

## Chapter 5

# How can we see distant stars in a young universe?

- If the universe is young and it takes millions of years for light to get to us from many stars, how can we see them?
- Did God create light in transit?
- Was the speed of light faster in the past?
- Does this have anything to do with the big bang?
- What about Relativity?

**S**OME galaxies are billions of light-years away. Since a light-year is the distance light would travel over the time period of one year, and we can see such galaxies, does this mean that the universe<sup>1</sup> is very old?

Despite all the biblical and scientific evidence for a young earth/universe, this has long been a seemingly intractable problem. However, any scientific understanding of origins will always have opportunities for research—problems that need to be solved. We can never have complete knowledge and so there will always be things to learn.

### **The big bang light travel problem**

It's important to note that the most widely held cosmology, the standard secular big bang theory, has a problem of its own with time and light travel, called the *horizon problem*.

According to the big bang, the universe began in a fireball from which all matter in the universe is ultimately derived. For galaxies to have any hope of forming at all during the expansion process, the fireball must

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1. See: Age of the Earth; [creation.com/age](http://creation.com/age) and Young age evidence Q&A; [creation.com/young](http://creation.com/young).

have begun with an uneven distribution of temperatures. However, we see radiation coming from the cosmos, in all directions of the sky that has a very uniform temperature. This is the cosmic microwave background (CMB) radiation and its temperature has been measured to be uniform to one part in 100,000.

If the regions started at uneven temperatures, and are now almost at the same temperature, then energy must have been transferred from hot regions to cooler ones. The fastest way that energy can be transferred is by radiation, at the speed of light. Consider, then, a region of space 10 billion light years (a light year is the distance light travels in a year) away from earth in the north sky, and the other 10 billion light years in the south. They are 20 billion light years apart. However, since the big bang was allegedly only 13.7 billion years ago, this is not enough time for light to have travelled from one region to the other. Yet the background temperature is almost identical.

However, the problem for the big bang<sup>2</sup> is even more severe than this. The CMB radiation is alleged to be the radiation that appeared when the temperature of the initial fireball cooled enough for it to become transparent to radiation. This is alleged to have happened about 300,000 years after the initial fireball appearance. Consequently, only those regions within about 300,000 light-years of each other could have become uniform in temperature during this time. Yet we have regions separated by at least 20 billion light-years that are at essentially the same temperature.

This horizon problem gave rise to hypothetical fudge factors such as faster-than-light ‘inflation’ of space being added to the big bang—expanding by a factor of  $10^{50}$  in  $10^{-33}$  seconds.<sup>3</sup> However, there is no known mechanism to start or stop the process in a smooth fashion—it is effectively a naturalistic ‘miracle’. Even *New Scientist* asked whether inflation was “just wishful thinking”.<sup>4</sup> Dr Paul Steinhardt, winner of the 2002 Dirac Medal for his contributions to inflation theory, wrote an article, featured on the cover of *Scientific American* as “Quantum Gaps in the big bang: Why our best explanation of how the universe evolved must be fixed—or replaced.” Steinhardt identified four ways in which inflationary theory fails.<sup>5</sup>

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2. The big bang hypothesis has many problems; see [creation.com/bigbang](http://creation.com/bigbang).

3. This explains the mass-media excitement in early 2014 when cosmologists claimed proof for inflation in gravitational waves. See Williams, A., Big Bang blunder bursts the multiverse bubble; [creation.com/multiverse-bubble-bursts](http://creation.com/multiverse-bubble-bursts), 12 June 2014.

4. Brooks, M., 13 things that do not make sense, *New Scientist* 2491:30–37, 19 March 2005.

5. Steinhardt, P., The inflation debate, *Scientific American* 304(4):36–43, April 2011.

Other big bang cosmologists have even suggested that the speed of light (radiation) may have been much faster in the past<sup>6</sup> (see also “Did light always travel at the same speed?” below). So no-one can rightly claim this issue as a reason not to believe the Bible, because the standard secular big bang cosmology has a similar problem.<sup>7</sup>

At this point we could just say, ‘The big bang has miracles without any miracle worker, so surely we Christians can have miracles *with* a miracle worker!’ Creation Week was, after all, a miraculous event.



