

The Good Word

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BIBLICAL CREATION AND MODERN COSMOLOGY

by Dr. Seraphim Steger

In our last issue we saw that the perceived *expansion of the Universe*, based on the observed *redshift* of light coming from the far reaches of the cosmos coupled with a profound philosophical prejudice against Judeo-Christian Biblical creationism and rejection of the idea of earth and man holding a special place in creation, has resulted in the general acceptance of a naturalistic evolutionary model for the genesis of a 10-20 billion year old Universe by the modern scientific community.

A 21ST CENTURY ASSESSMENT OF COSMOLOGY

“There was a time [pre-Copernicus] when *everyone knew* that the sun travelled around the earth-- it was a *fact of observation*. When some people pointed out that the motions of the planets did not seem to fit that picture, instead of looking for another explanation (after all that might mean abandoning the *fact of observation*), people just invented even *more* complicated theories (*epicycles*) [e.g., Ptolemy] to *explain away* these inconvenient observations.

“... a similar thing happened in more recent times in regard to astronomy -- complicated explanations were invented to *explain away* inconvenient facts. When Newton’s seemingly all-conquering laws of physics failed to explain certain astronomical observations, scientists dreamed up various *fudge factors*, such as an unknown hidden planet, to explain the discrepancy. In reality, what was needed was new physics that would still encompass Newton’s laws, but expand our understanding -- this arrived with Einstein [and his theories of special and general relativity].

“In our day, a similar thing is happening, in another area ... because of the insistence by the majority on the unbiblical *big bang* model [and its *inflationary* modifications], a whole new suite of *fudge factors* has been postulated to explain certain puzzling observations. These *fudge factors* include unknown and invisible (*dark*) forms of matter and even energy.”¹

For us to get a better understanding of modern cosmology from an Orthodox viewpoint, we will begin with an insightful summary of the general status of contemporary cosmology in 2011 by Hieromonk Damascene of the St. Herman of Alaska Brotherhood:

1. Hartnett, John, Dr., *Starlight, Time, and the New Physics: How we can see starlight in our young Universe (Updated, Second Edition)*, Creation Book Publishers, Atlanta, GA, 2010, pp.12-13.

“ON ASTRONOMY AND COSMOLOGY”

HIEROMONK DAMASCENE, ST. HERMAN OF ALASKA
BROTHERHOOD, PLATINA, CA, 2011

“The big bang theory, along with nebular accretion models of the origin of heavenly bodies, is today the standard naturalistic evolutionary model by which to explain the beginning and history of the cosmos. [I.e., after the big bang or expansion/inflation of the primordial matter, over millions to billions of years, gravity pulled a variety of gaseous molecules together to form stars, planets, satellites (moons), constellations, galaxies, and galaxy clusters/arcs.] This theory has a number of features which are at variance with the Scriptural-Patristic *cosmogony* [also spelled *cosmogony*, i.e., the *gen-esis* of the cosmos]. First of all, the evolutionary model runs counter to the Scriptural-Patristic view of God’s instantaneous creation of the earth and the heavenly bodies; secondly, it contradicts the order of creation as described in the Bible and understood by the Holy Fathers, which has the earth and even its vegetation created before the heavenly lights; and finally, unlike the Bible and the Holy Fathers, it posits a vast age of the earth and the cosmos, which leaves no place for an original incorrupt condition of creation and thus has a corrosive effect on traditional Christian soteriology.


“Creationist astronomers and physicists have provided a number of valuable resources which point out the known scientific problems connected with the reigning evolutionary cosmogony, highlight indicators of Divine creation and intelligent design in the Universe, and discuss the many lines of evidence for a young Universe (the *faint young sun paradox*, the recession of the moon from the earth, the magnetic fields of planets and moons in our solar system, the existence of short-period comets in the solar system, the spiral structure of galaxies, etc.). Of these resources, we would recommend the books: *Taking Back Astronomy*² (2006) by Jason Lisle (doctor of astrophysics);³ *Universe by Design* (2004) by Danny Faulkner (professor emeritus of astrophysics University of South Carolina in Lancaster)⁴; and *Dismantling the Big Bang* (2005) by Alex Williams (former consultant to the United Nations’ International Atomic Energy Agency) and John Hartnett (professor of physics, University of Western Australia in Perth)⁵; the articles by D. Russell Humphreys (doctor of physics, researcher at Sandia National

2. Lisle J, *Taking Back Astronomy*, Master Books, Green Forest, AK, 2006, pp. 125. A beautifully-photographed and easy to read introductory book of astronomy which gives a solid biblical basis for modern cosmology, albeit from a protestant viewpoint.

3. Also, Lisle J, *The Physics of Einstein: Black Holes, Time Travel, Distant Starlight, E=mc²*, Bible Science Institute, Aledo, TX, 2018, pp. 282.

4. Also, Faulkner, Daniel R, *The Created Cosmos*, Master Books, Green Forest, AR, 2016, pp. 352, and Faulkner, Daniel R, *The Expanse of Heaven*, Master Books, Green Forest, AR, 2017, pp. 345.

5. Also, Hartnett, John, *Starlight, Time, and the New Physics: How we can see starlight in our young Universe (updated)*, Creation Book Publishers, Atlanta, GA, 2010, pp. 220.



