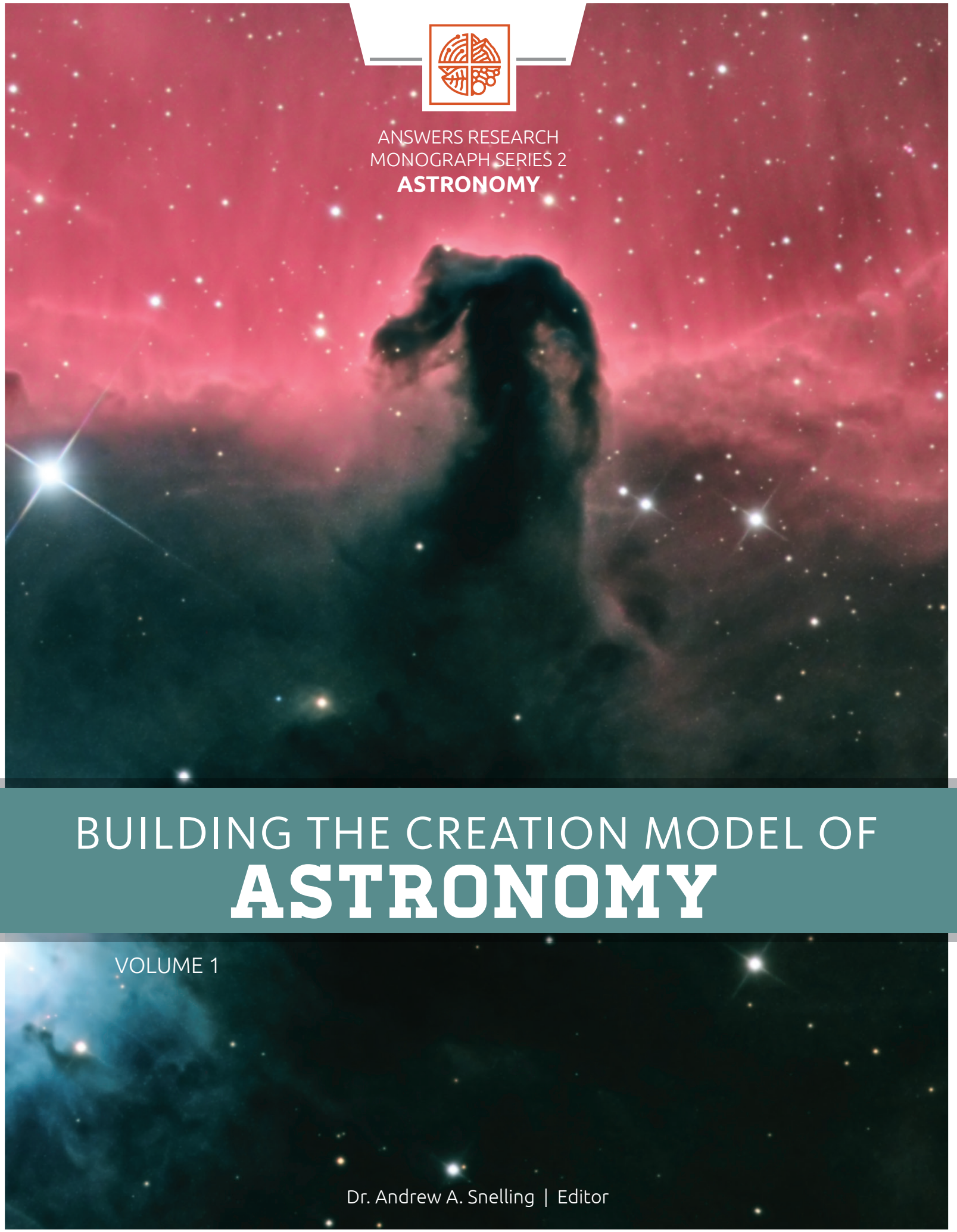

ANSWERS RESEARCH
MONOGRAPH SERIES 2
ASTRONOMY

BUILDING THE CREATION MODEL OF ASTRONOMY

VOLUME 1

Dr. Andrew A. Snelling | Editor

Building the Creation Model of Astronomy

ARMS

ANSWERS RESEARCH MONOGRAPH SERIES 1

Astronomy

VOLUME 1

BUILDING THE CREATION MODEL OF ASTRONOMY

ANDREW A. SNELLING, *Editor*

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Contents

Editor's Foreword

Since its initial publication in January 2008, the *Answers Research Journal* has existed as one of the premier professional, peer-reviewed technical journals for the publication of interdisciplinary scientific and other relevant research from the perspective of the recent Creation and the global Flood within a biblical framework. As an increasing number of quality papers have been submitted to the *Answers Research Journal* over the last several years, one of our desires has been to arrange and publish collections of many of those papers in topical formats, with the aim of providing creationists with in-depth resources on given subjects all in one place. The Answers Research Monograph Series represents the result of that desire.

