

Proposed Explanations for Apparent Age of the Universe in a Creationist Framework

Part II: White Hole Cosmology

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Here we give the technical details of the second of two principal approaches of Creationist thinkers to account for the apparent great age of the universe. Problems with this approach are also discussed. This is the make-or-break issue for Creationism, because an old universe undermines the entire Creationist explanatory paradigm, but leaves the other schools intact. And correspondingly a young universe demolishes Neo-Darwinism and Meta-Darwinism. (Intelligent Design survives under either hypothesis). The following material is rather technical in nature, and for that reason and on account of its length, it was not included in the book. It is, however, important for a thorough understanding of the Creationist position. Creationists may in the future come up with additional explanations, or modify those discussed here to deal with objections. In that case, this text will be revised.

Approach 2: White Hole Cosmology

This theory takes as its starting point modern cosmology, and in particular, Big Bang theories based on General Relativity. The propounder of the White Hole Cosmology theory, Dr. Russell Humphreys, examined the premises of the usual versions of the Big Bang theories, and noticed that there is one premise which is not actually based on direct observations, but postulated as a "reasonable" assumption (Humphreys calls it "arbitrary"). It is the "Cosmological" or "Copernican" principle: the universe is spatially homogeneous and thus has no boundary, i.e., no edges and no center. According to this principle, the universe itself expands along with matter.

What is the justification for this assumption? Observationally, matter (galaxies) appears to be distributed evenly around us, averaged over a large enough scale. In addition, the cosmic background radiation appears to come uniformly from all directions in space. It is based on the inference that if there were a boundary, we would not see matter (galaxies) distributed evenly around us:

...[W]e are not able to make cosmological models without some admixture of ideology. In the earliest cosmologies, man placed himself in a commanding position at the center of the universe. Since the time of Copernicus we have been steadily demoted to a medium sized planet going round a medium sized star on the outer edge of a fairly average galaxy, which is itself one of a local group of galaxies. Indeed we are now so democratic that we would not claim our position in space is specially distinguished in any way. We shall...call this assumption the *Copernican Principle*. A reasonable interpretation of this

somewhat vague principle is to understand it as implying that, when viewed on a suitable scale, the universe is approximately spatially homogeneous.¹

In point of fact, the postulated homogeneity has never actually been confirmed; observations at larger and larger distance scales keep turning up larger and larger structures, with stars giving way to galaxies, which in turn have become part of galaxy clusters, and these yielding to a “Great Attractor”, dethroned by a “Great Wall”. Clustering on scales of the order of a thousand megaparsecs* has now been confirmed.² The significance of this is unclear; but despite the lack of confirming observations, homogeneity is still assumed by most cosmology theorists.³ As suggested above, it is based on the general “sameness” of the universe, no matter where we look, something referred to as “isotropy”. An observer could travel to any part of the universe, and would find the same approximate density of matter; thus, there would be no boundaries or edges where things change. Such a cosmos is said to be “unbounded”. The standard Big Bang model is based upon this postulated homogeneity; matter uniformly fills all space at all times. Since this always holds, it means that even at the beginning point (the singularity event of the Big Bang), there was never any empty space surrounding the matter of the universe, despite the fact that the universe is expanding. While this may seem counterintuitive (the average person assumes the universe is expanding out into empty space) it is an integral assumption of the standard Big Bang cosmology and has its implications. According to Humphrey:

Since there would never be any empty space around the matter, there could never be a boundary around the matter. Lacking such a boundary, we could never determine a unique center, such as a center of mass, inside it.⁴

Such a cosmos is said to be “unbounded”. Combining an unbounded cosmos with observations that the cosmos has expanded will yield Big Bang cosmologies as we know them and a universe without a unique center.⁵

Now, isotropy and unboundedness indeed follow if the universe is proven to be homogeneous, as the standard Big Bang cosmology implies. However, the converse is not necessarily true; that is, isotropy does not imply that the universe is homogeneous. One therefore does not have to start with the assumption of homogeneity that drives the standard Big Bang cosmology. The isotropy or sameness could be due to something else, and it is here that Creationists find an opening:

...[W]hat if we begin our calculations with the opposite assumption, equally scientifically valid, namely that matter in the universe *has* a center and an edge (is bounded)? This makes more sense and is also Scripturally far more appropriate. When we feed in this, plus the same observations, into General Relativity, quite a different cosmology falls out.⁶

In this case, isotropy follows not from homogeneity, but from the privileged place of earthbound observers, viz., near the center of the universe. The significance of this assumption is that allows Creationists to solve the problem of the “old” universe within the context of General Relativity. The argument proceeds in the following manner:

* A megaparsec is 3.26 million light years.