## Created light?

A few decades ago, perhaps the most common explanation from biblical creationists was that God created the light ‘on its way’, so that Adam could see the stars immediately without having to wait years for the light from even the closest ones to reach the earth. While we should not limit the power of God, this has some immense difficulties.

It would mean that whenever we look at a very distant object, what we apparently see happening never really happened at all. For instance, say we see an object a million light-years away that appears to be rotating; that is, the light we receive in our telescopes carries this information, ‘recording’ this behaviour. However, according to the ‘created in transit’ explanation, the light we are now receiving did not come from the star, but was created ‘en route’.

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6. Wieland, C., Speed of light slowing down after all? *Journal of Creation* **16**(3):7–10, 2002; [creation.com/cdk](http://creation.com/cdk).
  7. Lisle, J., Light-travel time: a problem for the big bang, *Creation* **25**(4):48–49, 2003; [creation.com/lighttravel](http://creation.com/lighttravel).

This would mean, for a, say, 10,000-year-old universe, that anything we see happening beyond about 10,000 light-years is actually part of a gigantic picture-show of things that have not actually happened, showing us objects that may not even exist.

To explain this problem further, consider an exploding star (supernova) at, say, an accurately measured distance of 100,000 light-years. (Remember we are using this explanation in a 10,000-year-old universe.) As the astronomer on Earth watches this exploding star, he is not just receiving a beam of light. If that were all, then it would be no problem at all to say that God could have created a whole chain of photons (light particles) already on their way. However, what the astronomer receives is also a particular, very specific pattern of variation within the light, showing the changes that one would expect to accompany such an explosion—a predictable sequence of events involving neutrinos, visible light, X rays and gamma-rays. For example, because most neutrinos pass through solid matter as if it were not there, while light is slowed down, we can detect a massive neutrino burst before the light reaches us.

The light and neutrino burst carry information recording an apparently real event. The astronomer is perfectly justified in interpreting this ‘message’ as representing actual reality—that there really was such an object, which exploded according to the laws of physics, brightened, emitted X-rays, dimmed, and so on, all in accord with the expected outcomes of known physical laws.

Everything the astronomer sees is consistent with this, including the spectral patterns in the light from the star, giving us a chemical signature of the elements contained in it. Yet the ‘light created en route’ explanation would mean that this recorded message of events, transmitted through space, had to be contained within the light beam from the moment of its creation, or planted into the light beam at a later date, without ever having originated from that distant point. (If it had started from the star—assuming that there really was such a star—the light beam would still be 90,000 light-years away from Earth, if the universe was 10,000 years old and the speed of light constant.)

To create such a detailed series of signals in light beams reaching Earth, signals which seem to have come from a series of real events but in fact did not, has no conceivable purpose. Worse, it is like saying that God created fossils in rocks to fool us, or even test our faith, and that they don’t represent anything real (a real animal or plant that lived and died in the past). This would be a strange deception for a holy God to engage in.

## Did light always travel at the same speed?

An obvious solution would seem to be a higher speed of light in the past, allowing the light to cover the same distance in less time. This seems at first glance a too-convenient *ad hoc* explanation. Some years ago, Barry Setterfield raised such a possibility to a high profile by showing that there seemed to be a decreasing trend in the historical observations of the speed of light ( $c$ ) over the past 300 years or so. Setterfield (and his later co-author, Trevor Norman) produced evidence in favour of their ‘cdk’ theory.<sup>8</sup> They believed that it would have affected radiometric dating results, and even have caused the red-shifting of light from distant galaxies, although this idea was later overturned, and other modifications were made also.

Many attacked the idea on the fallacious grounds that Einstein’s Special Relativity said that the speed of light could not change. It actually just says that the speed of light measured by observers will be invariant regardless of the speed of the source or observer.