Like the *Answers Research Journal*, the Answers Research Monograph Series serves to address the need to disseminate the latest original research conducted by creationist experts in the vast fields of theology, history, archaeology, anthropology, biology, geology, astronomy, and other disciplines of science, and to provide scientists and students the results of cutting-edge research that demonstrates the validity of the young-earth model, the global Flood, the non-evolutionary origin of "created kinds," and other evidences that are consistent with the biblical account of origins. Most of the papers contained in the Answers Research Monograph Series began as contributions to the Answers Research Journal, though some of the articles to be published are original to this series.

It is our sincere hope that the Answers Research Monograph Series, like the Answ*ers Research Journal*, proves a blessing to creationists as they endeavor to defend the literal account of the early chapters of Genesis and as they seek to uphold biblical authority on every issue with which they engage.

Dr. Andrew A. Snelling
Petersburg, Kentucky
October, 2021

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Wayne grew up in a home where his Father was an atheist and his Mother was a Christian. As a young man, Wayne was an agnostic until personal crises led to his conversion to Christianity at age 20. Wayne has seen God's grace effect great change in his life and that the Bible is a completely trustworthy source of answers for our lives.

Beyond Distant Starlight: Next Steps For Creationist Cosmology

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Abstract

The question of how distant starlight can be seen in a young universe has received much attention within creationist research. But creationist cosmological models need to explain much else in addition to the passage of light across vast distances. On both large and small cosmic scales there is a diverse range of trends, patterns, and phenomena that beckon some kind of explanation. Many of these can be understood plausibly within the framework of the standard "big bang" cosmology. But few attempts have been made to integrate them into a model for a young universe. After surveying the astronomical evidence I discuss various avenues that creationist cosmology could profitably pursue in facing this challenge.

Keywords: cosmology, galaxies, young universe, distant starlight

Introduction

How can we see galaxies that are several billion light-years away if the universe is only a few thousand years old? Or how could Adam have seen stars that were a few light-years away when the universe was only a few days old? These are obvious questions for people to ask when considering the young-age creation position, and creationist writers have given much attention to them.

Advocates of a young universe have had to seek creative solutions to this distant starlight problem. For example, it has been suggested that the light was created in transit (for example, DeYoung 2010), that the speed of light may have been much greater in the past (Norman and Setterfield 1987), that Einstein's general relativity with appropriate boundary conditions (Humphreys 1994, 1998, 2007, 2008) or with appropriate extensions (Hartnett 2007) can accommodate a young universe, and that the problem itself assumes an arbitrary choice of convention for synchronizing clocks (Lisle 2010; Newton 2001).

This focus on the light-travel-time issue can give the impression that, once this problem has been resolved, there are few, if any, significant challenges remaining for young-universe cosmological models. However, this is not the case; even if it is assumed that the distant starlight problem has been solved, there is much more that a young-universe cosmological model would need to explain.

The purpose of this paper is to consider those next steps for creationist cosmological models, beyond the problem of distant starlight. This builds on the work of Faulkner and DeYoung (1991) and Faulkner (1993, 1998), who argued that creationist models for astronomy need to address seriously the topic of stellar evolution.

After some discussion in the following section about what it means for a model to explain something, the next section contains a survey of various lines of astronomical evidence, along with their proposed explanations within a "big bang" cosmological framework (the "standard model" of cosmology; hereafter SMC). This is followed by an overview of some proposed creationist models for cosmology, with an evaluation of how well those models can explain what is seen in the universe. Finally, I conclude by discussing the implications for the current state of creationist cosmology.

What is an Explanation?

The task below will be to find explanations for observed astronomical phenomena: those trends and correlations that go beyond mere chance occurrences. But before attempting this, it is important to make clear the criteria that a legitimate explanation will be required to satisfy. We will denote the proposed explanation by E and the phenomenon (data) to be explained by D. There are various criteria that could be mentioned, but only one will be directly relevant to this paper.

The requirement is as follows: for E to be an explanation for D, it must be the case that ***D* follows necessarily from *E***. This is one characteristic of the *covering law* model of scientific explanation (Hempel and Oppenheim 1948). Thus if D is the observation that a particular glowing lightbulb is generating heat, then an explanation for D would be

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https://assets.answersingenesis.org/doc/articles/pdf-versions/arj/v4/distant-starlight-cosmology.pdf

E: "Whenever electricity passes through a resistor, some electrical energy is converted to heat, and this particular glowing lightbulb contains a resistor that is carrying an electric current." In this case, *D* is a logical consequence of *E*, so *E* qualifies as an explanation for *D*.

Three points must be noted.

First, it follows that explanation is a stronger condition than consistency or accommodation. For example, the statement, *E*: "God created galaxies and God loves variety" can easily accommodate the observation, *D*: "most large galaxies have either spiral morphology or elliptical morphology"; the statement and the observation are entirely consistent. But, in this example, *D* does not follow logically or necessarily from *E*, so *E* does not qualify as an explanation for *D*. To express this in another way, an explanation *E* must be sufficient to answer the question, "Why do we observe *D* rather than *not-D*?" This is something we would intuitively expect from an explanation. But, in this case, *E* would not be sufficient to answer that question, because *E* is equally consistent with *not-D*, the (false) statement that "most large galaxies have morphologies that are neither spiral nor elliptical".

