

THE DECREASE IN THE SPEED OF LIGHT
- AN UPDATE ON DEVELOPMENTS
by Malcolm Bowden

There have been many articles on the work of Barry Setterfield of Australia who has contended that the speed of light was faster in the past. This article is to try and put the record straight for there are many unaware of the confirmations that have arisen but which have had little publicity. It is to try and correct this situation that the following facts are presented.

1. The first point is that there is criticism of Setterfield's early work in which he -

- a) shows that the speed of light has decreased by listing numerous measurements of "c" made over many years, and
- b) attempts to determine the mathematical shape of the curve by which the decrease has fallen. Critics have sometimes slammed his attempts to find the right curve (b) and thereby tried to ignore the clear evidence of a definite fall (a).

Since those early days Setterfield and Trevor Norman have produced an invited report for the prestigious Stanford Research Institute International in 1987 [1].

This gives much of the background material upon which Setterfield bases his claim of "c" decay (= CDK). This is 90 pages long and contains 377 references.

The invitation to give this report came from Lambert T. Dolphin, (who was sceptical at first), a member of SRI, where it was given peer review and also vetted by outside laboratories - all of them approving its publication. Dolphin also gave a lecture on the subject in 1988 to the Batelle Institute where it was well received. The SRI hierarchy tried to rescind the report on an administrative technicality when they realised its implications. Dolphin and his manager were made redundant.

Setterfield is still being criticised for "not publishing his results in a reputable journal". What critics do not realise is that no journal is prepared to publish such a revolutionary concept, no matter how well researched it is. We then have the "catch 22" situation:- i) No 'scientist' will examine the paper unless it has been published. ii) Publishers reject it because their referees do not like the implications and fail it for trivial reasons such as no other journal has published it; iii) Therefore no scientist reads of it in a 'reputable journal', etc. etc. The acceptance by SRI was a major breakthrough that the hierarchy tried to rescind. See also 6. below.

2. There has been much discussion of the paper by Goldstein et al. in which they claim that after analysing Roemer's 1675 records of "c", it has not changed by any significant amount. What these critics seem to be unaware of is that these papers contains two huge errors that, when corrected, result in SUPPORT for Setterfield's claim. I give the following details.

In 1973 [2] Goldstein published in the results of his calculations on the possible variation of the speed of light based upon the measurements of Roemer. His conclusion was that the speed of light had not varied by more than 0.5% from the present value. This paper has often been quoted as contradicting the decrease in the speed of light by a number of both evolutionists and creationists in various articles.

The errors the paper contained were pointed out by Lew Mammel in 1983 [3], [4]. He circulated his criticisms by means of the computer network linking the major astronomical centres of the world. What Mammel found first was that in making their calculations for the phases of Io (the moon of Jupiter used by Roemer), Goldstein and his co-workers incorrectly adjusted the average TIME of the observations, when they should have corrected the PHASES of Io. The result was that they obtained a value for "c" that was falsely close to the present day value, i.e. their value of not more than +/- 0.5%. After the figures had been corrected by Mammel, the result was that "c" was 8% SLOWER with an error of +/- 9%.

His second discovery a few days later was that there was a major blunder in a simple series of subtractions. Instead of subtracting the calculated from the observed time, Goldstein had subtracted the observed from the calculated. When Mammel amended this error, he obtained a value of 6% HIGHER than today with an error of +/-8.6%. There is yet another error Goldstein seems to have made in dealing with his results. He wrote a letter in February 1986 to Vivian Bounds and Setterfield quoted from this in his S.R.I. report. The original letter said "...a light travel time 2.6% lower than the presently accepted value. The formal uncertainty is +/- 1.8%". Now, with a travel time LOWER, i.e. shorter, the speed of light would be HIGHER of course.

Humphreys contacted Goldstein, who admitted that he had (and I quote Humphreys) "...stated his results ambiguously, apparently misleading both Bounds and Setterfield. What Goldstein had meant to say was the speed of light according to Roemer's data was 2.6% SLOWER in 1668 to 1678 by 2.6% than it is now. Professor Goldstein has given me permission to quote the following from his 2 November 1987 letter to me: "The new result is that the velocity of light was SLOWER in 1668 to 1678 by 2.6% than it is today. I do not think the difference is significant however."

