----- Original Message -----
From:
To:
Sent: Thursday, April 15, 2010 9:00 PM
Subject: What would it mean if the speed of light IS slowing down?

HISTORY OF THE LIGHT-SPEED DEBATE - (Print)

When we walk into a dark room, flip a switch and the light comes on, it seems that light has no speed but is somehow infinite - instantly there. That was the majority opinion of scientists and philosophers until September 1676, when Danish astronomer Olaf Roemer announced to the Paris Academie des Sciences that the anomalous behavior of the eclipse times of Jupiter's inner moon, Io, could be accounted for by a finite speed of light. His work and his report split the scientific community in half, involving strong opinions and discussions for the next fifty years. It was Bradley's independent confirmation of the finite speed of light, published January 1, 1729, which finally ended the opposition. The speed of light was finite-incredibly fast, but finite.

The following question was: "Is the speed of light constant?" Interestingly enough, every time it was measured over the next few hundred years, it seemed to be a little slower than before. This could be explained away, as the first measurements were unbelievably rough compared to the technical accuracy later. It was not that simple, though. When the same person did the same test using the same equipment at a later period in time, the speed was slower. Not much, but slower.

These results kicked off a series of lively debates in the scientific community during the first half of the 20th century. Raymond Birge, highly respected chairman of the physics department at the University of California, Berkeley, had, from 1929 on, established himself as an arbiter of the values of atomic constants. The speed of light is considered an atomic constant. However Birge's recommended values for the speed of light decreased steadily until 1940, when an article written by him, entitled "The General Physical Constants, as of August 1940 with details on the velocity of light only," appeared in *Reports on Progress in Physics* (Vol. 8, pp.90-100, 1941). Birge began the article saying: "This paper is being written on request - and at this time on request ... a belief in any significant variability of the constants of nature is fatal to the spirit of science, as science is now understood ." These words, from this man, for whatever reason he wrote them, shut down the debate on the speed of light. Birge had previously recognized, as had others, that if the speed of light was changing, it was quite necessary that some of the other "constants" were also changing. This was evidently not to be allowed, whether it was true or not, and so the values for the various constants were declared and that was that. Almost. In the October 1975 issue of *Scientific American* (p. 120), C.L. Strong questioned whether the speed of light might change with time "as science has failed to get a consistently accurate value." It was just a ripple, but the issue had not quite disappeared.

Partly in order to quell any further doubts about the constancy of the speed of light, in October 1983 the speed of light was declared a universal constant of nature, defined as 299,792.458 kilometers per second, which is often rounded off to the measurement we are more familiar with in the West as 186,000 miles per second.

Birge's paper was published in 1941. Just a year later, Barry Setterfield was born in Australia. In 1979 he was 37 years old. That year he received a book from a friend, a book on astronomical anomalies. It was a large book, and near the end of it there was a section on the speed of light, questioning its constancy. Barry was stunned. Nothing he had read or learned in physics or

astronomy had even hinted that there was a question regarding the speed of light. It was a constant, wasn't it? As he read, he learned about the measurements that had been taken years before, and the arguments that had gone on in the scientific literature, and he was fascinated. He figured he could read up on it and wrap up the question in about two weeks; it didn't quite work out that way.

Within a couple of years, one of the creationist organizations had started publishing some of Barry's findings. They were still preliminary, but there was so much more to this than he had thought. In the following years his exploration continued, and he read all the literature he could find. His work caught the attention of a senior research physicist at Stanford Research Institute International (SRI), who then asked him to submit a paper regarding his research. It was to be a white paper, or one that was for the purposes of discussion within the Institute.

Barry teamed up with Trevor Norman of Flinders University in Adelaide, and in 1987 Flinders itself published their paper, "Atomic Constants, Light, and Time." Their math department had checked it and approved it and it was published with the Stanford Research Institute logo as well.

Gerald Aardsma, a man at another creationist organization, got wind of the paper and got a copy of it. Having his own ax to grind on the subject of physics, he called the heads of both Flinders and SRI and asked them if they knew that Setterfield and Norman were creationists! SRI was undergoing a massive staff change at the time and since the paper had been published by Flinders, they disavowed it and requested their logo be taken off. Flinders University threatened Trevor Norman with his job and informed Barry Setterfield that he was no longer welcome to use any resources there but the library. Aardsma then published a paper criticizing the Norman-Setterfield statistical use of the data. His paper went out under the auspices of a respected creation institution.

Under attack by both evolutionists and creationists for their work, Norman and Setterfield found themselves writing long articles of defense, which appeared in a number of issues of creation journals. In the meantime, Lambert Dolphin, the physicist at Stanford who had originally requested the paper, teamed up with professional statistician Alan Montgomery to take the proverbial fine-tooth comb through the Norman-Setterfield paper to check the statistics used. Their defense of the paper and the statistical use of the data was then published in a scientific journal [*Galilean Electrodynamics* , Vol. 4 No. 5, pp. 93ff., 1993] and Montgomery went on to present a public defense at the 1994 International Creation Conference. Neither defense has ever been refuted in any journal or conference. Interestingly enough, later in 1987, after the Norman-Setterfield paper was published, another paper on light speed appeared, written by a Russian, V. S. Troitskii ["Physical Constants and the Evolution of the Universe", *Astrophysics and Space Science* Vol. 139, 1987, pp 389-411]. Troitskii not only postulated that the speed of light had not been constant, but that light speed had originally been about 1010 times faster than now.

