

# Computer Analysis of the Historical Values of the Velocity of Light — A Response

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Evered<sup>1</sup> has laboured hard to bring forth a rational justification of his rejection of Setterfield's analysis of the velocity of light,  $c$ , but much is old and refuted. After the publication of Aardsma,<sup>2</sup> Humphreys,<sup>3</sup> and Brown's<sup>4</sup> critiques of Norman and Setterfield,<sup>5</sup> the **Creation Research Society Quarterly** published my paper showing an analysis based on the most appropriate methods for testing a trend versus constancy. The results were contrary to their conclusions.<sup>6</sup>

I would like to state three objections to the findings of Evered.

Firstly, the regression lines in his paper are not followed by an analysis of the residuals as recommended by Draper and Smith.<sup>7</sup> Such an analysis is done to check whether in fact a suitable model was chosen for the regression. Evered thus misses the statistical clues that would inform him that a linear function was inappropriate. Since the residuals attest to the lack of fit to a linear model, and since also no claim has been made to support a linear model, either as a statistical or theoretical model, the negative conclusions based on a rejected linear model are spurious.

Secondly, the regression technique is only an indirect test of the hypothesis. It tests a potential linear model against constancy, not trend against constancy. In my paper mentioned above I use the mean square successive difference and the run tests, which do actually test the hypothesis given. The results negated constancy at the 95% confidence level in 18 of 20 tests. Evered must be aware of this paper because he quotes Brown's response to it. Neither Aardsma, Humphreys, Brown or Evered have responded to these results. Are they valid? If not, why?

Thirdly, the  $c$ -dependent values show trend, but the  $c$ -independent values do not. This seems to be an amazing coincidence which Setterfield's opponents fail to address. Is it a conspiracy of the physicists? Is it some kind of psychological bias? If so, why does it show up only in the atomic values which are time dependent? Why also are the trends all in the right direction for Setterfield's theory?

I will also make some further comments on the work

of Evered. He never gives the coefficient of determination of any of his lines, which are decidedly lower than the ones produced by Norman, Setterfield, and Hasofer<sup>8,9</sup> for their lines. This is a tacit admission that Evered is using an inferior fit to reject the results of a superior fit. In addition, the equations in his sections 2, 3, 4 and 5 use data that includes the values in the 1966–84 era which are measured using atomic clocks. He is thus mixing incompatible data. The result is that he is testing an hypothesis other than the one Setterfield and Norman have proposed, that is, a straw man.

Evered is right on insisting that theoretical models must fit all data. However, the models proposed in Norman and Setterfield's monograph are statistical models. The rejection of some of the statistical models on theoretical grounds does not negate the possibility that a theoretical model can be found. In fact, the cosecant squared statistical model is still a potential theoretical model, as it does allow carbon-14 dating to work as observed.

Evered's histogram of  $c$  values is almost useless. About one hundred (100) of the one hundred and sixty-three (163) values are clumped into the central grouping of 1000 km/s around  $c$ . This is hardly revealing. Other values are thinly scattered, showing only an unusual number of outliers.

There remains one other point that the reader will want to be aware of. Evered claims that Hasofer's data supplied by Norman and Setterfield are supposedly 'markedly' different. The truth is that 22 error bars have been added where they were missing previously. This information was necessary to allow Hasofer to do his analysis, as it was also necessary for Aardsma to add these values. In addition, seven other error bars were adjusted by 10km/s, an adjustment which could not be significant. One error bar was increased from 300 to 1000km/s, and the value of the Roemer datum was **lowered** by **16,000** km/s. This lower value is a considerable concession, as it is probably wrong and also lowers the average value of the data considerably. One datum which appeared previously in Table 2 of the Norman and Setterfield monograph was

calculated and added to the rest of the Bradley aberration method data. This is not what I could call ‘markedly’ different! The changes are not all in favour of Setterfield’s hypothesis, as can be easily discerned from a simply check of the two data sets. This kind of aspersion is unjustified.

Evered does us all a disfavoured by writing a highly flawed and partisan article with no substantive basis for his conclusion. He simply ignores other evidences which contradict his own results, and then insults all those who disagree by stating that it’s all in our minds!

## REFERENCES

1. Evered, M. G., 1991. Computer analysis of historical values of the velocity of light. *CEN Tech. J.*, 5(2):94–96.
2. Aardsma, G., 1988. Has the speed of light decayed recently? Paper 1. *Creation Research Society Quarterly*, 25(1):36–40.
3. Humphreys, D. R., 1988. Has the speed of light decayed recently? Paper 2. *Creation Research Society Quarterly*, 25(1):40–45.
4. Brown, R.H., 1990. Speed of light statistics. *Creation Research Society Quarterly*, 26(4):142–143.
5. Norman, T. and Setterfield, B., 1987. *The Atomic Constants, Light and Time*, Technical Monograph, Flinders University, Adelaide, Australia.
6. Montgomery, A., 1990. Statistical analysis of  $c$  and related atomic constants. *Creation Research Society Quarterly*, 26(4): 138–142.
7. Draper, N. S. and Smith, H., 1966. *Applied Regression Analysis*, John Wiley and Sons, New York.
8. Norman and Setterfield, Ref. 5.
9. Hasofer, A. M., 1990. A regression analysis of historical light measurement data. *EN Tech. J.*, 4:191–197.

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