Much debate raged to and fro among capable people within creationist circles about whether the statistical evidence really supported cdk or not.

The biggest difficulty, however, is with certain physical consequences of the theory. If  $c$  had declined the way Setterfield proposed, these consequences should still be discernible in the light from distant galaxies, but they are apparently not. High-precision tests of Einstein’s Theory of General Relativity, in our galaxy, using co-orbiting pairs of neutron stars, where at least one is a pulsar, within thousands of light-years distance, indicate the same value for  $c$  as we measure locally.<sup>9</sup> In short, none of the theory’s defenders have been able to answer all the problems raised. Interestingly, big bang defenders treated the idea of cdk with contempt, but then one of their own, João Magueijo, proposed a similar idea to rescue the big bang from its own light-travel (horizon) problem!<sup>10</sup>

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8. Norman, T.G. and Setterfield, B., *The atomic constants, light and time*, privately published, 1990.

9. Creationist physicist Dr Keith Wanser pointed out that the rate of energy loss of a pulsar due to gravitational radiation is proportional to  $c$ , according to General Relativity. The 1993 Nobel Prize in Physics was awarded to Russell Hulse and Joseph Taylor for discovering a binary pulsar and showing that the observed energy loss matched the predictions of General Relativity to within 0.4%. But this indicates that  $c$  hasn’t changed in the thousands of years since light left that pulsar.

10. Magueijo, J., *Faster Than The Speed of Light: The Story of a Scientific Speculation*, Basic Books, 2003.

## New creationist cosmologies

Nevertheless, the cdk theory stimulated much thinking about the issues. For example, creationist physicist Dr Russell Humphreys says that he spent a year, on and off, trying to get the cdk theory to work consistently, but without success. However, the thinking inspired him to develop ideas for a new creationist cosmology as an alternative to big bang theory.

This sort of development, in which one creationist theory, cdk, is overtaken by another, is a healthy aspect of science. The basic biblical framework, because it comes from the Creator, is non-negotiable, as opposed to the changing views and models of fallible people seeking to understand the data within that framework (evolutionists also often change their ideas on exactly how things have made themselves, but never whether they did; that materialistic framework remains non-negotiable).

### A clue

Consider that the time taken for something to travel a given distance is the distance divided by the speed it is travelling. That is,

$$\text{Time} = \text{Distance (divided by) Speed.}$$

When this is applied to light from distant stars, the time calculates out to be billions of years. Some have sought to challenge the distances, but they are very unlikely to be substantially wrong.<sup>11</sup>

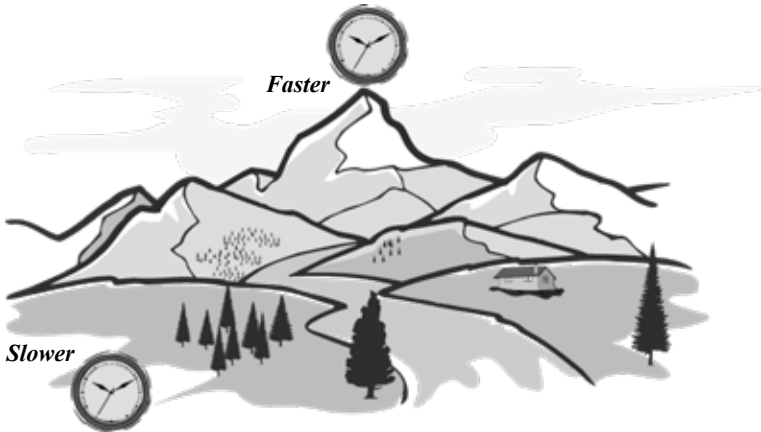
Astronomers use many different methods to measure the distances, and no informed creationist astronomer would claim that errors would be so vast that billions of light-years could be reduced to several thousand, for example. Even our own Milky Way Galaxy is about 100,000 light years across.