Since 1987, when V. S. Troitskii argued that light speed had originally been about 1010 times faster than now, a multitude of papers on cosmology and the speed of light have shown up in journals and on the web. The theories abound as to what is changing, and in relation to what, and what the possible effects are.

As the storm around the 1987 report settled down, Barry Setterfield got back to work, investigating the data rather than playing around with pure theory. Meanwhile, halfway around the world from Australia, in Arizona, a respected astronomer named William Tifft was finding something strange going on with the redshift measurements of light from distant galaxies. It had

been presumed that the shift toward the red end of the spectrum of light from these distant galaxies was due to a currently expanding universe, and the measurements should be seen as gradually but smoothly increasing as one went through space. That wasn't what Tifft was finding. The measurements weren't smooth. They jumped from one plateau to another. They were quantized, or came in quantities with distinct breaks in between them.

When Tifft published his findings, astronomers were incredulous and dismissive. In the early 1990s in Scotland, two other astronomers decided to prove him wrong once and for all. Guthrie and Napier collected their own data and studied it. They ended up deciding Tifft was right [T. Beardsley, *Scientific American* 267:6 (1992), p. 19;. J. Gribbin, *New Scientist* 9 July (1994), 17; R. Matthews, *Science* 271 (1996), 759]. What was going on? Barry Setterfield read the material and studied the data. The universe could not be expanding if the red shift measurements were quantized. Expansion would not occur in fits and starts. So what did the red shift mean? While most others were simply denying the Tifft findings, Barry took a closer look. And it all started to make sense. While many articles continued to be published regarding theoretical cosmologies with little regard for much of the data available, Barry was more interested in the data.

Yet, his work is not referenced by any of the others. The Stanford paper is just about forgotten, if it was ever known, by the folks in mainstream physics and astronomy. However, not only are the measurements still there, but the red shift data has added much more information, making it possible to calculate the speed of light back to the first moment of creation. So Barry wrote another paper and submitted it to a standard physics journal in 1999. They did not send it to peer review but returned it immediately, saying it was not a timely subject, was of no current interest, and was not substantial enough. (It was over fifty pages long with about a hundred and fifty references to standard physics papers and texts.) So Barry resubmitted it to an astronomy journal. They sent it out to peer review and the report came back that the paper was really interesting but that it really belonged in a physics journal. So, in 2000, he sent it off to another physics journal. They refused it because they did not like one of the references Barry used: a university text on physics.

There is a reason that Barry's work is not being referenced by mainstream scientists - or even looked at by most. If Barry is right about what the data are indicating, we are living in a very young universe. This inevitable conclusion will never be accepted by standard science. Evolution requires billions of years.

And there is a reason why the major creation organizations are holding his work at an arm's length as well: they are sinking great amounts of money into trying to prove that radiometric dating procedures are fatally flawed. According to what Barry is seeing, however, they are not basically flawed at all: there is a very good reason why such old dates keep appearing in the test results. The rate of decay of radioactive elements is directly related to the speed of light. When the speed of light was higher, decay rates were faster, and the long ages would be expected to show up. As the speed of light slowed down, so the radioactive decay rates slowed down.

By assuming today's rate of decay has been uniform, the earth and universe look extremely old. Thus, the evolutionists are happy with the time that gives for evolution and the creationists are looking for flaws in the methods used for testing for dates. But if the rates of decay for the different elements have not been the same through time, then that throws both groups off! Here was an "atomic clock" which ran according to atomic processes and, possibly, a different "dynamical" clock, the one we use everyday, which is governed by gravity - the rotation and revolution rates of the earth and moon. Could it be that these two "clocks" were not measuring time the same way? A data analysis suggested this was indeed happening. Tom Van Flandern,

with a Ph.D. from Yale in astronomy, specializing in celestial mechanics, and for twenty years (1963-1983) Research Astronomer and Chief of the Celestial Mechanics Branch at the U.S. Naval Observatory in Washington D.C., released the results of some tests showing that the rate of ticking of the atomic clock was measurably slowing down when compared with the "dynamical clock." (Tom Van Flandern was terminated from his work with that institution shortly thereafter, although his work carries a 1984 publication date.)

In recognizing this verified difference between the two different "clocks," it is important to realize that the entire dating system recognized by geology and science in general, saying that the earth is about 4.5 billion years old, and the universe somewhere around ten billion years older than that, might be thrown into total disarray. The standard science models cannot deal with that. The standard creation models cannot, at this point, deal with the fact that radiometric dating may be, for the most part, telling the truth on the atomic clock. And, meanwhile, the Hubble spacecraft keeps sending back data which keep slipping into Barry Setterfield's model as though they actually belonged there.

[The majority of this article was excerpted from "History of the Light-Speed Debate" by Helen Setterfield, originally published in the July 2002 *Personal Update NewsJournal*]

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