Laboratories) and Don Batten; ... and the videos *The Young Sun* (2009), *The Heavens Declare* (2009), *Created Cosmos* (2007), *Astronomy: What Do We Really Know?* (2005), *Big Problems with the Big Bang* (2005), *Creation & Cosmology* (2007), and *What You Aren't Being Told About Astronomy*, vol. 1: *Our Created Solar System* (2009). The book *Dismantling the Big Bang* is notable for its valuable discussion of how belief systems shape scientific theories, including theories of cosmology (chap. 2).⁶ It concludes by reproducing an *Open Letter to the Scientific Community*, signed by over two hundred secular scientists who reject the big bang model based on its inability to account for many astronomical observations, and who object to the fact that research into alternative models is severely hindered by funding agencies which do not tolerate dissent from the reigning paradigm (the letter, first published in *New Scientist*, May 22-28, 2004). For the Biblical model of a creation only thousands of years old, the question arises of how starlight from galaxies millions of light years away could have reached the earth. While creationists recognize this as a challenging question, sometimes referring to it as the *light travel-time problem*, they rightly point out that the big bang has the equivalent problem of a light-travel problem of its own, known as the *horizon problem* -- namely, that the temperature of the Universe could not have reached its current homogeneity even within the approximately 14 billion years allowed by the big bang theory. To deal with this anomaly in their model, big bang theorists have introduced the concept of an early inflation of the cosmos at a rate much faster than the speed of light. This, however, is only a conjecture with no supporting evidence, and hence is referred to as a *hypothetical entity* and a *fudge factor* ... from dissenting scientists.

"In recent years, Protestant creationists have been working on a number of scientific cosmological models within the Biblical framework, the most prominent being those of those of the above mentioned doctors of physics D. Russell Humphreys and John Hartnett. Starting with the theory of relativity and the concept of an expanding Universe -- both of which are accepted by evolutionists -- Humphreys and Hartnett have also assumed a spherical Universe with the earth near the center. This latter assumption is rejected by secular cosmologists not on experimental but on philosophical grounds, since, presupposing a naturalistic origin of the cosmos, they cannot regard the earth as having a *special* place and are thus obliged to believe that the Universe has no edge and no center. Humphreys and Hartnett, having abandoned the evolutionists' chosen starting point of an unbounded Universe, have found solutions of the relativistic field equations which depict the mechanics of the cosmos quite differently from the big bang model and potentially solve the creationists' *light travel-time problem*. Their [time dilation/achronicity] models also provide possible answers to some of the problems that big bang theorists have not resolved; for example, both of them (especially Hartnett's) obviate the need for invisible, undetectable *dark matter* and *dark energy* -- two other 'hypothetical entities' and 'fudge

6. Williams A and Hartnett J, *Chapter 2: Science, World Views, and Cosmological Models, Dismantling the Big Bang: God's Universe Rediscovered*, Master Books, Green Forest, AK, 2005, see pp. 53-80.
7. Lerner, E. , *Bucking the Big Bang: Open Letter on Cosmology / Cosmology Statement*, (An Open Letter to the Scientific Community). *New Scientist*, (2004), May 22, at <https://www.newscientist.com/article/mg18224482-900>

factors' pointed out in the 'Open Letter to the Scientific Community' -- to account for astronomical data, and both offer a straightforward explanation for the observed anomaly known as the *Pioneer effect* (see D. Russell Humphreys, *Creationist Cosmologies Explain the Anomalous Acceleration of Pioneer Spacecraft*, *Journal of Creation*, vol. 21, no. 2, Aug. 2007, pp. 61-70⁸).⁹

"Admittedly, the creationist cosmologies have unverifiable *fudge factors* of their own. This, however, illustrates the nature of all scientific cosmological models, which because they enter the realm of origins or historical science (as distinct from operational or observational science), are especially reliant on untestable assumptions and therefore must be regarded as, at best, merely tentative. Drs. Humphreys and Hartnett, as well as honest secular cosmologists, will readily admit this. As one of the leading secular theorists in cosmology, George F. R. Ellis, has said, 'People need to be aware that there is a range of models that could explain the observations. ... For instance, I can construct for you a spherically symmetrical Universe with Earth at its center, and you cannot disprove it based on observations. ... 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.'¹⁰


"Although the work of Protestant creationists in the field of cosmology can be seen as nothing more than provisional, we, in agreement with several Orthodox Christians holding doctorates in mathematics and the natural sciences (physics, cosmology), find it to be of potential value to Orthodox believers, for it shows that astronomical data *can* be interpreted scientifically in a way which conforms to the Biblical time scale, and which at the same time fits some observations better than does the big bang model. This consideration underlines the fact that different cosmological models which are equally scientific can be derived on the basis of different belief systems or world-views, and that the currently prevailing big bang model is by no means an inescapable construct dictated by observation and reason.

"For the Orthodox Christian, however, a difficulty arises in accepting, even tentatively, *any* scientific model which includes speculations about what occurred at the creation of the cosmos. By virtue of being '*scientific*', such models must apply the current laws of physics when trying to understand cosmological origins. The aforementioned models of Drs. Humphreys and Hartnett are no exception. In light of the Scriptural-Patristic teachings on the miraculous, supernatural events of the Six Days, Orthodox Christians are apt to have

8. <https://creation.com/creationist-cosmologies-explain-the-anomalous-acceleration-of-pioneer-spacecraft>

9. Note: Humphreys' solution was one of a multitude of suggestions for this anomaly. This problem of negative acceleration in the Pioneer spacecraft was finally solved a decade later in 2009 by Toth and Turyshev, <https://arxiv.org/pdf/0901.4597.pdf>, to everyone's satisfaction, who concluded that radiation forces from differential heating of the front end of the spacecraft, known as thermal recoil forces explain the entire Pioneer anomaly. The effect lessened as radioactive levels in the 4 Radioisotope Thermoelectric Generators (RTGs) in the craft decreased, lessening the thermal recoil effects. That was key to the explanation. See, also, Adler, Doug, *How the Pioneer Anomaly was Solved*, *Astronomy*, Aug 17, 2018, <https://astronomy.com/news/2018/08/how-the-pioneer-anomaly-was-solved>

