

Does Distant Starlight Prove the Universe Is Old?

by [Dr. Jason Lisle](#) on December 13, 2007

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Critics of biblical creation sometimes use distant starlight as an argument against a [young universe](#). The argument goes something like this: (1) there are galaxies that are so far away, it would take light from their stars billions of years to get from there to here; (2) we can see these galaxies, so their starlight has already arrived here; and (3) the universe must be at least billions of years old—much older than the 6,000 or so years indicated in the [Bible](#).

Many big bang supporters consider this to be an excellent argument against the biblical timescale. But when we examine this argument carefully, we will see that it does not work. The universe is very big and contains galaxies that are very far away, but that does not mean that the universe must be billions of years old.

The distant starlight question has caused some people to question cosmic distances. “Do we really know that galaxies are so far away? Perhaps they are much closer, so the light really doesn’t travel very far.”¹ However, the techniques that astronomers use to measure cosmic distances are generally logical and scientifically sound. They do not rely on evolutionary assumptions about the past. Moreover, they are a part of [observational science](#) (as opposed to historical/origins science); they are testable and repeatable in the present. You could repeat the experiment to determine the distance to a star or galaxy, and you would get approximately the same answer. So we have good reason to believe that space really is very big. In fact, the amazing size of the universe brings glory to God ([Psalm 19:1](#)).

Some Christians have proposed that God created the beams of light from distant stars already on their way to the earth. After all, Adam didn’t need any time to grow from a baby because he was made as an adult. Likewise, it is argued that the universe was made mature, and so perhaps the light was created in-transit. Of course, the universe was indeed made to function right from the first week, and many aspects of it were indeed created “mature.” The only problem with

assuming that the light was created in-transit is that we see things happen in space. For example, we see stars change brightness and move. Sometimes we see stars explode. We see these things because their light has reached us.

But if God created the light beams already on their way, then that means none of the events we see in space (beyond a distance of 6,000 light-years) actually happened. It would mean that those exploding stars never exploded or existed; God merely painted pictures of these fictional events. It seems uncharacteristic of **God** to make illusions like this. God made our eyes to accurately probe the real universe; so we can trust that the events that we see in space really happened. For this reason, most **creation scientists** believe that light created in-transit is not the best way to respond to the distant starlight argument. Let me suggest that the answer to distant starlight lies in some of the unstated assumptions that secular astronomers make.

The Assumptions of Light Travel-time Arguments

Any attempt to scientifically estimate the age of something will necessarily involve a number of *assumptions*. These can be assumptions about the starting conditions, constancy of rates, contamination of the system, and many others. If even one of these assumptions is wrong, so is the age estimate. Sometimes an incorrect worldview is to blame when people make faulty assumptions. The distant starlight argument involves several assumptions that are questionable—any one of which makes the argument unsound. Let's examine a few of these assumptions.

The Constancy of the Speed of Light

It is usually assumed that the speed of light is constant with time.² At today's rate, it takes light (in a vacuum) about one year to cover a distance of 6 trillion miles. But has this always been so? If we incorrectly assume that the rate has always been today's rate, we would end up estimating an age that is much older than the true age. But some people have proposed that light was much quicker in the past. If so, light could traverse the universe in only a fraction of the time it would take today. Some creation scientists believe that this is the answer to the problem of distant starlight in a young universe.

However, the speed of light is not an “arbitrary” parameter. In other words, changing the speed of light would cause other things to change as well, such as the ratio of energy to mass in any system.³ Some people have argued that the speed of light can never have been much different than it is today because it is so connected to other constants of nature. In other words, life may not be possible if the speed of light were any different.

This is a legitimate concern. The way in which the universal constants are connected is only partially understood. So, the impact of a changing speed of light on the universe and life on earth is not fully known. Some creation scientists are actively researching questions relating to the speed of light. Other creation scientists feel that the assumption of the constancy of the speed of light is probably reasonable and that the solution to distant starlight lies elsewhere.

The Assumption of Rigidity of Time

Many people assume that time flows at the same rate in all conditions. At first, this seems like a very reasonable assumption. But, in fact, this assumption is false. And there are a few different ways in which the non-rigid nature of time could allow distant starlight to reach earth within the biblical timescale.