Second, it should be noted that there can be, and often there is, more than one plausible explanation for a particular phenomenon. Hence, finding a plausible explanation, *E*, does not prove that *E* is the correct explanation.

Third, it should also be noted that there are different levels of explanation. At the highest level, we may seek an *ultimate explanation* for something, for example, for why something exists rather than nothing. A purely naturalistic cosmological model cannot satisfy this, whereas a creationist model does provide such an ultimate explanation. However, lower-level, *proximate explanations* are also of value. For example, a proximate explanation for a smashed window might be that it was struck by a brick. This is an acceptable explanation, even though it begs the answer to some higher-level questions: who threw the brick and why? This is relevant when evaluating proposed SMC explanations, which will necessarily be proximate rather than ultimate explanations.

Astronomical Phenomena That Require Explanations

The remaining tasks are to identify some astronomical phenomena that require (proximate) explanations, and then to seek explanations for these phenomena. Proposed SMC explanations will be considered in this section, while proposed creationist explanations will be considered in the following section. Alternative explanations have been put forward within cosmological models that are neither SMC nor biblical models; these will not be discussed in this paper. To simplify the discussion, the SMC will be treated as a "package deal", with no attempt to dissect it into its constituent parts (including the "big bang" itself, inflation, dark energy, dark matter, and the formation of stars and galaxies). In addition, the focus will be on the successes of this model; this should not be interpreted as an attempt to hide the problems and weaknesses of the SMC, which are frequently discussed elsewhere in the creationist literature (for example, Williams and Hartnett 2005).

Oscillations in the cosmic microwave background

There is a faint background of microwave radiation reaching us from all directions in the universe: the "cosmic microwave background" (CMB). It is widely known that the CMB exhibits a black body spectrum, i.e., something in thermal equilibrium, with a characteristic temperature of 3K (Mather et al. 1994). What is less often mentioned is that this radiation also exhibits patterns in the variation of intensity with position on the sky. This is represented by the angular power spectrum of the CMB, which is shown in fig. 1.

The general form of the CMB angular power spectrum can readily be explained by the SMC, and in fact was successfully predicted many years before it was observed (Peebles and Yu 1970). The proposed explanation is that the matter and radiation in the early universe behaved as a fluid in thermal equilibrium, in which the particles interacted through pressure as well as through gravity. Fluctuations in the density of this fluid would have travelled through the fluid as acoustic oscillations (sound waves). Just as a note played on a musical instrument has a fundamental harmonic and a sequence of harmonic overtones, so in this cosmic fluid, oscillations would have had a fundamental wavelength and a series of shorter-wavelength overtones. When the universe became transparent (with the radiation "decoupling" from the matter), the radiation would have retained this imprint of the oscillations. This would have shown up in the CMB as a series of peaks in the angular power spectrum, with a high peak at the fundamental oscillation scale, and a series of smaller peaks on smaller scales.

Detailed features in the clustering of galaxies

Galaxies cluster together. It is found that the clustering is stronger on smaller physical scales and weaker on larger physical scales. This transition from strong to weak clustering is smooth, apart from a few small oscillations, which were discovered in 2005 by teams working on two independent surveys of galaxy redshifts (Cole et al. 2005; Eisenstein et al. 2005).