10. Gibbs, WW, *Profile: George F.R. Ellis*, *Scientific American*, (1995), Vol. 273:4 (Oct.), p. 55.



reservations when Protestant creationists attempt to describe, according to current laws [of physics], the fashioning of the Universe with its heavenly lights. As Fr. Seraphim [Rose] wrote, ‘By their very nature the events of these days are miraculous, are not subject to the laws of nature that now govern the world, and we cannot understand them by projections from our present experience.’ Not only can we not scientifically examine the creation of the heavenly bodies, which God made to *give light upon the earth* (Gen. 1:15), we cannot even know what they and their light were like between the time of their creation and the fall of man. In the words of St. Barsanuphius of Optina [c.1910], ‘We don’t know what kind of moon there was then, what kind of sun, what kind of light ... All of this changed after the fall.’

“If, as Drs. Hartnett and Humphreys postulate in their models, the solution to the *light travel-time problem* lies in what occurred during the Six Days of Creation, for an Orthodox Christian this can only mean that its is ultimately beyond the scope of scientific inquiry. This conclusion has been at least partially acknowledged by the Protestant astrophysicists Danny Faulkner and Jason Lisle, who, while welcoming scientific attempts to solve the *light travel-time problem* such as those outlined above, say it is wrong to simply assume that a scientific solution can be found.¹¹ As Dr. Faulkner observes: ‘Instead of majoring on the *light travel-time* problem, perhaps we should realize that only an unbelievably powerful Creator could make such a large Universe while at the same time enabling us to see it all. Instead of a problem, it could be one of the most remarkable testaments of God’s creation (Faulkner D, *Universe by Design*, p. 104, & Lisle J, *Taking Back Astronomy*, pp. 46-48).’¹²

Some of the above creationist information needs significant updating. But first, we would do well to gain a better conceptual understanding of Einstein’s Theory of General Relativity, especially from one of the aforementioned creationist physicists, Dr. Jason Lisle before we delve into the more recent literature:

JASON LISLE, PH.D., *THE PHYSICS OF EINSTEIN: GENERAL RELATIVITY OF THE UNIVERSE (2018)*

“One particularly interesting aspect of general relativity is that it can describe the average curvature of spacetime for the entire Universe, given the mass distribution in the Universe. Of course, we don’t know precisely the mass distribution in the Universe is. Technology allows us to map the positions of the brighter galaxies. But there may be additional matter in the Universe that remains unseen. As an approximation, astrophysicists often assume that the mass in the Universe is isotropic (the same in all directions) and homogeneous

11. However, Dr. Lisle’s surprisingly insightful theory of *Anisotropic Synchrony Convention* totally removes *light-travel time* as a problem, as we shall see in a subsequent issue, and is now considered the best solution by fellow creationist John Hartnett. See Lisle, Jason P., *Anisotropic Synchrony Convention—A Solution to the Distant Starlight Problem*, *Answers Research Journal*, 2010, 3:191–207. <https://answersingenesis.org/astronomy/starlight/anisotropic-synchrony-convention-distant-starlight-problem/>

12. Hieromonk Damascene, *Suggested Resources 7. On Astronomy and Cosmology*, in Fr. Seraphim Rose, *Genesis, Creation, and Early Man: The Orthodox Christian Vision*, St. Herman of Alaska Brotherhood, Platina, CA, 2011, pp. 901-906.

(roughly the same density everywhere), at least on the largest scales [These 2 assumptions constitute what is known as the *cosmological principle*, a cornerstone of modern astrophysics and cosmology]. This [maximum symmetry] allows them to solve the [16 complex] Einstein field equations on a cosmic scale, at least as an approximation.

“Alexander Friedmann was the first to solve Einstein’s field equations correctly for the Universe under the assumption of an isotropic, homogeneous mass distribution. He made this discovery in the early 1920s. In 1927, George Lemaître independently arrived at the solution. In the 1930s, Howard Robertson and Arthur Walker confirmed this solution under the given assumptions. For this reason, the geometry describing the curvature of spacetime for a Universe with mass evenly distributed is called the Robertson-Walker metric [a model of an idyllic Universe that simplifies Einstein’s field equations so that a solution can be found]. Sometimes all four names are included: the Friedmann-Lemaître-Robertson-Walker [FLRW] metric.


“The solution implies that the Universe cannot be eternally static; it must either expand or contract. This was contrary to the mainstream scientific consensus of the early 1920s. Most astronomers at the time believed that the distant Universe was static, as most people had believed for thousands of years. Even Einstein himself was initially reticent to accept Friedmann’s solution, but later conceded that it was correct.

“So is our Universe expanding or is it contracting? Observations by astronomer Edwin Hubble in the late 1920s found that the light from most galaxies is redshifted. Moreover, the farther a galaxy is found from our position, the more redshifted it is. The redshift implies that the galaxy is receding from ours [this is currently the accepted *mainstream* interpretation of the redshift phenomenon]. Since the recession rate is proportional to distance, this implies that all galaxies see others receding from them too -- a universal expansion. Friedmann was right -- our Universe is expanding. [Editor: Although *redshift* can also be explained by many other mechanisms¹³, there is quite a lot of scientific data to back up universal expansion according to creationist astronomer Danny Faulkner.¹⁴] Perhaps Christians should have anticipated this result in light of many Scriptural passages that seem to teach that the heavens are being stretched out, e.g., Isaiah 40:22, 42:5; 44:24, 45:12, 51:13; Job 9:8, 37:18; Psalm 103:2, Jeremiah 10:12, 51:15; Zechariah 12:1. In any case, it seems that the Bible anticipated the discovery of Hubble, Friedmann, and others by several thousand years.