If the speed of light ( $c$ ) has not changed, the only thing left in the equation is time itself. In fact, Einstein's Relativity Theory has been telling the world for a hundred years that time is not an absolute. Scientists may not know what time is but they do know how to measure it. Nowadays very precise and exact atomic clocks measure the rate or flow of time and it has been measured to vary from place to place.<sup>12</sup>

In fact, two things have been observed to distort the flow of time—one is speed and the other is gravity. Einstein's general theory, the best theory of gravity we have at present, indicates that gravity distorts time.

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11. Many billions of stars exist, many just like our own sun, according to the analysis of the light coming from them. Such numbers of stars have to be distributed through a huge volume of space, otherwise we would all be fried.
  12. Creationist physics professor, Dr John Hartnett builds the world's most precise clocks at present; see [creation.com/hartnett-interview](http://creation.com/hartnett-interview).

This effect has been measured experimentally, many times. Clocks at the top of tall buildings, where gravity is slightly less, run slightly faster than those at the bottom, just as predicted by the equations of General Relativity (GR).<sup>13,14</sup>



*Gravity distorts time so that a clock on the top of a mountain will run faster than a clock on the plains.*

### **There are assumptions ...**

Most people think of the universe as having a centre and an edge. This means that if you were to travel into space, you would eventually come to a place beyond which there was no more matter. In this understanding, Earth is near the centre, as it appears to be as we look out into space.

This might sound like common sense, as indeed it is, but all modern secular cosmologies deny this. That is, they make the assumption that the universe has no boundary—no edge and no centre—dubbed the ‘cosmological principle’. In this assumed universe, every galaxy would be surrounded by galaxies spread evenly in all directions (figure 1). In such a universe, all net gravitational forces cancel out and there is no preferred direction, so there are also no net effects of movement of astronomical objects.

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13. The demonstrable usefulness of GR in the physics of time-keeping, for example, can be separated from certain ‘philosophical baggage’ that some have illegitimately attached to it, and to which some Christians have objected, thinking that such relativity in physics in some way supported relative morality. However, the fundamental postulate of relativity is the absoluteness of the speed of light; Einstein actually wanted to call it the ‘Invariance Theory’.
  14. Satellite scientist Dr Mark Harwood points out that time dilation is most relevant to GPS navigation, because the clocks in the satellites are faster by 38 microseconds per day than clocks at sea level. This doesn’t sound like much, but would accumulate errors in position at a rate of 400 metres every hour. See [creation.com/starlight2](http://creation.com/starlight2), 17 January 2009.

This is a *philosophical* assumption; that is, religious. And it is made to remove Earth from its apparently privileged position near the centre of the universe (because that's what the Bible implies—that Earth is the focus of God's attention in creating the universe). Note the views of respected cosmologist George Ellis, once a colleague of the famous Stephen Hawking; as reported by *Scientific American*:

“People need to be aware that there is a range of models that could explain the observations” Ellis argues. “For instance, I can construct you a spherically symmetrical universe with Earth at its centre, and you cannot disprove it based on observations.” Ellis has published a paper on this. “You can only exclude it on philosophical grounds. In my view there is absolutely nothing wrong in that. What I want to bring into the open is the fact that we are using philosophical criteria in choosing our models. A lot of cosmology tries to hide that.”<sup>15</sup>

Not only can you have such an understanding of the universe, but it actually fits the evidence better than the no-centre, boundless universe assumed by secularists. There is now observational evidence that the universe has a centre. For example, galaxies appear to have a large-scale structure centred near our galaxy.<sup>16</sup> These observations do not fit the materialists' no-centre, unbounded, randomly generated universe, but are consistent with a universe designed by a creator.