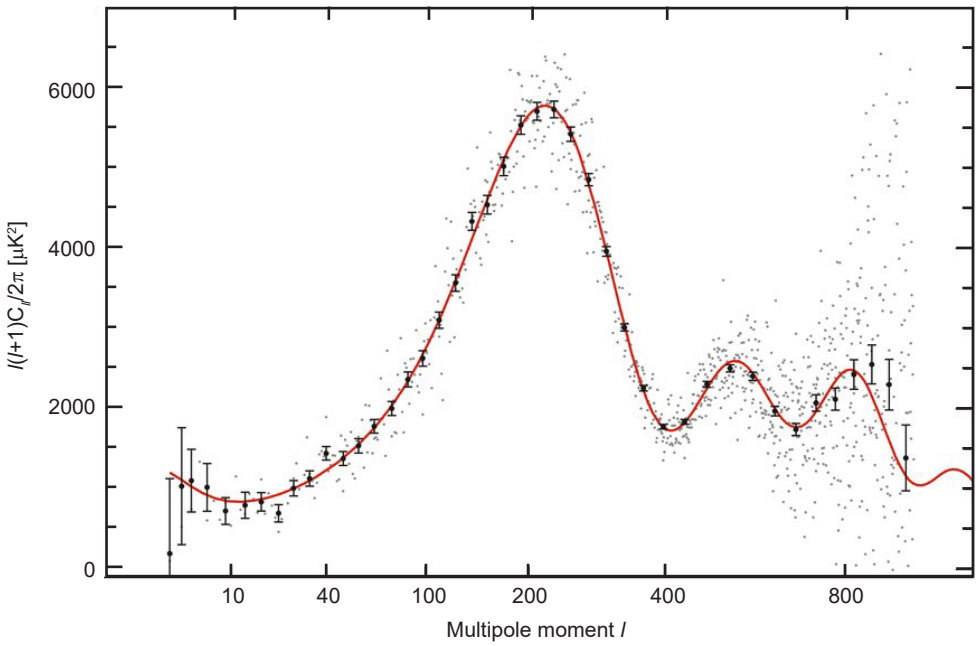

Fig. 1. The temperature angular power spectrum from the CMB, as measured by WMAP (after Dunkley et al. 2009). Angular scale is decreasing towards the right, with the highest peak corresponding to an angular scale of approximately 1°. The power spectrum shows that the greatest variation in CMB temperature happens on angular scales of a degree, with significant variation on scales of half a degree or a third of a degree. In the figure, the faint points show the individual data points, the darker points with error bars show the binned data, and the curve is a model fit to the data, where the model contains six parameters, which are tuned to produce the best fit to the data. (The WMAP Science Team. "Temperature Angular Power Spectrum Corresponding to the WMAP-Only Best-Fit ΛCDM Model. The Gray Dots Are the Unbinned Data; the Black Data Points Are Binned Data with 1σ Error Bars Including Both Noise and Cosmic Variance Computed for the Best-Fit Model." http://dx.doi.org/10.1088/0067-0049/180/2/306. © AAS.) Reproduced with permission.

The SMC explanation for these oscillations is as follows. The ripples in the density of the cosmic fluid, seen in the CMB angular power spectrum (fig. 1), would persist to later cosmic epochs, leaving a slight imprint in how galaxies cluster. As with the CMB acoustic oscillations, this effect (known as the "baryon acoustic oscillations", or BAOs) was predicted many years before it was observed (Peebles and Yu 1970).

The large-scale structure of the universe

Galaxies are observed to cluster together, forming a vast cosmic web with clusters, filaments, and voids.

Within the SMC, this is explained as the outworking of the laws of gravity on small inhomogeneities in the density of matter over long periods of time. Computer simulations have been performed to test this. Particles of matter are placed randomly in a cube, with clustering properties consistent with the observed angular power spectrum of the CMB. These are then allowed to move under the influence of gravity.

Galaxy properties and environment

Large galaxies can be classified according to their color and according to their morphology, with most being either red elliptical galaxies or blue spiral galaxies. In the nearby universe, both color and morphology have been observed to exhibit strong trends based on the environment, with a greater fraction of elliptical galaxies and a greater fraction of red galaxies in higher-density regions (Bamford et al. 2009).

The SMC explanation for these observations is that these patterns reflect the dependence of galaxy formation on environment. For the dependence of color on environment, blue colors are taken to signify recent or current star formation, since the light from young stellar populations would be dominated by luminous high-mass stars with high surface temperatures. Star and galaxy formation would occur more rapidly in high-density environments, so galaxies in these regions would have finished forming stars several billion years ago. This means that galaxies in high-density environments would contain only old stars, and would be expected to be red in color. For the dependence of morphology on environment, galaxy-galaxy interactions would be more commonplace where the density of galaxies is higher, and interactions between galaxies would be expected to make the galaxies more elliptical in morphology, while also removing the gas reservoirs from the outer regions of the galaxies, thus preventing further disc and spiral formation from infalling matter.

Interacting galaxies

Many galaxies are seen in close proximity, apparently interacting with each other, with greatly disturbed and entangled morphologies. Examples are shown in fig. 2.

The SMC explanation for this is that the galaxies are indeed interacting, and in many cases are merging together into one larger galaxy. This would be expected, assuming galaxies interact through gravity, and assuming they do so over sufficiently long periods of time (many millions of years).

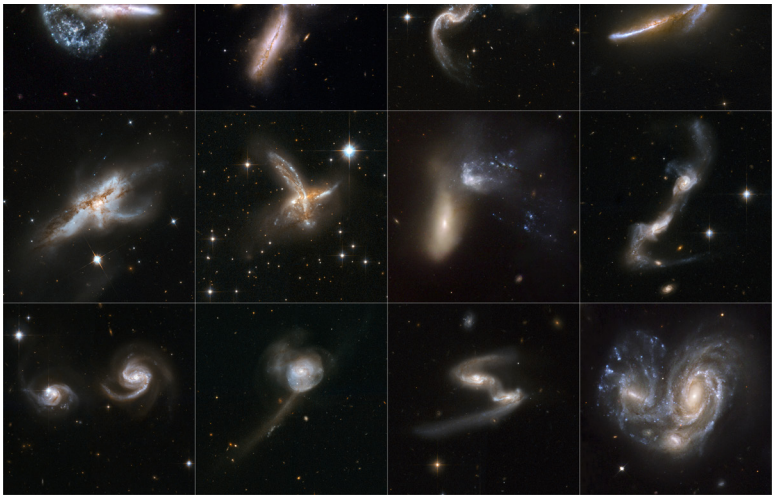

Fig. 2. Images of interacting galaxies taken by the Hubble Telescope. NASA, ESA, the Hubble Heritage (STScI/AURA)-ESA/Hubble Collaboration, and A. Evans (University of Virginia, Charlottesville/NRAO/Stony Brook University), "Cosmic Collisions Galore!," http://hubblesite.org/image/2299/news_release/2008-16, Public Domain.

