

THE UNCERTAIN SPEED OF LIGHT

by Henry M. Morris*

One of the most frequent questions encountered by those of us who believe in the literal Genesis record of creation is: "How can the universe be young if the stars are old? If a star is, say, a million light-years from Earth, wouldn't it take a million years for its light to reach us?"

Creationists have tried to answer this problem in various ways. One point creationists can make is that actual geometric measurements of star distances are possible only out to about 300 light years. Greater distances are mere "guesstimates" based on a series of assumptions. However, there is no *Biblical* problem with the concept of an infinite universe created by an omnipotent Creator (note such Scriptures as Isaiah 55:9; Genesis 22:17; Job 22:12; etc.), so we have no basic problem with distance estimates involving millions of light years.

Others, including this writer, have stressed that God could have created the light from the stars simultaneously with the stars themselves, so that Adam could have seen the stars as soon as they were created. A major difficulty with this assumption is how to deal with post-creation stellar events such as supernovas.

An Australian scientist, Barry Setterfield, developed the idea of a decreasing velocity of light. However, most physicists reject this suggestion out of hand.

A constant "c" is basic throughout Einsteinnian relativistic physics, which most physicists have adopted as incontrovertibly proved. There was also a question about the statistical strength of Setterfield's evidence for decreasing speed.

Based on relativity concepts, a number of physicists—most notably Dr. Russell Humphreys of ICR—have argued from Einstein's relativity theories that, at great distances, six literal days on Earth could correspond to billions of years in distant space. The problem is that one would almost have to be a Ph.D. in theoretical physics even to comprehend the physics and mathematics involved in this argument. That raises the question: would God expect ordinary people to depend on theoretical physics to determine whether or not they could believe the Bible?

The uncertainties among cosmologists about origins has now been further pointed up by their interest in the theories of João Magueijo.¹ Magueijo is not a creationist, but is himself stressing that a changing speed of light would solve many cosmological problems, even though it would drastically modify Einstein's theories of relativity.

It was as if the riddles of the Big Bang universe were trying to tell us

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precisely that light *was* much faster in the early universe, and that at some very fundamental level physics had to be based on a structure richer than the theory of relativity.²

The above was taken from Magueijo's new book, *Faster Than the Speed of Light*. In an earlier article he had said:

It now appears that the constancy of "c" is not so essential to relativity after all; the theory can be based on other postulates.³

The inflationary hypothesis (describing the initial phase of the Big Bang) postulates an extremely short period of inflation, when the primeval particle of space/time first inflated at an extremely high velocity to grapefruit size; this stage was followed by the standard Big Bang explosion which then developed into our cosmos. This inflation model also had problems, which soon led to various proposed modifications.

Roughly, 50 forms of inflation have been proposed, named and studied, including double, triple, and hybrid inflation, tilted hybrid inflation, hyperextended inflation, and inflation that is "warm," "soft," "tepid," and "natural."⁴

So therefore, Magueijo says:

Although cosmic inflation has acquired an aura of invincibility, alternative theories continue to attract some interest among cosmologists. . . . But the most promising and provocative alternative may be the varying-speed-of-light theory (VSL), which my colleagues and I have been developing for several years.⁵

Magueijo was subjected to disdain and opposition when he suggested to his colleagues that the velocity of light might not be a constant. After all, as he noted:

. . . relativity's spell is so strong that the constancy of "c" is now woven

into all the mathematical tools available to the physicist.⁶

Nevertheless, his ideas are gradually gaining a number of important adherents. An interviewer with *New Scientist* asked him whether the theory had yet got to the point of acceptance by his colleagues. He answered as follows:

It depends what you mean by accepted. I have been commissioned by a journal to write a big review article. And we have become respectable in the sense that there's a huge number of people working on it now. . . . But I wouldn't say it's mainstream yet.⁷

Another fascinating article in the same issue of *New Scientist* deals with the theories of an Italian scientist, Giovanni Amelino-Camelia, who has been working on a different type of criticism and revision of Einstein's relativity, that he enthusiastically calls "Doubly Special Relativity" (DSL).

Einstein's special theory of relativity, which describes the behavior of space, and time and bound them together as "space-time," has been passed down the generations as an immutable fact. . . . But, says Amelino-Camelia, Einstein may have had only half the story.⁸

Magueijo has found a kindred spirit in Amelino-Camelia, combining the latter's theories with his own.

João Magueijo, . . . had been formulating an explanation of the evolution of the Universe. . . . But there was a heavy price to pay. . . . He was suggesting that the speed of light has been slowing ever since the big bang.⁹

These two men and a number of other physicists have become confident that all of physics could eventually be found to fit into their revolutionary theories.

If these physicists are right, then Einstein's reign is coming to an end.¹⁰

Now none of this means that we now have a firm answer to the question about starlight and the age of the universe. Such an idea would be considered absurd by Magueijo. His VSL cosmology leads to various other conclusions which would be even more difficult for us to deal with (for example, it negates the first law of thermodynamics, the principle of energy conservation)!