The big bang has many other problems,<sup>17,18</sup> so much so that even many secularists are calling for a radical rethink:<sup>19</sup>

“Big bang theory relies on a growing number of hypothetical entities—things that we have never observed. Inflation, dark matter and dark energy are the most prominent. Without them there would be fatal contradictions between the observations made by astronomers and the predictions of the big bang theory.”<sup>20</sup>

15. Gibbs, W.W., Profile: George F.R. Ellis—Thinking globally, acting universally, *Scientific American* **273**(4):50–55, 1995.

16. Hartnett, J., Where are we in the universe? *Journal of Creation* **24**(2):105–107, 2010; creation.com/location-in-universe.

17. Williams, A. and Hartnett, J., *Dismantling the big bang; God's universe rediscovered*, Master Books, US, 2005; creation.com/dtbb.

18. See papers listed under: What are some of the problems with the big bang hypothesis? creation.com/astronomy#bigbang.

19. Wieland, C., Secular scientists blast the big bang, *Creation* **27**(2):23–25, 2005; creation.com/bigbangblast.

20. Eric Lerner and 33 other scientists from 10 different countries, Bucking the big bang, *New Scientist* **182**(2448):20, 2004; cosmology.info/open-letter.



According to GR, if the universe has a boundary and centre, then there can be net gravitational effects on a cosmological scale and these can affect the flow of time during its history. Depending on how the universe was created, clocks could have run at different rates on Earth compared to other parts of the universe. In other words, it is no longer enough to say God made the universe in six days. He certainly did (Exodus 20:11 and Genesis 1), but six days as measured by which clocks? (If we say ‘God’s time’ we miss the point that He created the flow of time as we now experience it; He is outside of time, seeing the end from the beginning. Equally seriously, God inspired Scripture to instruct us (2 Timothy 2:15–17). This entails that words and logical inferences must be the same for God and man, otherwise Scripture would not be able to equip us with truth He reveals.)<sup>21</sup>

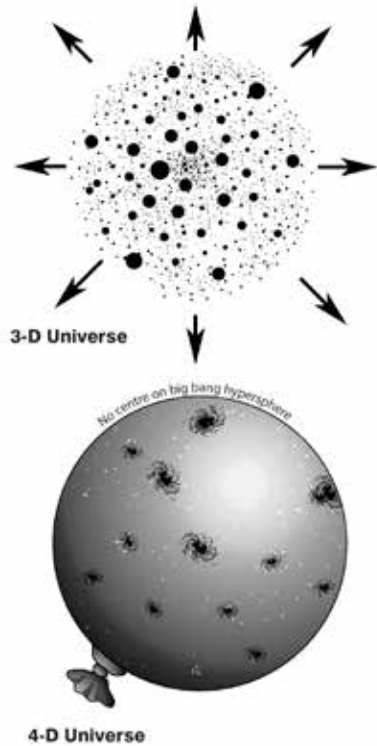


Figure 1. A 3-D spherical ball of space and matter has a centre and thus a net gravitational force. In the big bang model, the matter of our universe is imagined to be spread over the surface of a 4-dimensional or higher dimensional space, which has no centre (balloon analogy).

## New approaches

We now have two creationist cosmologies that could explain how God created everything in six earth days and Adam and Eve could see distant starlight. Both these concepts are rather mind-stretching, but we should not be surprised that when we are trying to get a glimpse of the miracle of creation it is not easy to understand (God’s ways are higher than our ways!).

### 1. Dr Russ Humphreys

Dr Humphreys had an earlier model, as explained in the book, *Starlight and Time*, but it failed to account for observations in relation

21. Genesis 1:1, Ecclesiastes 3:11, Isaiah 26:4, Romans 1:20, 1 Timothy 1:17, and Hebrews 11:3. Interestingly, according to GR, time does not exist without matter.