1. When the visible universe was smaller than at present by a factor of 50, it would either be in a black hole* or a white hole, due to the extremely high density of matter. Therefore it was inside an event horizon.†
2. Since it would be contracting if it were in a black hole, it must have been in a white hole, since the universe has expanded.
3. At the present density, an event horizon can no longer exist because the density of the universe is too low, which implies that at some point in the past it shrunk to zero radius.
4. Therefore, if the universe is bounded, at some point in the past it must have expanded out of the white hole.
5. Due to gravitational time dilation, time slows down as one approaches an event horizon, and effectively stands still at the horizon.
6. If the event horizon crossed the earth's surface at the appropriate time, hypothesized to be the beginning of the fourth day of Creation Week (cf. Genesis 1:14-19), then billions of years of time would go by for the rest of the universe, while only a few hours transpired on earth. Thus the universe would appear to men on the earth more or less as it does now, even though the earth itself was only a few days old (as measured by earth clocks).

The difference between the two cosmologies is illustrated in Figure C-6. Humphreys summarizes the situation as follows:

The main point is that according to GR, *time effectively stands still at the event horizon*. Clocks and all physical processes at that location are stopped, and near that location they run very slowly (relative to clocks away from it). We have already shown how the scientific evidence indicates that the universe (with the earth roughly at its center) must have expanded out of a white hole which no longer exists. This means that the event horizon shrank down to zero...*If you were standing on the earth as the event horizon arrived, distant objects in the universe could age billions of years in a single day of your time. And there would be ample time for their light to reach you.*⁷ [some italics added]

* A “black hole” is an entity whose existence is predicted by the General Theory of Relativity. It is a place where the high density of matter creates such intense gravitational fields that even light cannot escape; thus the hole cannot be directly seen. However, matter in its vicinity is sucked into it, often reaching very high velocities in the process, and giving off considerable radiant energy. The “event horizon” of a black hole is the point of no return, so to speak; that boundary around the whole from which, once crossed, there is no escape. It is a sphere whose radius is known as the “Schwarzschild radius”, which depends on the mass of matter within the hole. Due to quantum mechanical effects, Hawking has shown that black holes will eventually evaporate, as a result of what is known as “Hawking radiation”. A “white hole” is a black hole running in reverse: nothing can enter it, and all light is reflected off of it; hence its name.

† Note that according to the standard Big Bang cosmologies, the universe, being unbounded, never was in a black hole (or white hole).

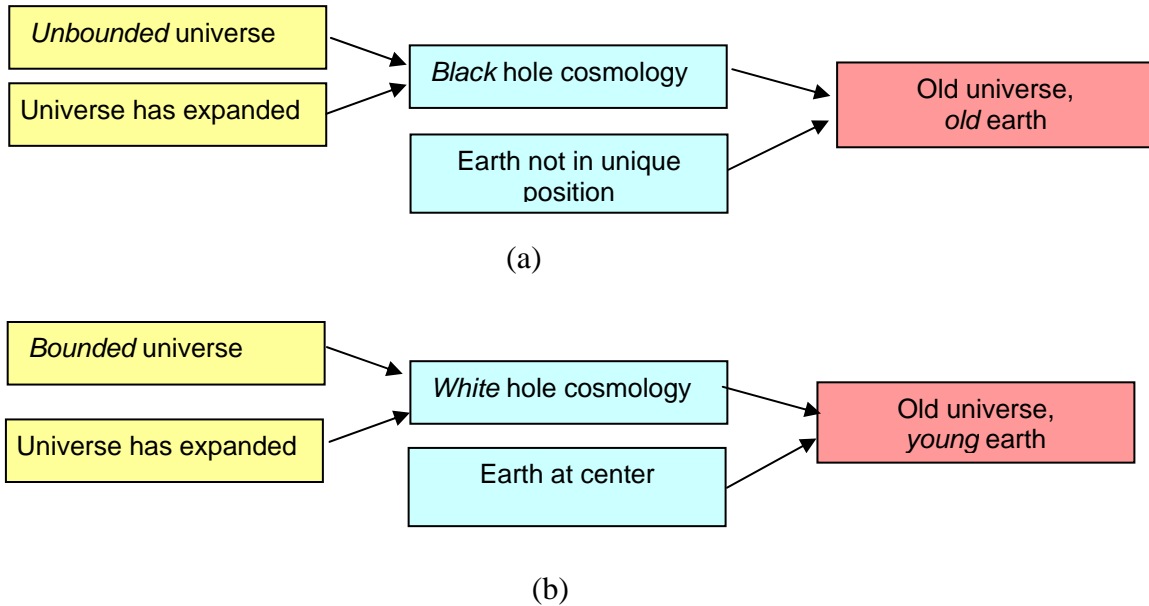


Figure C-6. Difference between standard or black hole cosmologies, and Creationist white hole cosmology.