Albert Einstein discovered that the rate at which time passes is affected by motion and by gravity. For example, when an object moves very fast, close to the speed of light, its time is slowed down. This is called “time-dilation.” So, if we were able to accelerate a clock to nearly the speed of light, that clock would tick very slowly. If we could somehow reach the speed of light, the clock would stop completely. This isn’t a problem with the clock; the effect would happen regardless of the clock’s particular construction because it is time itself that is slowed. Likewise, gravity slows the passage of time. A clock at sea-level would tick slower than one on a mountain, since the clock at sea-level is closer to the source of gravity.

It seems hard to believe that velocity or gravity would affect the passage of time since our everyday experience cannot detect this. After all, when we are traveling in a vehicle, time appears to flow at the same rate as when we are standing still. But that’s because we move so slowly compared to the speed of light, and the earth’s gravity is so weak that the effects of time-dilation are correspondingly tiny. However, the effects of time-dilation have been measured with atomic clocks.

Since time can flow at different rates from different points of view, events that would take a long time as measured by one person will take very little time as measured by another person. This also applies to distant starlight. Light that

would take billions of years to reach earth (as measured by clocks in deep space) could reach earth in only thousands of years as measured by clocks on earth. This would happen naturally if the earth is in a *gravitational well*, which we will discuss below.

Many secular astronomers assume that the universe is infinitely big and has an infinite number of galaxies. This has never been proven, nor is there evidence that would lead us naturally to that conclusion. So, it is a leap of “blind” faith on their part. However, if we make a different assumption instead, it leads to a very different conclusion. Suppose that our solar system is located near the center of a finite distribution of galaxies. Although this cannot be proven for certain at present, it is fully consistent with the evidence; so it is a reasonable possibility.

In that case, the earth would be in a gravitational well. This term means that it would require energy to pull something away from our position into deeper space. In this gravitational well, we would not “feel” any extra gravity, nonetheless time would flow more slowly on earth (or anywhere in our solar system) than in other places of the universe. This effect is thought to be very small today; however, it may have been much stronger in the past. (If the universe is expanding as most astronomers believe, then physics demands that such effects would have been stronger when the universe was smaller). This being the case, clocks on earth would have ticked much more slowly than clocks in deep space. Thus, light from the most distant galaxies would arrive on earth in only a few thousand years as measured by clocks on earth. This idea is certainly intriguing. And although there are still a number of mathematical details that need to be worked out, the premise certainly is reasonable. Some creation scientists are actively researching this idea.

Assumptions of Synchronization

Another way in which the relativity of time is important concerns the topic of synchronization: how clocks are set so that they read the same time at the same time.⁴ Relativity has shown that synchronization is not absolute. In other words, if one person measures two clocks to be synchronized, another person (moving at a different speed) would *not* necessarily measure those two clocks to be synchronized. As with time-dilation, this effect is counterintuitive because it is too small to measure in most of our everyday experience. Since there is no method by which two clocks (separated by a distance) can be synchronized in an absolute sense, such that all observers would agree regardless of motion, it follows that there is some flexibility in how we choose what constitutes synchronized clocks. The following analogy may be helpful.

Imagine that a plane leaves a certain city at 4:00 p.m. for a two-hour flight. However, when the plane lands, the time is still 4:00. Since the plane arrived at the same time it left, we might call this an instantaneous trip. How is this possible? The answer has to do with time zones. If the plane left Kentucky at 4:00 p.m. local time, it would arrive in Colorado at 4:00 p.m. local time. Of course, an observer on the plane would experience two hours of travel. So, the trip takes two hours as measured by *universal time*. However, as long as the plane is traveling west (and providing it travels fast enough), it will always naturally arrive at the same time it left as measured in *local time*.

There is a cosmic equivalent to local and universal time. Light traveling toward earth is like the plane traveling west; it always remains at the same cosmic local time. Although most astronomers today primarily use cosmic universal time (in which it takes light 100 years to travel 100 light-years), historically cosmic local time has been the standard. And so it may be that the Bible also uses cosmic local time when reporting events.

