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A Case in Instantaneous Terrestrial Measure and the Disqualification of Toothed -Wheel Experiments Used to Calculate the Speed of Light

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Abstract:
The Young and Forbes 1891 toothed- wheel experiment will reveal that the speed of light has nothing to do with the distance of the base-line, between the distant mirror and the rotating toothed- wheel.

Introduction:
Since, the author supports the theory of instantaneous light, every attempt will be made to demonstrate its viability. Form Setterfields' section, Part 3: Fizeau and the Toothed-Wheel Experiments:
One of the main problems facing the toothed- wheel method was the estimation of the exact moment of eclipse of the light beam. Cornu overcame the problem by making pairs of observations on either side of the exact eclipse position and further pairing with reversed wheel rotation. Young and Forbes in England in 1891 used a different technique. From an observing station at Wemyss Bay, **light was sent to two distant reflector, instead of the normal one**, in the hills behind Inellan. The reflectors were in the same line but the nearer one was 16,835.0 feet from the observation post, and the other was at 18,212.2 feet distance. **The two images so formed were observed simultaneously**. The position of the eclipses or the maximum was not needed. The speed of the cogwheel was measured instead at the time when both images appeared to be of equal intensity.

The advantage of this method is that the eye is extremely sensitive to slight differences in the intensity of adjacent images. The **extreme disadvantage of their arrangement consisted of the short base-length**. Even taking the most distant reflector, the base was only 5551.07 meters long. This was by far the shortest for this type of experiment being not quite two-thirds of Fizeau's base-length. The problems of the short base asserted themselves, as did other experimental features that were **not conducive to obtaining good results.** This determination was severely criticized by both Newcomb and Cornu. It is omitted in the definitive list of best c determinations treated by Birge. Dorsey comments, "*it is generally admitted that their work is seriously in error, and is reported unsatisfactorily.*" This Young/Forbes result was given as 301,382 Km/s, "*with an unwarranted accuracy but give no probable error*". (1)

Discussion:
First of all, this is similar, in many respects to the author's "Light Sandwich Experiment" model, except that the Young/Forbes experiment is apparently a two way measure; whereas, the author's is a one way measure.
The main question must be asked, why didn't the scientific community of the time investigate

this simultaneous event of separated light sources more thoroughly? Why didn't the scientists of the time extend the base-line, long enough to be able to derive a most accurate result? It seems that Newcomb, Cornu, Birge, Dorsey, among others had no desire- no curiosity to find out the truth behind this troublesome simultaneous result. Yet, the scientific community accepted the "unwarranted accuracy" of the result of the Young/Forbes measure of 301,382 Km/s.

Distance-wise, there is a 7.56% difference between the near reflector and far reflector in the Young/Forbes experiment. The main questions are:
1. What is a far enough distance of separation between near and far reflectors to be able to measure a non-simultaneous result?
2. What is an overall far enough distance of the reflectors from the toothed -wheel in order to measure an accurate result?

The second question seems to be fairly straight forward. The Cornu/Helmert experiments of 1874, and reworked in 1876 were the first to be generally accepted and derived a speed of light to be 299,990 Km/S +- 200 Km. They performed 624 trials at a base-line of 22,910 meters. (2) So, a distance roughly four times that of Young/Forbes is most acceptable.

Here, is where the evidence comes to a halt, because of the lack of desire to extend the base-line of the Young/Forbes toothed-wheel experiment. But, this does not prevent the author from theorizing about what would be found by doing so.

Conclusion:
The author theorizes that; regardless, of the length of the base-line of the Forbes/Young toothed-wheel experiment; and regardless, of the separation between the near and far reflectors- the extension of the base-line of this experiment will reveal that the near and far reflectors will maintain their simultaneity. In other words, regardless of distance of the varying reflectors' distance from the toothed-wheel, simultaneity will be maintained. This means that all toothed-wheel experiments which claim distance to be an inherent and critical factor in determining the speed of light, is false. As a result, all the delay inherent in all tooth-wheeled experiments must be attributed to the device itself. Finally, if all delay in all toothed-wheel experiments is attributed to the internal mechanisms of the device, then all toothed-wheel experiments, which are dependent upon distance for their calculations, are thereby disqualified.

References:
1. Http://www.setterfield.org/000docs/cx3.html#table5
2. Http://www.setterfield.org/000docs/cx3.html#table5