Actually, Humphreys has not quite nailed down item 6 above; it appears that he needs a fairly large value for the famous “cosmological constant” Λ , the “tension” of space-time, which has been the object of speculation for decades. As yet, in addition, he does not seem to have a closed-form solution of the necessary relativistic equations with a non-zero value for Λ . So item 6 above is still a tentative conclusion. Humphreys goes on to speculate that the original matter created by God was water; but that goes beyond the scope of this analysis.*

Humphreys’ idea that the Universe expanded from a white hole has some support from theoretical researchers outside of the Creationist movement. Recently, two researchers published an article suggesting that the universe *did* have a center and that it *is* emerging from a white hole.⁸ Unlike Humphreys, they see no need to postulate that the earth occupies the center of the universe, since there is no data to support that claim. In addition they believe the event horizon still has yet to pass the earth and would therefore also dispute claim (3) made by Humphreys. Note that having the event horizon pass earth on the fourth “day” of creation is integral to the success of Humphreys’ theory. This is a critically important point; a white hole cosmology *by itself* does not solve the age of the universe problem. In fact, other highly controversial and experimentally unverified (some are unverifiable) assumptions must be made.

Furthermore, if the earth really is at the center of the universe, and the universe is bounded, there will be some differences between predictions of Humphreys’ theory and the standard models. However, Humphreys stops short of making any definitive predictions based on his theory. He only hypothesizes that certain well-known problems can be better explained on the basis of the white hole cosmology:

* We were unable to get a response from Humphreys on the present status of his research. In general, our experience has been that the Creationists do not appear to have much interest in speaking with those outside of their circle.

There is a good possibility that developments of this theory can explain many of the anomalies encountered by the conventional theories, such as superluminal quasar jets, proportions of nuclei found in the cosmos, vestiges of rotation in the cosmos, numbers of galaxies at large red shifts, the extraordinary uniformity of the cosmic background radiation, the extreme brightness of the universe (10^9 photos per nucleon), the cosmological constant problem, the flatness problem, and so forth.⁹

None of this, however, is adequately worked out in a form to permit up-or-down tests, so we are back to the old problem of lots of retrodiction but little prediction. Humphreys has expanded his theory in later publications, to allow for proper look-back times and other observations.¹⁰

Nonetheless, there is at least one area where significant differences may yet be observed, thanks to Noether's Principle. In 1918, German physicist Emmy Noether determined that well-known physical conservation laws, such as conservation of momentum and conservation of energy, reflect important symmetries. A violation of the conservation law entails a violation of the corresponding symmetry, and conversely. The major symmetries in question, and the corresponding conservation laws, are given in Table C-1.

<i>Conservation Law</i>	<i>Symmetry</i>
Linear Momentum	Homogeneity of Space
Angular Momentum	Isotropy of Space
Energy	Homogeneity of Time
Electromagnetic Charge	Gauge Symmetry

Table C-1. Noether's Principle, Associating Conservation Laws with Symmetries¹¹

This is important because two of the entries in the table deal with matters discussed here, namely, homogeneity and isotropy. Homogeneity and Isotropy can be understood in two senses: with respect to empty space, and with respect to the distribution of matter in space, which is what concerns Humphreys' theory. The conservation laws in question, however, refer to the structure of empty space. Now, for the standard Big Bang theories, as we discussed, space is the same in all directions in every sense, and so the distinction between the two meanings is not so important. Space is homogeneous and isotropic, empty or occupied, and thus the conservation laws will be confirmed everywhere. In the case of the White Hole cosmology, however, there may be a significant difference. If the cosmos has boundaries, then in the vicinity of the boundaries, at least, space is not likely to be either homogeneous or isotropic, in either of the two senses. If these symmetries are broken, it would imply a violation of the conservation laws there, the effects of which it may be possible to observe and measure from earth.

Humphreys has also looked for other evidence to support his theory, and one intriguing item is the quantized galaxy red shifts.¹² Over the past 25 years, observations have confirmed that in a frame of reference at rest with respect to the center of our galaxy, the Milky Way, the red shifts of observable galaxies tend to cluster around multiples of a number, ~ 37.5 km/second or ~ 71.5 km/second. These galactocentric periodicities, as they are termed, are acknowledged as real by the astronomy community, and not an artifact of data collection methods or analysis.¹³ Research on redshifts of quasars, done in the 1970s, suggests that they too could be arranged on concentric shells surrounding the earth.¹⁴ Observations such as these call for some explanation and only vague speculations about possible quantum fluctuations in the early history of the universe have so far been proposed by astronomers. The Creationists, however, see the effects as clear

evidence for a galactocentric cosmos. They chide astronomers for overlooking what they believe to be the obvious explanation:

...secular astronomers have avoided the simple explanation, most not even mentioning it as a possibility. Instead, they have grasped at a straw they would normally disdain, by invoking mysterious unknown physics. I suggest that they are avoiding the obvious because galactocentricity brings into question their deepest worldviews.¹⁵