Since God created the stars on Day 4, their light would leave the star on Day 4 and reach earth on Day 4 *cosmic local time*. Light from all galaxies would reach earth on Day 4 if we measure it according to cosmic local time. Someone might object that the light itself would experience billions of years (as the passenger on the plane experiences the two hour trip). However, according to Einstein's relativity, light does not experience the passage of time, so the trip would be instantaneous. Now, this idea may or may not be the reason that distant starlight is able to reach earth within the biblical timescale, but so far no one has been able to prove that the Bible does *not* use cosmic local time. So, it is an intriguing possibility.⁵

The Assumption of Naturalism

One of the most overlooked assumptions in most arguments against the Bible is the assumption of *naturalism*. Naturalism is the belief that nature is "all that there is." Proponents of naturalism *assume* that all phenomena can be explained in terms of natural laws. This is not only a blind assumption, but it is also clearly anti-biblical. The Bible makes it clear that God is not bound by [natural laws](#) (they are, after all, *His* laws). Of course God can use laws of nature to accomplish His will; and He usually does so. In fact, natural laws could be considered a description of the way in which God normally upholds the universe. But God is supernatural and is capable of acting outside natural law.

This would certainly have been the case during Creation Week. God created the universe supernaturally. He created it from nothing, not from previous material

([Hebrews 11:3](#)). Today, we do not see God speaking into existence new stars or new [kinds](#) of creatures. This is because God ended His work of creation by the seventh day. Today, God sustains the universe in a different way than how He created it. However, the naturalist erroneously assumes that the universe was created by the same processes by which it operates today. Of course it would be absurd to apply this assumption to most other things. A flashlight, for example, operates by converting electricity into light, but the flashlight was not created by this process.

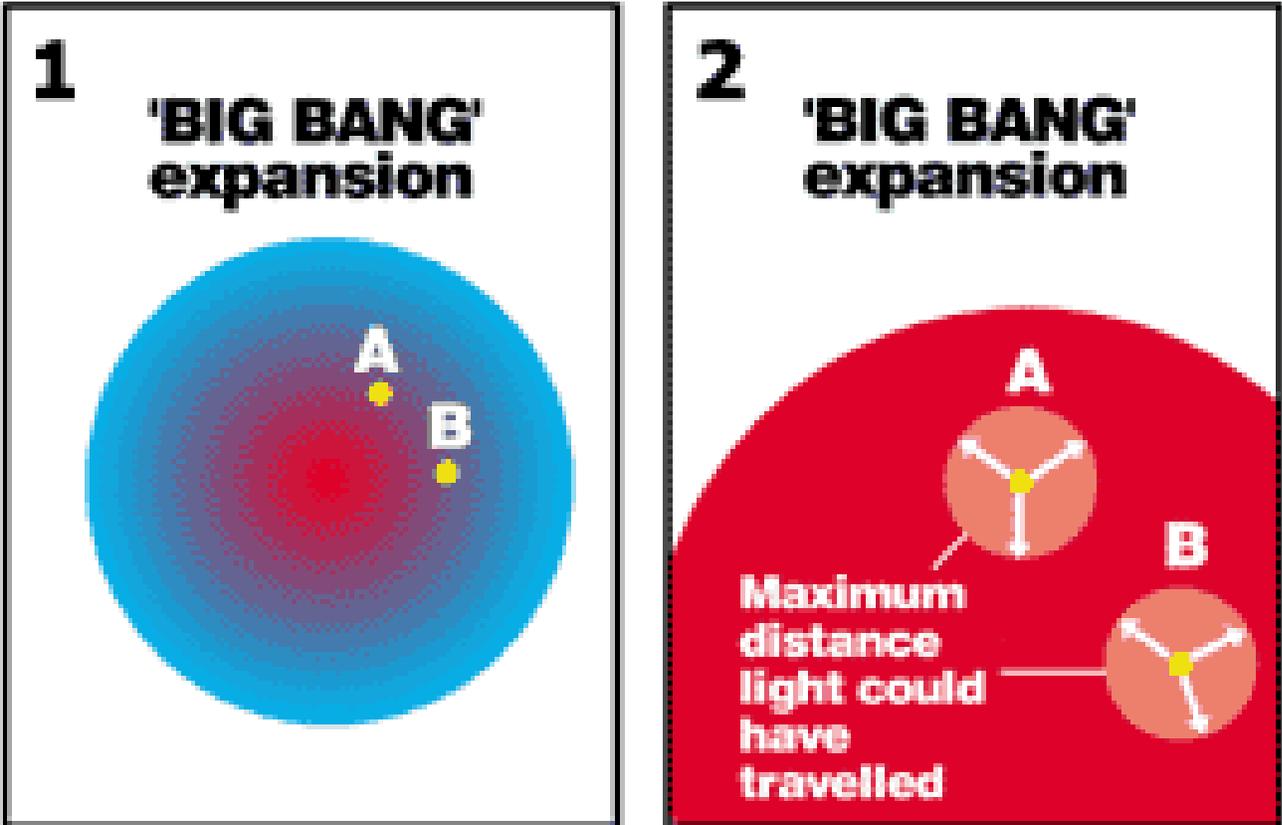
Since the stars were created during Creation Week and since God made them to give light upon the earth, the way in which distant starlight arrived on earth may have been supernatural. We cannot assume that past acts of God are necessarily understandable in terms of a current scientific mechanism, because science can only probe the way in which God sustains the universe today. It is [irrational](#) to argue that a supernatural act cannot be true on the basis that it cannot be explained by natural processes observed today.