Structure of galaxies

Spiral galaxies are observed to have complex structures, with a disc, a stellar bulge, a stellar halo, and with different kinds of stellar populations found in these different components (Freeman and Bland-Hawthorn 2002).

The SMC explanation for this is that these features reflect the long process of galaxy formation and evolution. For example, star formation would occur predominantly in the disc of a galaxy, where the gas and dust reside, and the observable signatures of this would include (1) the presence of dust and gas in the disc, (2) bluer stars, and (3) higher-metallicity stars (that is, more heavy elements), compared with the rest of the galaxy. These signatures are all seen in the Milky Way Galaxy (Freeman and Bland-Hawthorn 2002).

Streams of stars in the Milky Way Galaxy

In mapping the positions of stars in the Milky Way Galaxy, astronomers have identified various distinct streams of stars, spanning large distances.

The SMC explanation for this is that the Milky Way Galaxy (as any large galaxy) has "swallowed" many smaller galaxies during its lifetime. The remains of some of these smaller galaxies would still be observable as distinct streams of stars in the galaxy.

Clusters of stars

The Hertzsprung-Russell (H-R) diagram for a population of stars shows the surface temperature of the stars compared with their luminosity. For clusters of stars, either open clusters or globular clusters, the location of the stars on the H-R diagram forms a characteristic shape, with most stars lying on a "main sequence" and with a clear "turnoff" from the main sequence at a certain point. This is shown in fig. 3.

The SMC explanation for this is that stars would form together in clusters, and that a population of stars that formed at the same time would display a clear turnoff point in its H-R diagram, with the position of the turnoff depending on the age of the population (Faulkner and DeYoung 1991; Krauss and Chaboyer 2003). Thus globular clusters would be considerably older than open clusters, having turnoff points further down the main sequence.

One other features of globular clusters worth highlighting is the presence of "blue stragglers": stars with anomalously blue colors, suggesting an age much younger than the apparent age of the cluster. This presents a challenge to the standard interpretation of globular cluster ages. However, their existence can tentatively be explained within the context of the SMC. As noted by Bernitt (2002), "By far the most preferred explanations today are ones that increase the mass of a star long after the cluster originally formed. In this way, the star can be old and blue at the same time."

Seeking Creationist Explanations for these Phenomena

We have seen so far that there are many patterns and trends in the universe that beckon some kind of explanation, and that many of these appear to have plausible explanations within the SMC. However, even if plausible explanations exist, these explanations are not necessarily the only plausible explanations, or the best, so we now turn to seek alternative explanations for these phenomena, from a creationist perspective.

Special creation

The idea of special creation, most simply understood, is that the universe we see is the universe God created ex nihilo on Day 4, and that it has not

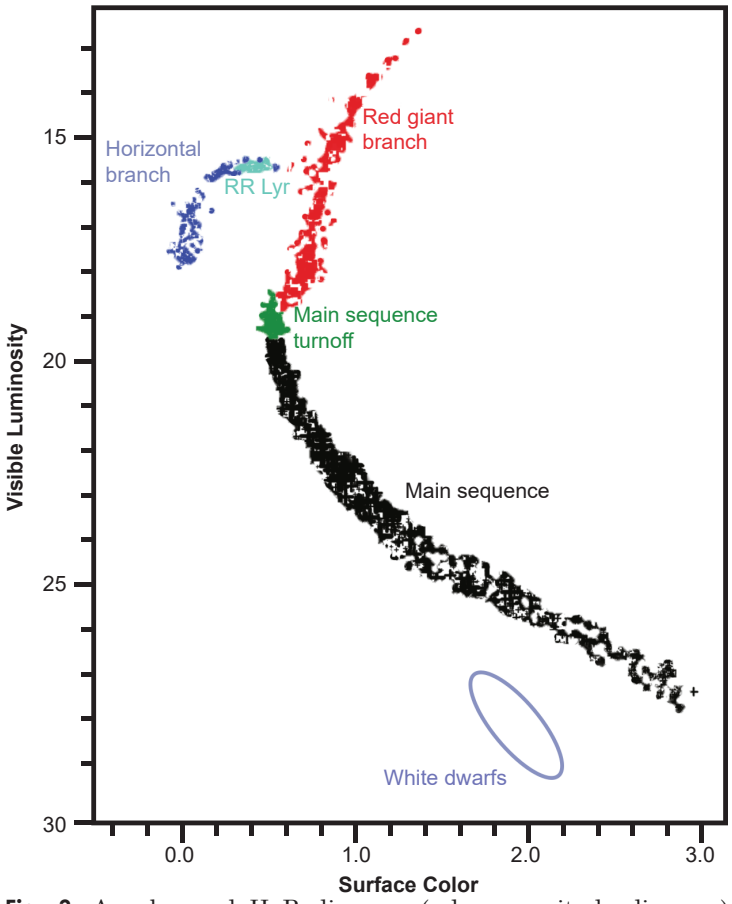

Fig. 3. An observed H–R diagram (color–magnitude diagram) for a typical globular cluster (after Kraus and Chaboyer 2003). The surface color corresponds to the surface temperature, with blue (hot) to the left and red (cool) to the right. The "Visible luminosity," more commonly the "magnitude," is an astronomer's measure of brightness, with increasing magnitude corresponding to decreasing brightness.

changed significantly since that time. This could be used to accommodate all of the phenomena mentioned in the previous section: God simply made the universe that way.