“The geometry of space time is determined by the rate of expansion and the average density. The density of the Universe is the mass in a particular region of space divided by the volume of that region. The density can vary tremendously from place to place. But on the largest scale, the density is thought to be basically uniform -- the assumption of homogeneity. [However, a homogeneous Universe cannot

13. Marmet, Louis, *On the Interpretation of Spectral Red-Shift in Astrophysics: A Survey of Red-Shift Mechanisms - II*, 2018, pp. 1-55, PDF only; http://personalpages.to.infn.it/~zaninett/projects/storia/Marmet_2018.pdf. (59 different mechanisms are discussed)

14. Faulkner, Danny R., *The Case for Cosmological Redshifts*, *Answers Research Journal*, (2018), 11:31-47. https://assets.answersingenesis.org/doc/articles/pdf-versions/arj/v11/cosmological_redshifts.pdf



form stars and planets by the laws of physics, but small differences in densities in a slightly non-homogenous Universe can, but only over billions of years!] Friedmann found that the geometry of the Universe would fall into one of three categories depending on the cosmic density and expansion rate. But he did not know what the average density of the Universe is, nor the expansion rate. So he published three solutions, leaving the density as an unknown parameter. The three solutions are called *open*, *closed*, and *flat*.

“If the density of the Universe is high compared to its rate of expansion, then the *closed* solution applies. In this case, the geometry of spacetime is a bit like a sphere. So if we were to construct a cosmically large triangle, we would measure the internal angles as adding to more than 180 degrees-- just like a triangle painted on a sphere. In a closed Universe, initially parallel lines eventually intersect, just like the longitude lines on a sphere intersect at the poles, though they are parallel at the equator. Imagine a giant spherical region of our Universe containing many galaxies. If the galaxies are equally distributed, you might expect that doubling the radius (r) of the sphere should result in *eight times* as many galaxies in the new larger sphere since the volume goes up as r^3 . But in a closed Universe, the new sphere will have somewhat less than this.

“In addition to the geometrical effects, the density to expansion rate ratio also affects the dynamics of the Universe. In a closed Universe, the gravitational attraction between all the galaxies is ‘larger’ than the outward rate of expansion. The result is that gravity will eventually halt the expansion, and the Universe will begin to collapse. A closed Universe *cannot* last forever.

“Conversely, if the density of the Universe is low compared to its rate of expansion, then the Universe is said to be *open*. The geometry of spacetime can be compared to a saddle. If you draw a triangle on a saddle and measure its internal angles, you will find that they add to *less* than 180 degrees. So a cosmically-large triangle in an open Universe will likewise have less than 180 degrees. In an open Universe, initially-parallel lines will diverge. A cosmic sphere with twice the radius of another one will contain *more* than 8 times the number of galaxies. In an open Universe the expansion rate is larger than the gravity of all the galaxies; so the Universe will continue to expand forever.

“Exactly between these two cases is the ‘flat’ Universe. In this case, the density of the Universe exactly matches the expansion rate. The Universe expands at exactly its own escape velocity. Geometry behaves “normally” in a flat Universe; all triangles have exactly 180 degrees, and a giant sphere that is twice the radius of another one will contain eight times as many galaxies. Parallel lines neither intersect nor diverge, but remain exactly parallel. In a flat Universe the expansion rate exactly matches the combined gravity of the galaxies, so that gravity will constantly slow the expansion, but never quite stop it.

“In physics, density is usually represented by the lowercase Greek letter rho (ρ). For a given expansion rate, the cosmic density necessary to make the Universe flat is called the critical density (ρ_c). The ratio of the actual average density of the Universe (ρ) to the critical density is called the *density parameter*, and is symbolized by a capital omega (Ω). So by definition, $\Omega = \rho/\rho_c$. For a flat Universe $\Omega = 1$. For a closed Universe $\Omega > 1$. And for an open Universe $\Omega < 1$.

“THE PHYSICS OF EINSTEIN: THE REAL UNIVERSE, DARK MATTER, AND DARK ENERGY

“So which solution applies to our Universe? To find the answer we need to measure the expansion rate of our Universe, and then measure the average density. Astronomers have been able to measure the expansion rate of the Universe with decent accuracy by comparing the distances to galaxies with the corresponding redshift.¹⁵ The expansion rate is approximately 70 (km/s)/Mpc¹⁶ The units are *kilometers per second per megaparsec*. A parsec is 1.917×10^{13} miles [or 3.26 million light years]. This rate means that if two galaxies were separated by 1 Megaparsec (1 million parsecs), then the galaxies would be moving away from each other by 70 kilometers per second due to the expansion of the Universe. This expansion rate is called the Hubble constant and is designated by H_0 . The zero subscript indicates that this is the expansion rate at the present time; recall that gravity is constantly slowing the rate of expansion over time.

“The average density of the Universe is much more difficult to estimate. We can estimate the number of stars in a galaxy, and we can measure the gas and dust which also contribute to a galaxy’s mass. We then multiple this by the number of galaxies in a volume of space. If so, we would find that $\Omega = 0.04$. This is much less than one, so the Universe is open, it would seem, at first glance.