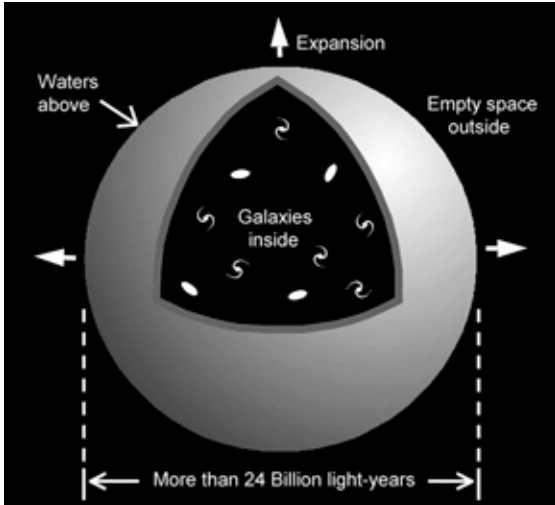


Figure 2. According to Dr Humphreys, the waters above the heavens (Psalm 148:4) today are possibly a thin veil of ice particles, or scattered planet-sized spheres of water covered with thick crusts of ice, at the edge of (surrounding) the universe.

to nearby galaxies. He has developed a new explanation of light-transit-times, to explain how light travelled from the distant cosmos and reached Earth, all during one ordinary-length day on Earth, the fourth day of creation week. This understanding depends on the effect of gravity on time (gravitational time dilation). Humphreys takes the “waters that are above the heavens” (Psalm 148:4 cf. Genesis 1:6–10), to mean that God created the universe with a massive layer of water that encircles the universe (figure 2). If the mass of this water were very large, it would have a large effect on the flow of time throughout the universe. And then there is the effect of God’s creating the stars during the fourth day of creation week as well (Isaiah 40:26). He also takes it that God ‘stretching out the heavens’, mentioned in various places in Scripture, refers to the expansion of the universe, especially during the fourth day. This expansion could have started on Day 2, when God created the ‘expanse’ (Hebrew *raqia*, KJV “firmament”, Genesis 1:7).

The model indicates that early on the fourth day, Earth plunged into a zone of timelessness. In this zone all physical processes, including clocks, come to a complete stop. The spherical zone of timelessness expands out from the earth at the speed of light, engulfing the newly-created stars and galaxies. After reaching the most distant galaxies, the timeless zone reverses direction and begins shrinking back toward the

earth at the speed of light. As it does so, it uncovers the new galaxies, so that the light can be seen on Earth. Dr Humphreys: “When the sphere reaches zero radius and disappears, Earth emerges, and immediately the light that has been following the sphere will reach Earth, even light that started billions of light-years away. On the fourth day, an observer on the night side of the earth would see a black sky one instant, and a sky filled with stars the next instant.”<sup>22</sup>

A universe with a centre and an edge, plus Humphreys’ concept of the waters above, provided an explanation for the ‘Pioneer anomaly’, which is a small but strange deceleration of four outgoing spacecraft: Galileo, Ulysses, and Pioneers 10 and 11.<sup>23</sup>

## 2. Dr John Hartnett

Dr John Hartnett has taken a different approach, which uses a different aspect of Einstein’s relativity theory. His cosmology applies a concept developed by Israeli cosmologist Dr Moshe Carmeli (1933–2007) called ‘cosmological relativity’.<sup>24</sup> Carmeli argued that to adequately describe the large-scale structure of the universe, in addition to length, breadth, depth, time (four dimensions), another measure, or dimension, was needed: the velocity of the expansion of space. This dimension has an effect on gravity and time—hence ‘cosmological general relativity’. Carmeli’s ideas have been successful in explaining long-standing astronomical puzzles, such as high redshift supernovas, galactic rotation observations, spheroidal galaxy anomalous dispersion, and expansion of the large scale universe. A great strength of Carmelian relativity is that it does away with hypothetical unobserved entities such as dark matter and dark energy, both of which are needed for big bang cosmology.<sup>25</sup>

Carmeli developed his cosmology with the assumption of the cosmological principle (no centre and no edge to the universe), but Hartnett realized that these ideas also worked with a universe with a centre and an edge. Furthermore, with this approach, an acceleration (increasing velocity) of the expansion of space, such as could be expected on the fourth day of the creation week, would have profound implications for time during that period. Time dilation results, but not due to a net gravitational effect—it is due to the enormous accelerated stretching of

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22. Humphreys, D.R., New time dilation helps creation cosmology, *Journal of Creation* 22(3):84–92, 2008 (technical); [creation.com/dilation](http://creation.com/dilation).