However, this idea does not actually explain any of those phenomena, in the way explanations were described earlier. Moreover, the idea of special creation does not explain why the SMC has had so many successes.

Two specific forms of this idea of special creation are the creation of light in transit (DeYoung 2010; Whitcomb and Morris 1969, 369) and a model using an alternative convention for synchronizing clocks (Lisle 2010; Newton 2001), under both of which the universe we see is the universe essentially as it was when God created it 6,000–10,000 years ago.

Functioning creation

When Adam was created, he would have been a fully functioning human being. But this would require him to have some "apparent age", since he would have been a "fully-grown" man. It has been suggested that the universe is similar, displaying "apparent age" in order to function properly.

This in turn begs the question of what the function of the universe is. For this we need to turn to Scripture. One purpose of the heavenly bodies is "to give light on the earth" (Genesis 1:17*); another is to "declare the glory of God" (Psalm 19:1). This suggests, among other things, that a functioning cosmos should have a certain size, grandeur, and stability.

However, it is difficult to see why the universe should need to have any of the specific properties described above in order to function in this way. For example, why does the universe need to contain interacting galaxies in order to function? Answers to such questions may be revealed after further investigation, but on the basis of our current understanding there is little reason to believe this approach could explain all of the phenomena above.

In response to this, it could be argued that the universe ought to be arranged so that God's hand is not immediately apparent, noting that God is "a God who hides himself" (Isaiah 45:15) and "catches the wise in their craftiness" (Job 5:13; 1 Corinthians 3:19). Thus God could have specially created a universe that displayed properties consistent with a naturalistic origin, such as that proposed in the "big bang". However, this is similar to the suggestion by Philip Gosse (1857) that the fossil record was specially created by God in the Creation Week, and raises the same theological questions about whether God would create something with such an apparent, but false, history.

Faster speed of light

It has been suggested that the speed of light was much greater in the past, and that a greater speed of light would enable us to see distant galaxies in a young universe (Norman and Setterfield 1987). While this could conceivably explain some of the phenomena above, such as certain properties of stars, there are some phenomena that depend clearly on the speed of matter, rather than the speed of light, such as interacting galaxies (Taylor 2005). In order to accommodate this, a varying speed of light would need to be coupled with additional components, such as processes taking place on very small physical scales prior to a rapid expansion of the universe (Setterfield 2006).

Time dilation

The idea that time may have run at different rates in different places in the universe ("time dilation") is a central feature of some recent creationist cosmological models (Hartnett 2007; Humphreys 1994, 1998, 2007, 2008). This is used to solve the distant starlight problem, and further investigation into these models may conceivably lead to explanations for some of the phenomena described above. For example, many of the observations relating to galaxies and their stellar populations could be explained by a model that has billions of years passing within those galaxies before the light that we see was emitted.

However, difficulties occur when considering the Milky Way Galaxy. One can simplistically imagine that billions of years may have passed in the "distant universe," while only thousands of years have passed in the "nearby universe," but where is the transition between the "distant universe" and the "nearby universe"? For example, if the "nearby universe" includes the Milky Way Galaxy, then how can we see starlight from the other side of the galaxy (tens of thousands of light years away)? Or if the "nearby universe" is not much larger than our solar system, then what happened to the solar system during the evolution of the rest of the galaxy? Any transition scale between these two scales would presumably lead to large distortions in the Milky Way Galaxy, which are not observed. We are led to consider the earth or the solar system suspended (supernaturally?) in a time dilation "bubble," orbiting the Milky Way Galaxy for several billion years, before being released from this state presumably during the Creation Week. This is not something that has yet been addressed within creationist models of time dilation.

Old creation

The possibility that the universe might be genuinely old is not one that has received much consideration from within the creationist community. There is no logical contradiction between an old age for the universe and many core elements of creationism, such as a recent supernatural origin for life in the past few thousand years, the goodness of the original creation, death as a consequence of the Fall, and a recent global catastrophic Flood, which led to the formation of much or all of the fossil record. Attempts have been made to formulate such a "young biosphere, old universe" position (Gray 2009), but the biblical and theological consequences need careful assessment, and so far such attempts have tended to result in unusual and unnatural interpretations of Scripture (DeRemer 2005).

New models

A plausible young-universe explanation for the cosmological data may be something that will come at a future date. We learn from the history of science that many seemingly insurmountable problems have been solved by means of novel and creative ways of thinking. It may be that a creationist understanding of the cosmos will prove to be another example.