“Not everything is space glows, or reflects light, or gives evidence of its existence by blocking the light of other objects. Some mass might be undetectable by telescopes; dark compact objects or massive particles that do not interact strongly with matter: *dark matter*. If dark matter exists, such undetectable mass will contribute to the cosmic density, and invalidate our previous estimate of Ω . But how can we possibly detect mass that is practically invisible? Even invisible mass produces a gravitational effect on other visible mass. Therefore, by measuring the motion of visible objects, we can compute the pull of gravity on them, and deduce the total mass of the system.

“When we apply such computations to the motion of stars in galaxies, and the motions of galaxies in clusters, we find that $\Omega = 0.27$. So the Universe is still apparently *open*, yet the density is higher than we would have suspected by counting only visible objects. What is remarkable is how much higher the new estimate is! If the number is to be believed, then there is actually far more dark matter in the Universe than visible matter, about six times more. It is humbling to think that with all we know about astronomy, we have not yet even detected that which makes up most of the Universe.

“But things become even stranger when we consider geometric effects. Recall that the curvature of spacetime causes geometry to deviate from what we normally expect. The internal angles of triangles do not necessarily add to 180 degrees, and doubling the radius of a sphere does not necessarily result in capturing eight time more volume.

15. However, it is interesting and important to note that Hubble, even up to his final lecture before the Royal Society, always held open the possibility that the redshift did not by necessity mean velocity of recession, i.e., expansion of the Universe, but might be caused by something else.

16. The most recent rate by Cepheid variable luminosity (as of December 15, 2020) is 72.3 km/s/Mpc <https://arxiv.org/abs/2012.08534>, and by Tip of the Red Giant Branch luminosity (as of Jul 1, 2021) is 67.4 km/sec/Mpc <https://arxiv.org/pdf/2106.15656.pdf>.



Therefore, it is also possible to estimate Ω by observing how geometry works on cosmic scales.

“When we use geometric techniques to estimate the density parameter (Ω) we find that it is very nearly 1, in which case the Universe is flat. But how can this be, since the matter in the Universe, both visible and dark, contributes only 0.27 to Ω ? Where is the remaining 0.73 coming from?

“It could be that spacetime itself plays a role. If spacetime exerts a sort of *pressure*, it could accelerate cosmic expansion, and produce the very geometric effects that we observe. This property of spacetime is called the *cosmological constant*, and is denoted by the Greek uppercase lambda (Λ). If Λ has any value other than zero, it will curve spacetime, much the way matter does. But what mechanism could possibly cause such a gravitational repulsion?

“One possibility that physicists have proposed is that spacetime itself has energy. Since $E = mc^2$, This energy will necessarily have mass. Mass produces a gravitational effect, curving spacetime. The idea that empty space has non-zero energy is called *dark energy*. Since dark energy (if it exists) is a property of spacetime, it is the same everywhere. Thus, it will produce no net gravitational attraction on visible bodies. This explains why it cannot be detected by observing orbital motions, the way dark matter can.

“But Einstein’s equations indicate that dark energy would exhibit a type of outward pressure, which would actually tend to accelerate the expansion of the Universe rather than halting it. Whether expansion of the Universe slows or accelerates will depend on the exact ratio of dark energy to *ordinary* mass. The details are beyond the scope of this text. But it is interesting that most astronomers now believe that the Universe is essentially flat, and that ordinary matter comprises only about 4% of the density of the Universe. Whether this turns out to be correct, only time will tell.

“THE PHYSICS OF EINSTEIN: A BIG BANG?”

“So far, all that we have discussed is good science. We have moved from the well-established principles (such as the basic tenets of general relativity), to reasonable inferences (such as dark matter), to the more tentative (such as dark energy). This is science because it is testable and repeatable in the present. As we devise new experiments and observations, it is likely that we will eventually either confirm or refute ideas like dark energy. But some people have suggested that general relativity proves, or at least implies, that the Universe started in a *big bang*, 13.8 billion years ago. This is not true, nor is it scientific. But it deserves some discussion.

“In 1927, when Lemaître proposed the idea that the Universe was expanding, he assumed that it had been created with size at some time in the past, and that it was now a bit larger due to such expansion. This is probably correct, and is what most creation scientists believe today. But Lemaître had a philosophy of *methodological naturalism*. This is the belief that scientists should ignore God in any scientific discussion; that they should do research as if they were atheists, regardless of whether or not God actually exists. Such a philosophy is contrary to Scripture of course. The Bible indicated that God constantly upholds His creation (cf. *Hebrews 1:3*). Science is possible only because God has chosen to uphold the Universe in a consistent and law-like fashion.

“But Lemaître, though he believed in God, began

contemplating the evolution of the Universe from a standpoint of naturalism. If God had not supernaturally created the Universe in the past, then we might be tempted to extrapolate the Universe’s present rate of expansion back to a time prior to creation. This was exactly what Lemaître reasoned. He supposed that the expansion of the Universe might be extrapolated back to a time when the Universe had essentially no size at all! In 1931 he published this idea, that the Universe had sprung from a point, many millions of years ago. This was a preliminary version of a model we now call *the big bang*.

“**First we note that Lemaître’s supposition is not observational science.** It is not something that can be tested or observed in the present. We cannot repeat the origin of the Universe, or directly see if it was ever compressed into a point. Such suppositions lie beyond the scope of the scientific method [nor can we assume that if the expansion happened, that it expanded at the same rate through all those years].