The significance of this for the evolution debate is twofold: (1) merely the name “galactocentric” is distasteful because it implies some sort of special status for our galaxy and possibly even our solar system. But that is not the real problem, which is, rather, (2) the galactocentric explanation wreaks havoc with standard theories, which rely on the assumption that the universe does not have a center. Humphreys notes that “...the observed redshift quantizations strongly imply that the universe has a center, and that our galaxy is uncannily close to it!”¹⁶ We shall leave this matter after noting two issues: (1) The observed periodicities extend out several million light years, but not to the edge of the visible universe. Other structures appear to dominate at large distances. (2) The Creationists have not actually shown that their models can generate the observed galaxy distribution. At this point, they are still speculating on how the effect may have arisen:

If God used processes as part of His making the stars and galaxies on the fourth day of Creation, then redshift quantizations are evidence that some of the processes were spherically symmetric around our galaxy. For example, we could imagine spherical shock waves bouncing back and forth between the center and edge of an expanding ball of gas or plasma....The reverberating waves would interfere with each other at some radii and enhance each other at other radii, setting up a pattern of ‘standing waves,’ concentric shells of denser gas.¹⁷

However, if the universe is really centered around the earth or the Milky Way galaxy, then the Creationists’ position is given an enormous boost regardless of how well their models account for this structure.

Not surprisingly, there are many other problems with the theory. First and foremost, although white hole cosmology may allow for the possibility of a young earth, it does not actually resolve the issue, given its dependence on the cosmological constant, Λ , the value of which no one knows (but current estimates place it on the order of 0.6),¹⁸ on the position of the earth relative to the center of the universe, which of course no one knows, and on the time the proposed event horizon passed over the earth, an event that appears unknowable. This implies that we must await clear and testable predictions from the model in order to judge it. We note, in passing, that the Creationists often cite other astronomical evidence in favor of a young earth, including the rate of shrinkage of the sun,¹⁹ and the life of short-period comets, though such evidence furnishes no confirmation of the White Hole theory.²⁰

We leave it to the Creationists to determine how well the White Hole Cosmology accords with their belief that the account of origins in *Genesis* is a factual presentation of simple historical truths. Within white hole cosmology, the age of the Universe is not denied; stars are still billions of years old. Is this in direct contradiction to the seven-day creation account in *Genesis*?

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- ¹ Hawking, Stephen, and Ellis, George, *The Large-Scale Structure of Space-Time*, Cambridge: Cambridge University Press, 1973, p. 134.
- ² Broadhurst, *et al.* [need ref]
- ³ Gott, Richard, "Implications of the Copernican principle for our future prospects", *Nature* **363**:315-319 (1993).
- ⁴ PRESTIGIOUS JOURNAL ENDORSES BASICS OF CREATIONIST COSMOLOGY by [D. Russell Humphreys](http://www.icr.org/headlines/whiteholecosmology.html), Ph.D. Physics, <http://www.icr.org/headlines/whiteholecosmology.html>
- ⁵ Humphreys, Russell, *Starlight and Time*, Green Forest, AR: Master Books, 1993, p. 86-88.
- ⁶ *Ibid.*
- ⁷ *Ibid.*, p. 28-29.
- ⁸ Joel Smoller and Blake Temple, Shock-wave cosmology inside a black hole, *Proceedings of the National Academy of Sciences* **100**(20):11216-11218, September 30, 2003.
- ⁹ *Ibid.*, p. 127-128.
- ¹⁰ Humphreys, D. Russell, reply to comments on his theory, *Creation Ex Nihilo Tech. J.* **15**(2):47-48 (2001).
- ¹¹ Hecht, Eugene, *Physics*, Pacific Grove: Brooks-Cole, 1996, p. 6-8, 143, 299.
- ¹² Humphreys, D. Russell, "Our galaxy is the centre of the universe, 'quantized' red shifts show", *Creation Ex Nihilo Tech. J.* **16**(2):95-104 (2002).
- ¹³ Napier, N., Guthrie, B., "Quantized redshifts: a status report", *J. Astrophysics and Astronomy* **18**(4):455-463 (1997).
- ¹⁴ Varshni, Y. P., "The red shift hypothesis for quasars: is the Earth the center of the universe?" *Astrophysics and Space Science* **43**:3-8 (1976).
- ¹⁵ Humphreys 2002, *op. cit.*, p. 100.
- ¹⁶ Humphreys 2002, *op. cit.*, p. 100.
- ¹⁷ Humphreys 2002, *op. cit.*, p. 102.
- ¹⁸ Lineweaver, Charles, "A Younger Age for the Universe", *Science* **284**:1503-1507 (May, 1999).
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- ²⁰ Faulkner, D., "Comets and the Age of the Solar System", *Creation Ex Nihilo Tech. J.* **11**(3):264-273 (1997).