Conclusion

What is the current state of creationist cosmology? The brief survey in this paper would suggest that much work still needs to be done. Indeed, beyond the distant starlight issue, very little has been done to explain the many patterns and trends that have been identified through observations of the universe beyond our solar system. In contrast, while it does not supply an ultimate explanation, the SMC does apparently provide plausible proximate explanations for all of the phenomena discussed above.

The implications of this need careful consideration. It should be noted that a model's ability to explain the observations can be misleading; for example, a model for the non-miraculous origin of the wine at Cana might be better than the true, supernatural, model at explaining the details of the chemical composition of the wine served at the wedding feast. But explanatory power is generally a good indicator that a model contains elements of the truth. The explanatory power of the SMC is itself something that beckons an explanation.

This has been a brief and selective sketch of some of the issues, but I hope future research will continue along these lines, seeking to find a cosmological model that is both faithful to Scripture and that has high explanatory power.

References

Bamford, Steven P., Robert C. Nichol, Ivan K. Baldry, Kate Land, Chris J. Lintott, Kevin Schawinski, Anze Slosar, et al. 2009. "Galaxy Zoo: The Dependence of Morphology and Colour on Environment." *Monthly Notices of the Royal Astronomical Society* 393, no. 4 (February 26): 1324–1352.

Bernitt, Rod. 2002. "Globular Clusters and the Challenge of Blue Straggler Stars." *Journal of Creation* 16, no. 2 (August): 5–7.

Cole, S., W.J. Percival, J.A. Peacock, P. Norberg, C.M. Baugh, C.S. Frenk, I. Baldry, et al. 2005. "The 2dF Galaxy Redshift Survey: Power-Spectrum Analysis of the Final Dataset and Cosmological Implications." *Monthly Notices of the Royal Astronomical Society* 362, no. 2 (September): 505–534.

DeRemer, Frank. 2005. "Young Biosphere, Old Universe? A Review of *The Age of the Universe: What Are the Biblical Limits?*" 2nd edition by Gorman Gray." *Journal of Creation* 19, no. 2 (August): 51–57.

DeYoung, Don B. 2010. "Mature Creation and Seeing Distant Starlight." *Journal of Creation* 24, no. 3 (December): 54–59.

Dunkley, J., E. Komatsu, M.R. Nolta, D.N. Spergel, D. Larson, G. Hinshaw, L. Page, et al. 2009. "Five-Year *Wilkinson Microwave Anisotropy Probe* Observations: Likelihoods and Parameters from the WMAP Data." *Astrophysical Journal Supplement* 180, no. 2 (February): 306–329.

Eisenstein, D.J., I. Zehavi, D.W. Hogg, R. Scoccimarro, M.R. Blanton, R.C. Nichol, R. Scranton, et al. 2005. "Detection of the Baryon Acoustic Peak in the Large-Scale Correlation Function of SDSS Luminous Red Galaxies." *Astrophysical Journal* 633, no. 2 (November 10): 560–574.

Faulkner, Danny R. 1993. "The Role of Stellar Population Types in the Discussion of Stellar Evolution." *Creation Research Society Quarterly* 30, no. 1 (June): 8–12.

Faulkner, Danny R. 1998. "The Current State of Creation Astronomy." In *Proceedings of the Fourth International Conference on Creationism*, edited by R.E. Walsh, 210–216. Pittsburgh, Pennsylvania: Creation Science Fellowship.

Faulkner, Danny R. and Don B. DeYoung. 1991. "Toward a Creationist Astronomy." *Creation Research Society Quarterly* 28, no. 3 (December): 87–92.

Freeman, Ken, and Joss Bland-Hawthorn. 2002. "The New Galaxy: Signatures of Its Formation." *Annual Review of Astronomy and Astrophysics* 40 (September): 487–537.

Gosse, Philip Henry. 1857. *Omphalos: An Attempt to Untie the Geological Knot*. London, United Kingdom: John Van Voorst.

Gray, Gorman. 2009. *The Age of the Universe: What Are the Biblical Limits?* 2nd ed. Revised. Washougal, Washington: Morning Star Publications.

Hartnett, John. 2007. *Starlight, Time and the New Physics*. Atlanta, Georgia: Creation Ministries International.

Hempel, Carl G., and Paul Oppenheim. 1948. "Studies in the Logic of Explanation." *Philosophy of Science* 15, no. 2 (April): 135–175.

Humphreys, D. Russell. 1994. "A Biblical Basis for Creationist Cosmology." In *Proceedings of the Third International Conference on Creationism*, edited by R.E. Walsh, 255–266. Pittsburgh, Pennsylvania: Creation Science Fellowship.

Humphreys, D. Russell. 1998. "New Vistas of Space-Time Rebut the Critics." *Creation Ex Nihilo Technical Journal* 12, no. 2 (August): 195–212.

Humphreys, D. Russell. 2007. "Creationist Cosmologies Explain the Anomalous Acceleration of Pioneer Spacecraft." *Journal of Creation* 21, no. 2 (August): 61–70.

