularly true when it comes to the relativity theories where any paper that questions these theories or challenges them is usually (and automatically) rejected as a form of heresy or pseudo-science or crackpot idiocy.

The obvious result is that only certain views and trends in science are heard and sponsored and hence only certain views and trends are encouraged to grow and prosper since the opposite views and trends will naturally die or weaken because very few scientists have the determination to continue their work when this work has no chance (or very little chance) to be in the public space. This form of unnatural selection is not only against the spirit and ethics of science but it is also against the interest of science and humanity since valuable ideas and contributions can be lost as a result of this form of unfair discrimination.

However, the situation generally improved in the recent times thanks to the emergence and wide availability of pre-print repositories and social networks (professional as well as non-professional) which enable anyone to publish his work. However, the attention and seriousness that published work enjoys when it is published in the mainstream and prestigious media (e.g. the high impact journals) still favors views and opinions that represent and accept (or inline with) the mainstream science, and this is certainly a type of prejudice and favoritism that should be addressed and fixed.

As indicated earlier, this discriminatory attitude is not limited to the scientific press but it can be seen and felt in every department of modern science such as awards, grants, academic posts, scientific venues (like conferences) and so on. In fact, the attitude of scientific press is just one of many forms and examples of discrimination and unfair treatment that characterize all the departments of modern science (noting that we limited our attention to the attitude of scientific press because that is what concerned Dingle in his book).

## 2.5 The Ethics of Modern Science

One of the most important (and "most true") concerns of Dingle (which he documented in detail in his book, sometimes explicitly and directly and sometimes implicitly and indirectly) is the lack of transparency and the absence of respect to the rules of ethics and morality in many practices of modern scientists. Unfortunately, science in modern times (and possibly even in old times) seems to be no more than a way for making a living and getting financial gains, reputation, prestige, awards, and so on. So, the search for truth and service to humanity (which are supposed to be, or at least should be, the main purpose of science) are of no concern to many (if not most) scientists.

In my view, the dodgy practices and unethical behavior of scientists of the kind indicated and highlighted by Dingle is just one type of the many types of immorality (and possibly the slightest type of immorality) of modern science and scientists. In fact, modern science and scientists are embroiled in many other types of immorality (and even criminality) such as experimenting on animals (or rather torturing and killing them in the name of science) and developing lethal weapons (especially weapons of mass destruction and weapons designed to target civilians or necessarily damage civilians and civilian infrastructures). So, despite the alleged ethical codes and rules of morality which are supposedly adopted by "respected" scientific institutions and bodies, the reality is very different especially when we note that even if all these alleged codes of conduct are implemented literally they do not satisfy even the minimum requirements of real ethical conduct and moral behavior because immorality and criminality are at the very essence of some of these "scientific" practices and disciplines. Anyway, this is not our main concern in this paper (but we intend to come back to this issue in the future).

## 2.6 The Transformations of Lorentz

Dingle seems to reject not only special relativity as an interpretation (demonstrated for instance in some of its epistemological aspects and consequences) as we do, but he rejects even its formalism. Although we do not believe that the formalism of Lorenz mechanics (which is based on the transformations of Lorentz as postulates in our view) is a final theory and it may not be a complete theory, we believe that the accumulated observational and experimental evidence should qualify this formalism to be regarded as an accepted scientific theory with the rejection of the illogical epistemological interpretation that is attached to it (as represented by special relativity).

In fact, Dingle seems to put question marks even on Maxwell's electrodynamic theory which proved to be very successful over its long history (in theory as well as in application and practice). This view of Dingle is understandable when we note the intimate relationship between Lorentz transformations and Maxwell's electrodynamic theory. Although it is possible and acceptable (in principle) to replace Maxwell's electrodynamic theory within a "global" and radical change (or rather revolution) in modern physics, it seems unwise (as well as impractical) to target Maxwell's theory initially and in this manner because of a logical inconsistency in special relativity. In other words, we can easily dismiss special relativity and get rid of it without sacrificing the formalism of Maxwell's equations or the Lorentz transformations, and this should not only be the easiest (or even the very easy) thing to do but also the most wise option. In fact, it is the option that is most consistent with the spirit and tradition of science and how it should develop and progress.

## 2.7 The Danger of Wrong Theory

The following excerpt from Dingle's book should summarize one of his major concerns about special relativity:

The second reason for the publication of this book is a practical one. Directly or indirectly - at present chiefly the latter, though none the less inseparably - special relativity is involved in all modern physical experiments, and these are known to be attended by such dangerous possibilities, should something go wrong with them, that the duty of ensuring as far as possible that this shall not happen is imperative. It is certain that, sooner or later, experiments based on false theories will have unexpected results, and these, in the experiments of the present day, may be harmless or incalculably disastrous. In these circumstances an inescapable obligation is laid on experimental physicists to subject their theories to the most stringent criticism. As this book will show, their general practice is

to leave such criticism to mathematical theorists who either evade or ignore it, and the possible consequences are evident and unspeakably menacing. This alone would compel the publication of the facts here revealed. (End of quote)[7]

In fact, this is one of the strangest claims of Dingle because if "special relativity" is a scientifically correct theory then it should already be "tested" in the laboratory of Universe and hence any new (human-made) experiment based on it should not lead to such disastrous consequences (as Dingle claims) more than any other experiment (based on other correct theory) do. On the other hand, if "special relativity" is a scientifically incorrect theory then any danger from experiments based on it should be an illusion because the theory should not lead to the consequences that the theory is supposed to produce. So, any danger from such experiments should originate (if so) from other sources of danger which all scientific experiments share (i.e. any scientific experiment can go wrong because of its bad design or because of its bad theoretical formulation or because of many other things like these). In fact, someone may argue exactly the opposite by claiming that false theories should be safer than correct theories because the expected effects of false theories should be null (or void).