But it does seem to reinforce our frequent observation that modern cosmology has become nothing but a morass of conflicting mathematical models, which few besides Ph.D. theoretical physicists really understand, and which they seem to replace with other models every week or so. Remember those 50 variations in the inflation model!

Another important example of cosmological uncertainty is the current notion that the stars and other measurable physical bodies comprise only 5% of the "matter" in space. The rest is either "dark matter" or "dark energy," neither of which has ever been observed, but which seem theoretically to be needed. But as one scientist observes referring to this unseen sea of unknown material:

We know little about that sea. The terms we use to describe its components, "dark matter" and "dark energy" serve mainly as expressions of our ignorance.¹¹

Space does not allow discussion of the numerous other problems and controversies in cosmology, but they are legion. But all of this accumulation of speculation may, indeed, give us the answer we seek. Why should we pay any attention at all to these cosmological speculations? No one outside this professional clique of specialists in higher mathematics and theoretical physics can really understand them—

especially when they disagree with each other and repeatedly revise their theories anyway.

On the other hand, we have the very record of the Creator Himself, who is surely capable of writing in plain language about His creation and telling about it simply and clearly to all us ordinary people who really want to know. We need to take seriously His statement that He "rested" at the end of creation week from His work of creating and making all things. This means that we cannot legitimately apply His present-day processes for conserving what He had created to the study of His processes of creation (Genesis 2:1–3).

In "six days" just like our days, He wrote, "*the LORD made heaven and earth,*" and He wrote these words, "*with the finger of God*" (Exodus 31:17–18). And that's the way it was!

Endnotes

1. Dr. Magueijo has a Ph.D. in Theoretical Physics from Cambridge University and is currently a professor of theoretical physics at Imperial College in London.
2. João Magueijo, *Faster Than the Speed of Light* (Cambridge, Massachusetts: Perseus Publishing, 2003), p. 6.
3. João Magueijo, "Plan B for the Cosmos," *Scientific American* (vol. 284, January 2001), p. 59.
4. Brad Lemly, "Guth's Grand Guess," *Discover* (vol. 23, April 2002), p. 38.
5. João Magueijo, "Plan B for the Cosmos," *Scientific American* (vol. 284, January 2001), p. 58.
6. *Ibid.*, p. 58.
7. Michael Brooks, "Hero or Heretic," *New Scientist* (vol. 177, Feb. 8, 2003), p. 48.
8. David Harris, "After Einstein," *New Scientist* (vol. 177, Feb. 8, 2003), p. 29.
9. *Ibid.*, p. 30.
10. *Ibid.*, p. 32.
11. David B. Cline, "The Search for Dark Matter," *Scientific American* (vol. 288, March 2003), p. 52. 

HOW LONG IS A BILLION YEARS?

by John D. Morris

We've all heard the phrase "billions and billions of years." Usually the phrase is accompanied by the speaker rolling his hands outwardly and repeatedly as if to demonstrate a continual unfolding of time. But what does this really mean? Can the human mind really comprehend a billion years?

The word "billion" is not as unfathomable as it was in days past. We now know the world holds over five billion people. The countries of India and China have over one billion residents each. That's a lot of people, and although no one has experienced such a crowd, we do have a foggy notion of its meaning.

Likewise, we have a feel for a billion dollars. There are now several hundred billionaires alive today, we are told, and the government can spend a billion dollars with ease. Maybe we don't experientially understand the amount, but it is within our comprehension.

But these are rather concrete items or concepts. We deal with people and dollars every day, but what of time? Certainly we experience time, and we have a feel for a long time, but how long?

Consider that the United States was founded just over 200 years ago. Columbus discovered America just 500 years ago. These events seem long ago, but the numbers are comparatively small. Continuing back in history, dates are less precise, but the pyramids in Egypt were built around 4000 years ago. The Asian empires were founded around the same time.

All of these events are rightly relegated to "ancient history." Archaeological artifacts and structures give only nebulous insights into the times of their origin. But in each of these cases we have

at least some written history to aid us, scanty though it may be. For times greater than these, the only reliable source we have are the Biblical records and genealogies. According to it, no civilization or record other than itself could exist before the great Flood of Noah's Day, and indeed, all ancient legends (i.e., post-flood memories of pre-flood events) are fraught with illogic and mythology. It even places the creation of all things less than 2000 years before the Flood. Our minds struggle with the antiquity implied in these long thousands of years.

But can we comprehend one billion years? One billion seconds is approximately 32 years. One billion minutes takes us to the time of Christ. One billion hours is about 115,000 years—beyond any true comprehension. One billion days is nearly three million years. Think about it. What could one billion days possibly mean to an old man who has lived just 30,000 days?

One billion years cannot be grasped, neither can 4.67 billion years for the supposed age of the Earth or 14 billion years or so since the Big Bang. These words may be easy to say, and within our mathematical calculations, but I suggest they carry no meaning. The invariably accompaniment of the outward rolling of the hands, suggest that tales of "billions and billions" of years are nothing more than arm-waving, perhaps capable of impressing or intimating, but not of communicating understandable information.

A billion years might just as well be eternity, an equally unfathomable time word. Eternity future we can't comprehend either, but we believe it, because the Creator of time promised it to us. 



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