It is perfectly acceptable for us to ask, “Did God use natural processes to get the starlight to earth in the biblical timescale? And if so, what is the mechanism?” But if no natural mechanism is apparent, this cannot be used as evidence against *supernatural* creation. So, the unbeliever is engaged in a subtle form of circular reasoning when he uses the assumption of naturalism to argue that distant starlight disproves the biblical timescale.

Light Travel-Time: A Self-Refuting Argument

Many [big bang](#) supporters use the above assumptions to argue that the biblical timescale cannot be correct because of the light travel-time issue. But such an argument is self-refuting. It is fatally flawed because the big bang has a light travel-time problem of its own. In the big bang model, light is required to travel a distance much greater than should be possible within the big bang’s own timeframe of about 14 billion years. This serious difficulty for the big bang is called the “horizon problem.” [6](#) The following are the details.

The Horizon Problem



In the big bang model, the universe begins in an infinitely small state called a singularity, which then rapidly expands. According to the big bang model, when the universe is still very small, it would develop different temperatures in different locations. (see *figure 1*) Let's suppose that point A is hot and point B is cold. Today, the universe has expanded (see *figure 2*), and points A and B are now widely separated.

However, the universe has an extremely uniform temperature at great distance—beyond the farthest known galaxies. In other words, points A and B have almost exactly the same temperature today. We know this because we see electromagnetic radiation coming from all directions in space in the form of microwaves. This is called the “cosmic microwave background” (CMB). The frequencies of radiation have a characteristic temperature of 2.7 K (-455°F) and

are *extremely* uniform in all directions. The temperature deviates by only one part in 10^5 .

The problem is this: How did points A and B come to be the same temperature? They can do this only by exchanging energy. This happens in many systems: consider an ice cube placed in hot coffee. The ice heats up and the coffee cools down by exchanging energy. Likewise, point A can give energy to point B in the form of electromagnetic radiation (light), which is the fastest way to transfer energy since nothing can travel faster than light. However, using the big bang supporters' own assumptions, including uniformitarianism and naturalism, there has not been enough time in 14 billion years to get light from A to B; they are too far apart. This is a light travel-time problem—and a very serious one. After all, A and B have almost exactly the same temperature today, and so must have exchanged light multiple times.

Big bang supporters have proposed a number of conjectures which attempt to solve the big bang's light travel-time problem. One of the most popular is called "inflation." In "inflationary" models, the universe has two expansion rates: a normal rate and a fast inflation rate. The universe begins with the normal rate, which is actually quite rapid, but is slow by comparison to the next phase. Then it briefly enters the inflation phase, where the universe expands much more rapidly. At a later time, the universe goes back to the normal rate. This all happens early on, long before stars and galaxies form.