[7] We should refer the readers to Dingle's book [1] for more quotes in this regard.

# 3 The Approach and Attitude of Dingle Himself

Although we appreciate the enthusiasm of Dingle in his campaign against special relativity and his attempt to convince and persuade the scientific world of its falsehood and "danger", we generally disagree with him about the approach that he followed and the attitude that he adopted in this campaign. We note for example that he personalized the dispute in some occasions and gave it the taste and flavor of a fight instead of keeping it as a theoretical scientific debate. Moreover, he was relentlessly insistent and repetitive in his demands trying to force his views and convictions and impose his wishes on other people who disagree with him or do not share his views and convictions.

However, we should forgive and excuse Dingle in this regard considering that special relativity in his view was not only a theoretical or logical "danger" to science but it is a physical danger to humanity and its physical safety and existence. The factor of age should also be considered and respected since a man of his age (at that time) can easily lose patience and temper and become somewhat detached from reality. In my view, the episode of Dingle in his campaign against special relativity should be seen as an amusing and entertaining story that should add a touch of humor and humanity on "cold" and "emotionless" science instead of being treated as an example of naughtiness and misbehavior and remembered with bitterness and discomfort (as reflected in the attitude of some opponents of Dingle whether those who were engaged in that dispute or those who expressed their opinion about it later on).

Anyway, Dingle's book contains a considerable amount of nonsense and useless arguments. It was better for him to present his views about special relativity (as well as about the integrity of science, scientists, scientific press, the ethics of science and so on) in a more professional way and academic manner instead of this talkative and vulgar way.

# 4 Conclusions

We summarize the main issues discussed or implicated in the present article in the following bullet points:

• In our view, "special relativity" (as it is commonly known) is a combination of the experimentally-endorsed formalism of Lorentz transformations and the logically-inconsistent interpretation of Einstein (which originally belongs to Poincare with the possibility of Einstein introducing some modifications or elaborations on it).[8] So, while we criticize and reject the logically-inconsistent interpretation of Einstein we think that the formalism of the theory (which we call "the mechanics of Lorentz transformations") is generally acceptable theory (although it is possibly a limited and interim theory).

• In our view, the main failure in Dingle's thesis is his failure to distinguish between the formalism of special relativity (which essentially is no more than Lorentz transformations with their implications and consequences) and its interpretation as an epistemological paradigm whose main purpose is to make sense of the formalism. In other words, Dingle was unable to distinguish between the scientific essence of the theory of relativity (i.e. the formalism of Lorentz transformations) which is experimentally supported and the philosophical (or epistemological) interpretation of Einstein which is logically inconsistent.

• Despite Dingle's failure to distinguish between the logically inconsistent interpretation of special relativity and the scientifically sound formalism of Lorentz transformations (which is the real scientific essence of what is commonly called "special relativity"), he should still get the credit for highlighting some important issues about the theory of special relativity, and for this reason we pay our tribute to him in this article. Interestingly and fortunately, there is more acceptance to the challenges to special relativity these days than fifty years ago and Dingle has obviously contributed positively to this shift in the attitude towards special relativity.

• Dingle's work and activities (which are mostly documented or indicated in his book "Science at the Crossroads") related to his opposition to special relativity highlight a very important issue, that is the resistance (with stubbornness) of the "mainstream" science and scientists to listen to arguments and consider ideas and theories that run outside their "stream" or against it. In fact, non-scientific (and even nasty) methods and tactics are used

[8] In fact, Einstein's version of the theory may not represent the views of Poincare exactly (since we have no sufficient knowledge about some details of Poincare's views). So, it is possible that the views of Poincare may not be logically inconsistent or they may not share the same logical inconsistencies as those in the interpretation of Einstein. In other words Einstein's version of "special relativity" may not be exactly the same as Poincare's version of "special relativity".

(shamelessly) by some scientists to suppress such opposition voices and this is especially true when it comes to the theories of relativity where Einstein is commonly regarded as a "holy" figure or symbol of science.

• We generally agree with Dingle about several other issues which include: the excessive mathematization of science, the general attitude of scientific press (or rather the general attitude of almost all institutions and departments of modern science), and the unethical practices in science.

• We reject the fears of Dingle about potential disaster happening as a result of accepting special relativity and experimenting on it. We also reject the depiction of his campaign against special relativity as a campaign to protect the public and save humanity. Most of his fears were baseless (as particularly related to special relativity) although warning of potential dangers of any scientific theory of serious experimental impacts and consequences is generally good.

• We also disagree with Dingle on many of his detailed accounts and analyses. However, we did not go through these due to the limits on the size of the paper and their relative insignificance (e.g. because they are out of scope or because of their similarity with the issues that we already discussed or indicated).

• There seems to be some confusion among the experts on relativity (including some of those who communicated and engaged with Dingle) between classical physics and *classical* logic where the rejection (or modification) of some classical physical concepts (like Newtonian time and space) seems to justify to those who reject these concepts to reject or sideline the rules of logic which should be universally and unequivocally accepted and respected to avoid nonsensical thinking and argumentation.

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