23. Humphreys, D.R., Flaw in creationist solution to the Pioneer anomaly? [creation.com/pioneer-anomaly-heat](http://creation.com/pioneer-anomaly-heat), 11 May 2013.

24. Carmeli, M., *Cosmological Relativity: The Special and General Theories for the Structure of the Universe*, World Scientific Publishing Company, 2006.

25. See ground-breaking technical papers by Dr Hartnett listed here: [creation.com/hartnett-papers](http://creation.com/hartnett-papers).

the fabric of space. This means that on Day 4, the clocks in the outer reaches of the expanding universe were running very fast compared to clocks on Earth. This allows time for distant starlight from the galaxies being created on the fourth day to travel to Earth and be visible to Adam and Eve.<sup>26,27</sup> Again, it's the fourth day as measured by Earth clocks, the clocks the Bible uses.

## Conclusion

What if no-one had ever thought of the possibility of time dilation? Many might have felt forced to agree with those scientists (including some Christians) who have asserted that there was no possible solution—vast ages for Earth are a fact because we can see distant stars, and the Bible must be ‘reinterpreted’ (massaged) or rejected. Many have urged Christians to abandon the Bible’s clear teaching of a recent creation because of these ‘undeniable facts’.

However, this reinterpretation of Scripture would also mean that Earth is old and the rocks containing fossils under our feet are old. So this also entails (if it is logically thought through) accepting that there were



26. Hartnett, J., A 5D spherically symmetric expanding universe is young, *Journal of Creation* 21(1):69–74, 2007; creation.com/5d (technical).
27. See layman’s summary: Wieland, C., Starlight and time—a further breakthrough, *Creation* 30(1):12–14, 2007; creation.com/starlight-time.

billions of years of death, disease, and bloodshed before Adam,<sup>28</sup> thus eroding the Creation/Fall/Restoration historical framework presented in the Bible<sup>29</sup>—the framework in which the Gospel makes sense, and upon which western civilization has been built, with all its many benefits.<sup>30</sup>

However, even without the new ideas that seem to solve the problem, such an approach would still have been wrong-headed. The authority of the Bible should never be compromised by mankind's 'scientific' proposals. One little previously unknown fact, or one change in a starting assumption, can drastically alter the whole picture so that what was 'fact' is no longer so.

This is worth remembering when dealing with other areas of difficulty which, despite the substantial evidence for Genesis creation, still remain. As shown, this particular area of difficulty is shared by the big bang theory, and creationists should point this out. Only God possesses infinite knowledge. By basing our scientific research on the assumption that His Word is true (instead of the assumption that it is wrong or irrelevant at points where today's 'science' cannot explain it) our scientific theories are much more likely, in the long run, to come to represent reality accurately. However, creation was a miraculous process and we must recognize that God is able to do things that we, in our human limitations, will struggle to understand. And big bangers invoke secular (God-less) 'miracles' to try to solve the same problems.

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28. Cosner, L. and Bates, G., Did God create over billions of years? [creation.com/billions](http://creation.com/billions), 6 October 2011.

29. Batten, D. and Sarfati, J., *15 Reasons to take Genesis as history*, Creation Ministries International, Australia, 2006; [creation.com/15r](http://creation.com/15r).

30. Zimmermann, A., The Christian foundations of the rule of law in the West: a legacy of liberty and resistance against tyranny, *Journal of Creation* **19**(2):67–73, 2005; [creation.com/christianlaw](http://creation.com/christianlaw). Dr Augusto Zimmermann lectures in Law at Western Australia's Murdoch University and is a Vice-President of the Australian Society of Legal Philosophy.