The inflation model allows points A and B to exchange energy (during the first normal expansion) and to then be pushed apart during the inflation phase to the enormous distances at which they are located today. But the inflation model amounts to nothing more than storytelling with no supporting evidence at all. It is merely speculation designed to align the big bang to conflicting observations. Moreover, inflation adds an additional set of problems and difficulties to the big bang model, such as the cause of such inflation and a graceful way to turn it off. An increasing number of secular astrophysicists are rejecting inflation for these reasons and others. Clearly, the horizon problem remains a serious light travel-time problem for the big bang.

The critic may suggest that the big bang is a better explanation of origins than the Bible since biblical creation has a light travel-time problem—distant starlight. But such an argument is not rational since the big bang has a light travel-time problem of its own. If both models have the same problem *in essence*⁷, then that problem cannot be used to support one model over the other. Therefore, distant starlight cannot be used to dismiss the Bible in favor of the big bang.

Conclusions

So, we've seen that the critics of creation must use a number of assumptions in order to use distant starlight as an argument against a young universe. And many of these assumptions are questionable. Do we know that light has always propagated at today's speed? Perhaps this is reasonable, but can we be absolutely certain, particularly during Creation Week when God was acting in a supernatural way? Can we be certain that the Bible is using "cosmic universal time," rather than the more common "cosmic local time" in which light reaches earth instantly?

We know that the rate at which time flows is not rigid. And although secular astronomers are well aware that time is relative, they *assume* that this effect is (and has always been) negligible, but can we be certain that this is so? And since stars were made during Creation Week when God was *supernaturally* creating, how do we know for certain that distant starlight has arrived on earth by entirely *natural* means? Furthermore, when big bang supporters use distant starlight to argue against biblical creation, they are using a self-refuting argument since the big bang has a light travel-time problem of its own. When we consider all of the above, we see that distant starlight has never been a legitimate argument against the biblical timescale of a few thousand years.

As creation scientists research possible solutions to the distant starlight problem, we should also remember the body of evidence that is consistent with the youth of the universe. We see rotating spiral galaxies that cannot last multiple billions of years because they would be twisted-up beyond recognition. We see multitudes of hot blue stars, which even secular astronomers would agree cannot last billions of years.⁸ In our own solar system we see disintegrating comets and decaying magnetic fields that cannot last billions of years; and there is evidence that other solar systems have these things as well. Of course, such arguments also involve assumptions about the past. That is why, ultimately, the only way to know about the past *for certain* is to have a reliable historic record written by an eyewitness. That is exactly what we have in the Bible.

Footnotes

1. See the DVD *Astronomy: What Do We Really Know?* by Dr. Jason Lisle for a more complete treatment of these questions, available at answersingenesis.org/store/. [See all footnotes](#)
2. Many people mistakenly think that Einstein's theory of relativity demands that the speed of light has not changed in time. In reality, this is not so. Relativity only requires that two different observers would measure the same velocity for a beam of light, even if they are moving relative to each other. [See all footnotes](#)
3. This follows from the equation $E=mc^2$, in which c is the speed of light and E is the energy associated with a given amount of mass (m). [See all footnotes](#)
4. For a discussion on synchrony conventions see W.C. Salmon, The philosophical significance of the one-way speed of light, *Nous* 11(3):253–292, Symposium on Space and Time, 1977. [See all footnotes](#)
5. See Distant Starlight and Genesis, *TJ* 15(1):80–85, 2001; available online at www.answersingenesis.org/tj/v15/i1/starlight.asp. [See all footnotes](#)
6. See www.answersingenesis.org/creation/v25/i4/lighttravel.asp. [See all footnotes](#)
7. The details, of course, differ. The big bang does not have a problem with distant starlight as such. But then again, biblical creation does not have a horizon problem. (The cosmic microwave background does not need to start with different temperatures in a creationist cosmogony.) However, both problems are the same in *essence*: how to get light to travel a greater distance than seems possible in the time allowed. [See all footnotes](#)
8. Secular astronomers believe that blue stars must have formed relatively recently. But there are considerable difficulties in star formation scenarios—problems with magnetic fields and angular momentum to name a couple.