“**Second, it is important to note that the big bang is not something that we could conclude from the science of general relativity without the additional assumption of naturalism. There is nothing in Einstein’s field equations that requires the Universe to have started from a point or to be billions of years old. And nothing in general relativity is inconsistent with the biblical history that God supernaturally created the Universe a few thousand years ago.**

“So it would be a big mistake to claim that general relativity proves or implies a big bang. It doesn’t. It is the *assumption of naturalism* coupled with the (correct) observation that the Universe is expanding that leads some people to assume that the Universe started as a point. But there is no scientific reason to believe this. And there are very good scientific reasons to doubt the big bang.”¹⁷

REDSHIFTS AND EXPANSION OF THE UNIVERSE


As mentioned above, redshifts are favored to be due to the expansion of the Universe. However, that it is still a debatable issue in cosmology has been noted by Dr. Teppo Mattsson of the Helsinki Institute of Physics, University of Helsinki, Finland, in 2009:

“**Understanding the physical origin of the perceived accelerated expansion of the Universe has been described as one of the greatest challenges in theoretical physics today.** The standard conception has been that it is because 75% of the energy in the Universe consists of mysterious dark energy with large negative pressure that give rise to repulsive gravity. However, the enormous fine tuning needed to explain both the size and timing of such an energy component has raised serious doubts about its correctness and thus motivates the search for alternatives.”¹⁸

As of 2018 alternative red-shift mechanisms have been systematically listed and analyzed by Dr. Louis

17. Lisle, Jason, *The Physics of Einstein: Black Holes, Time Travel, Distant Starlight, E=mc²*, Biblical Science Institute, Aledo, TX, 2018, pp. 176-183.

18. Mattsson, Teppo, Chapter 1, *Introduction, in Acceleration of the Cosmological Expansion as an Effect of Inhomogeneities*, (Ph.D. Thesis), Helsinki Institute of Physics, University of Helsinki, Helsinki, Finland, 2009, p. 2 of 67. http://personalpages.to.infn.it/~zaninett/projects/storia/Marmet_2018.pdf



Marmet of York University, Toronto, Canada. His detailed 2018 paper focuses on 59 mechanisms giving quantitative descriptions to explain the spectral red-shift of distant astronomical objects for the purpose of quantitative comparisons. A description is given for each mechanism including its properties, limits of applicability, functional relationships, and comments. Some of these mechanisms may only be relevant to exceptional situations in astronomy such as the solar limb red-shift or the red-shift of quasars in contrast to cosmological accelerated expansion. Marmet classified these 59 red-shift mechanisms into 7 categories based on how space, time, matter, and light might combine to produce the redshift [listed by *Section* number]:

- §3. **TIME-DEPENDENT DISTANCE OR METRIC OF SPACE:** 5 mechanisms including the Doppler Effect and the *Standard model* (lambda cold dark matter Λ CDM model) of cosmology;
- §4. **TIME-DEPENDENT PROPERTY OF GRAVITY:** 2 mechanisms;
- §5. **TIME-DEPENDENT PROPERTY OF MATTER:** 3 mechanisms including the Quasi Steady State Cosmology of Arp;
- §6 **TIME-DEPENDENT PROPERTY OF LIGHT OR AN INTERACTION OF LIGHT WITH ITSELF:** 20 mechanisms including interactions between photon energy and the vacuum of space, as well as varying-speed-of-light hypotheses;
- §7. **TIME-INDEPENDENT GEOMETRY OF SPACE AND TIME:** 6 mechanisms including non-Euclidean geometry of space;
- §8. **TIME-INDEPENDENT PROPERTY OF A FIELD, GRAVITATIONAL OR OTHER:** 8 mechanisms;
- §9. **INTERACTION BETWEEN LIGHT AND MATTER:** 15 mechanisms including Zwicky's 1929 *tired-light* theory, and interactions with intergalactic gas.¹⁹

Because of the wide range of conditions under which redshifts are observed, Marmet cautioned that more than one of the above mechanisms may be operative in any given situation. However, there are so many different mechanisms proposed for redshift besides the accelerated expansion of the Universe, how can we know which one or ones are correct in a given situation? Marmet provided a reasonable approach to the answer:

“An important question is how can one determine if one theory is better than another. The answer to this is not easy to obtain and **is highly dependent on personal preferences!** However, one necessary first step is to have quantitative predictions from all the theories to be compared. **A closer agreement with experimental data is certainly a step in the right direction, but not a sufficient condition to accept a theory** ... Some other desirable properties of a *scientific theory* are that it has few adjustable parameters, no *ad hoc* hypothesis, does not contradict existing observations, and can be confirmed or refuted experimentally with repeatable

19. Marmet, Louis, *On the Interpretation of Spectral Red-Shift in Astrophysics: A Survey of Red-Shift Mechanisms - II*, 2018, pp. 1-55, PDF only at http://perso.This.nalpages.to.infn.it/~zaninetti/projects/storia/Marmet_2018.pdf

measurements.”²⁰

The other *desirable properties* listed here of a scientific theory explains why creation theories are not usually considered “scientific” by scientists with a bias of *methodological naturalism*. They have a philosophical bias against creation and a Creator and would consider such theories to be *ad hoc* hypotheses.

Creation scientist Danny Faulkner believes there is a very good scientific case for redshifts being due to expansion of the Universe, as does Dr. Jason Lisle. He cites the tremendous amount of data accumulated over the past 50 years in support of the redshifts of quasars also being *cosmological*²¹. Although he cautions that the most straightforward interpretation of the Hubble relationship between red-shift and distance is the expansion of the Universe, it is not direct proof for it. However, no alternative explanations have eclipsed it:


“If the universe is not expanding, then it remains a mystery why the Hubble relation appears to describe the universe very well. Before Hubble's discovery, cosmologists who had applied general relativity to the universe had anticipated expansion. General relativity predicted that in the general case, the universe was either expanding or contracting. It was a matter of observation to determine which possibility was the correct description of the universe. Therefore, denial of the expansion of the universe interpretation of the Hubble relation amounts to a denial of general relativity.”²² [or just denial of the current standard lambda cold dark matter model (Λ CDM).]