I would suggest that his first statement is not simply "ambiguous" but is in fact very clear in its meaning - the transit time was less than today and therefore "c" was HIGHER. The wording cannot be interpreted in more than one way, and is simply a muddled expression on Goldstein's part. In addition, to dismiss a variation of 2.6% as "...not significant" when the whole subject hinges on a matter of a fraction of 1% is to try to gloss over the fact that his calculations DID show a variation from the present value, albeit lower (at that time at least). He still seems to be unaware that the second error discovered by Mammel makes the final result HIGHER than today.

This does call into question Goldstein's assessment of the whole subject, and whether his scientific objectivity is as impartial as it should be. The two major errors set out above require no further comment, except to wonder, as Mammel does, how his papers passed the scrutiny of the peer reviewers of the prestigious periodical in which they appeared. Questions remain, however, such as - why did Goldstein made so many errors in his calculations and then make misleading statements - all of them in a direction that

opposed CDK. Did he know that, correctly calculated, the results actually supported a decrease in the speed of light? Was the article accepted in order to cast doubt on a decrease in "c"?

4. Critics also refer to Aardsma's article [5] criticising CDK as though it was a full refutation of Setterfield's poor maths. Here again, they are unaware that there is a major error in Aardsma's method of analysing the results. I have pointed this out in a very simple way [6] as it was obvious even to me (and I am no mathematician) that Aardsma's method was unsuitable for a curve.

Trevor Norman, Setterfield's mathematical expert, also slammed his badly flawed analysis [7]. Briefly, Aardsma used one half of a statistical method which if used properly would have crashed the programme. He therefore used the second half of another method to get the answers he desired. Norman wrote to him pointing out this gross mistake but Aardsma claimed that he never received it. The erroneous method was duly published by Aardsma as proving Setterfield's maths were wrong! Norman criticised Aardsma in very strong terms in his article.

5. One of the most impressive confirmations of CDK is Setterfield's list of 17 physical 'constants' [8]. He obtained a number of past measurements of such values as the Gyromagnetic Ratio, Rydberg Constant etc. and found that 11 remained constant, 4 increased slightly and 2 decreased. He then showed that every single one had varied exactly as could be predicted from an examination of their basic formulae with a decrease in the speed of light.

6. Quite independently of Setterfield, a Russian scientist, Troitskii, has proposed [9] that "c" was very much higher than it is today by an amount of 10^{10} faster. This is within the order of the original change of speed that Setterfield had proposed which was between 10^7 to 10^{11} . Troitskii had based this entirely upon his examination of astronomical data, red shifts, superluminal jets etc., and not upon any direct measurements of "c" with laboratory instruments. The publication of this result in a professional journal is excellent confirmation of Setterfield's thesis.

The measurements of "c" have been made with very great accuracy; more than enough to determine whether it has decreased or not. The fact that virtually all the past measurements were above the present value should surely indicate that it could not have been due to "errors of measurement with inaccurate instruments" - which is the usual ploy used to dismiss them. Michelson was a Nobel prizewinner in the subject and surely the fact that he believed that "c" had decreased is worthy of some recognition.

There has been much ridicule and false mathematics directed at Setterfield's work, but those with qualifications in statistics agree that the evidence is FOR a decrease in the speed of light. Many readers of such diatribes will consider the case closed. Those that do are committing the crime of failing to listen to the case for the other side DIRECT; i.e. not a critics version of it which is then demolished as a 'straw man'. The information set out above is only part of the massive evidence that exists on the subject and I leave the reader to draw his own conclusions.

NOTE: In the UK only I circulate the SRI report, a supplement and other correspondence for those interested to copy and return to me within 14 days. A4 SAE envelope (clearly written!) and a loose \$1 stamp please. M. Bowden, 92 Bromley Common, Bromley, Kent BR2 9PF.

REFERENCES

- [1] Norman, T. and Setterfield, B. *"The Atomic Constants, Light and Time"* Stanford Research Institute International Invited Report. August 1987
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- [8] Setterfield, B. *"The Velocity of Light and the Age of the Universe"* Creation Science Association (Australia) Monograph 1983 (Now out of print).
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