Dr. Faulkner further emphasizes that belief in the expansion of the Universe does not inevitably lead to the *big-bang* model of cosmology -- the latter of which creationist cosmologists are extremely wary. Indeed the *steady-state model* in vogue prior to the *big-bang model* also relied upon an expanding Universe. Consequently, he cautions creationist cosmologists not to reject the observational data that support expansion. Rather, he has noted that there are many cosmologies that could explain an expanding Universe. Secondly, Dr. Faulkner believes that the Hubble's Law is so well supported by observational data, that outright dismissal of the Hubble relation is not an option. And at this time it appears to him to be the only viable explanation. He further believes that rejection of that interpretation amounts to a rejection of Einstein's Theory of General Relativity, one of the most successfully tested theories in the history of science. So, if the Universe is expanding, then it follows that the red-shifts of extragalactic objects are *cosmological*. The *big-bang* is just one possible expanding model of cosmology.

20. Marmet, *ibid.*, pp. 1-2.

21. Here, the term *cosmological* refers to the belief that the Universe is expanding and that red-shifts accurately indicate distance.

22. Faulkner, *ibid.*, p. 44.



As an example of not abandoning good data, Dr. Faulkner reviewed the recent history of Active Galactic Nuclei (AGN), the compact centers of galaxies that have a much higher luminosity than normal. He noted that it now appears that the distinction between quasars and *normal galaxies* is really a matter of degree, quasars representing the extreme high energy end of the spectrum, and normal galaxies representing the lower end of the spectrum -- they are both on a continuum. But because this could easily be interpreted in an evolutionary manner, he strongly encourages creationist scientists to develop better alternative cosmology models and not discount good scientific data.²³

REDSHIFTS NOT DUE TO EXPANSION OF THE UNIVERSE

However, the conclusion that redshifts are due to cosmological expansion is strongly contested by proponents of non-Euclidean Lobachevsky geometry^{24,25,26}, who contend that *redshifts* are due to the curvature of space, and that Einstein's *cosmological constant* (Λ) represents that slight degree of curvature. This non-Euclidean hyperbolic geometry of space results in progressive *redshift* the further one looks out into the distant reaches of the Universe. In other words the *Hubble constant* is actually a measure of the Gaussian curvature of the Universe and not expansion:

"Hubble's law describes a uniformly expanding flat universe. Hubble's law doesn't explain why distant objects were receding fastest. There is an approximately linear relationship between redshift and distance at small scales for all the FLRW models, and departures from linearity at larger scales can be used to measure *spatial curvature*. Locally the spacetime is flat. For distant objects, the imprint of the curvature is significant, where the spacetime does no longer remain flat. The redshifts from such distant objects increase according to the increase in the curvature of the hyperbolic spacetime. The cosmological (gravitational) redshift can be interpreted as a degree of the hyperbolicity of the curved spacetime."²⁷

It is to be noted that Louis Marmet included hyperbolic geometry as a red-shift mechanism under his category §7 TIME-INDEPENDENT GEOMETRY OF SPACE AND

TIME as listed above. Nevertheless, the theory has not gained much traction in the literature, perhaps because of the unfamiliarity of most astronomers with the complexities of Lobachevskian geometry.

Eric Lerner, the author of *The Big Bang Never Happened* (1991), a champion of plasma cosmology, and drafter of the *Open Letter to the Scientific Community* mentioned earlier by Hieromonk Damascene on page 2a above, is an independent researcher and the founder, president, and chief scientist of Lawrenceville Plasma Physics, Inc. He believes that the astronomical observations of the size and surface brightness of galaxies contradict the predictions of an expanding universe and that there is ample data to support a static, non-expanding universe model.^{28,29} He is thus another voice of scientific opposition to the standard model of an expanding universe.

Australian creationist physicist Dr. John G. Hartnett has evolved from his earlier time dilation model of the Universe and speculated on a new cosmological redshift mechanism due to *tired light* (different from Zwicky's *tired light* which was due to gravitational drag)³⁰ in a finite, created, bounded, non-homogeneous, isotropic *static yet unstable*, 6,000 year old earth centered Universe. He believes that the Universe was initiated by God, but not as a dimensionless point, a *singularity*, as Dr. Stephen Hawkins has proposed, or as an incredibly dense and tiny mass. He believes it was created in an inherently unstable condition [reflecting the תהו ובוהו *tohu v'bohu*, *astonishingly empty/desolate and void/empty; chaotic and confused* Hebrew description of creation in Genesis 1:2] and upheld solely by God's sustaining power, which was withdrawn following Adam's sin. Since then he believes the whole Universe has been inexorably headed for collapse and total destruction since God subjected the whole Universe to the curse as well as on Adam, Eve, and the serpent. With the known laws of thermodynamics, especially that of entropy, now in play, the Universe is *waxing old*, and as part of that,

23. Faulkner, *ibid.*, p. 45.

24. von Brzeski, J. G., *Expansion of the Universe -- Mistake of Edwin Hubble? Cosmological Redshift and Related Electromagnetic Phenomena in a Static Lobachevskian (Hyperbolic) Universe*, *Acta Physica Polonica B*, (2008), 39(6):1501. <https://www.actaphys.uj.edu.pl/fulltext?series=Reg&vol=39&page=1501>

25. von Brzeski, George. and von Brzeski, Vadim *Misconceptions of Universe Expansion, Accelerated Universe Expansion, and Their Sources. Virtual Reality of Inflationary Cosmology*, *Journal of Modern Physics*, (2018), 9:1326-1359. <https://doi.org/10.4236/jmp.2018.96081>.

26. Mabkhout, Salah, *the Cosmological Redshift Manifests the Curvature and Interpreted as a Degree of Hyperbolicity of the Spacetime*, *Journal for Foundations and Applications of Physics*, (2016) 3(1), p. 33, <https://www.academia.edu/28389841>.

27. *Ibid.*

28. Lerner, Eric J., and Scarpa, Riccardo, *UV Surface Brightness of Galaxies from the Local Universe to $z \sim 5$* , *International Journal of Modern Physics D*, (2014) 23(6), May, at <https://www.researchgate.net/publication/262071666>

29. Lerner, Eric J., *Observations Contradict Galaxy size and Surface Brightness Predictions that are Based on the Expanding Universe Hypothesis*, *Monthly Notices of the Royal Astronomical Society*, (2018) 477:3185-3196, <https://www.researchgate.net/publication/323957149>

30. Zwicky, Fritz, *On the Red Shift of Spectral Lines Through Interstellar Space*, *Proc. Nat. Acad. Scien. U.S.A.*, (1929), 15(10): 773-779. <https://www.pnas.org/content/pnas/15/10/773.full.pdf> In Zwicky's model, photons passing near a mass are deflected. They transfer momentum and energy to the mass. The photon changes its energy and therefore its frequency and wavelength.

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photons began losing energy from the time of their creation about 6,000 years ago. In other words, he believes that the photons' interaction with the vacuum of space during their flight causes photon energy loss resulting in a corresponding lengthening of the photon's wavelength, i.e., an incremental *red-shift*. If true, we would need to add a 16th mechanism to Marmet's classification of Red-Shift as a new subtype §9.16.³¹

Dr. Hartnett based his theory in part on a 2013 paper by Urban *et. al.*,³² which theoretically provides support for the idea that the finite speed of light (c) is determined by an interaction with ephemeral particles in the quantum vacuum at the sub-atomic Compton wavelength energy scale. The photon travels at infinite speed between interactions with fermion³³ pairs in the vacuum, which slow its progress.³⁴ Dr. Hartnett believes that this interaction impedes the speed of the photons and causes a minuscule loss of energy to the vacuum of space itself, but does not deflect the photons from their straight paths. That minuscule energy loss accumulates along their very long path to earth from their distant cosmic sources, thus resulting in the red-shift.

In summary, although the majority of astronomers and physicists believe that observed red-shift is due to

expansion of the Universe, a few cosmological "jurors" are still holding out against that verdict.

The team leaders of the Webb Space Telescope project hope to be able to persuade some of these "holdouts" to accept the standard consensus Λ CDM model view. This telescope, launched Dec 25, 2021,³⁵ is a honeycomb array of 18 hexagonal gold-surfaced beryllium-mirror segments which will unfold and assemble a million miles out in space to 6.5 meters (21 feet) in diameter. It is designed to capture infrared and microwave radiation with a 100-fold greater resolution than the Hubble Space Telescope.³⁶ University of Chicago astronomer Dr. Wendy L. Freedman, head of the Λ CDM consensus model team, will more closely evaluate cepheids and other stars in hopes of much more precisely measuring the Hubble expansion rate. This team believes that space should be expanding more slowly than the value obtained from the Super Nova Ia cepheid data obtained by Adam Riess' Johns Hopkins University team in late 2020.³⁷ The Webb Space Telescope will also be looking more closely at the Cosmic Microwave Background Radiation (CMBR). Results are expected beginning in July 2022.

✠ ✠ ✠ **NEXT ISSUE: CMBR: ITS INTERPRETATION AND IMPORTANCE IN COSMOGENY**

31. Marmet, p. 45.

32. Hartnett, John G., *Speculation on red-shift in a Created Universe*, *Answers Research Journal*, 2015, 8:77-83 <https://assets.answersingenesis.org/doc/articles/pdf-versions/arj/v8/red-shift-in-created-Universe.pdf>

33. Fermions are matter particles. Bosons are force particles.

34. Urban, M., Couchot, F., Sarazin, X., and Djannati-Atai, A., *The quantum vacuum as the origin of the speed of light*, *European Physical Journal D*, 2013, 67(3), pp.58-63. <https://arxiv.org/pdf/1302.6165.pdf>. Challenge to, see <https://www.researchgate.net/publication/260940416>. Rebuttal see <https://link.springer.com/article/10.1140/epjd/e2013-40464-y>

35. NASA's Webb telescope launches to see first galaxies, distant worlds, *Science Daily*, December 25, 2021, <https://www.sciencedaily.com/releases/2021/12/211225074846.htm>

36. Wolchover, Natalie, *The Webb Space Telescope Will Rewrite Cosmic History. If It Works*, *Quantamagazine*, Dec 3, 2021, <https://www.quantamagazine.org/why-nasas-james-webb-space-telescope-matters-so-much-20211203/>.

37. Riess, Adam G., Casertano, Stefano, Yuan, Wenlong, *et.al.*, *Cosmic Distances Calibrated to 1% Precision with Gaia EDR3 Parallaxes and Hubble Space Telescope Photometry of 75 Milky Way Cepheids Confirm Tension with Lambda CDM*, *Astrophysical Journal Letters* (2021), 908:L6, Feb 10, pp. 21, pdf at <https://robots.iopscience.iop.org/article/10.3847/2041-8213/abdbaf>