Humphreys, Russ. 2008. "New Time Dilation Helps Creation Cosmology." *Journal of Creation* 22, no. 3 (December): 84–92.

Krauss, Lawrence M., and Brian Chaboyer 2003. "Age Estimates of Globular Clusters in the Milky Way: Constraints on Cosmology." *Science* 299, no. 5603 (January 3): 65–69.

Lisle, Jason. 2010. "Anisotropic Synchrony Convention—A Solution to the Distant Starlight Problem." *Answers Research Journal* 3 (September 22): 191–207.

Mather, John C., E.S. Cheng, D.A. Cottingham, R.E. Eplee Jr., D.J. Fixsen, T. Hewagama, R.B. Isaacman, et al. 1994. "Measurement of the Cosmic Microwave Background Spectrum by the *COBE* FIRAS Instrument." *Astrophysical Journal* 420 (January): 439–444.

Newton, Robert. 2001. "Distant Starlight and Genesis: Conventions of Time Measurement." *TJ* 15, no. 1 (April): 80–85.

Norman, Trevor, and Barry Setterfield. 1987. *The Atomic Constants, Light, and Time*. Menlo Park, California: Stanford Research Institute.

Peebles, P.J.E., and J.T. Yu. 1970. "Primeval Adiabatic Perturbation in an Expanding Universe." *Astrophysical Journal* 162 (December): 815–836.

Setterfield, Barry. 2006. "Response to 'The Speed of Matter'." Barry Setterfield. March 25, 2006. https://www.barrysetterfield.org/speedofmatter.html.

Springel, Volker, Carlos S. Frenk, and Simon D.M. White. 2006. "The Large-Scale Structure of the Universe." *Nature* 440, no. 7088 (April): 1137–1144.

Taylor, Justin K. 2005. "The Speed of Matter." *TJ* 19, no. 3 (December): 91–95.

Whitcomb, John C., and Henry M. Morris. 1969. *The Genesis Flood*. London, United Kingdom: Evangelical Press.

Williams, Alex, and John Hartnett. 2005. *Dismantling the Big Bang: God's Universe Rediscovered*. Green Forest, Arkansas: Master Books.

A Proposal for a New Solution to the Light Travel Time Problem

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Abstract

I identify a little-noticed issue in the normal formulation of the light travel time problem. In addition, I lay groundwork for the beginning of a new solution to the problem. This solution invokes similarity between creative acts of Day Four and other days of the Creation Week, but especially Day Three. The Day Three account suggests unusually fast growth for plants. In similar fashion, this possible new solution suggests unusually fast propagation of light on Day Four, probably by rapid expansion of space. This is an appeal to a miraculous event rather than a physical process to get distant starlight to the earth. It is not yet clear whether this suggestion could have testable predictions. If this is the correct way to look at the problem, it may be that we are seeing much of the universe in something close to real time. I briefly compare this possible solution to the light travel time to other previously published proposals.

Introduction

The light travel time problem is one of the greatest challenges that recent creationists face today. Simply defined, if the universe is only thousands of years old as the Bible strongly suggests, then how can we see objects that are at light travel time distances far greater than a few thousand years? A popular unit of distance used in astronomy is the light year, the distance that light travels in a year. Multiplying the speed of light by the number of seconds in a year, we find that the light year is a little more than 9×10^{12} km. Obviously, using "normal" units of distance measurements such as meters or kilometers is woefully inadequate in astronomy, hence the definition of this new unit of distance. With the most straightforward approach to the biblical record and the vast distances in astronomy, we ought not to see any objects more than a few thousand light years away. Most of the objects visible to the naked eye are not this far away, so, as the light travel time problem normally is defined, most objects visible to the naked eye do not present a problem to the recent creation model.

However, there are two important points that we ought to consider. First, astronomers think that a few faint objects visible to the naked eye are much farther away than a few thousand light years. For instance, M31, the Andromeda Galaxy, the most distant object normally visible to the naked eye, is about two million light years away. Furthermore, since the invention of the telescope four centuries ago, astronomers have discovered many more other galaxies and objects much farther away than a few thousand light years. Most notable are quasars, which according to most estimates, are billions of light years away. If the world is only thousands of light years old, none of these very distant objects ought to be visible.

A second important point is that by concentrating upon the very distant objects, the light travel time problem is not formulated properly, for the situation is far worse! Most treatments of the light travel time problem concentrate upon the question of how we can see objects more than 6,000 lt-yr away. Because most objects clearly visible to the naked eye are well within 6,000 lt-yr, they aren't a problem in a recent creation. But while it is possible for us to see most of the naked eye stars and today, some millennia after the Creation Week, it would not have been possible for Adam to have seen any stars (other than the sun) for at least four years after his creation. The stars were made on Day Four, and Adam was made on Day Six. The nearest star after the sun is 4.3 lt-yr away, so Adam could not have seen even the closest star for more than four years, and then stars would have slowly winked in over the succeeding years. However, the stars could not have fulfilled their God ordained functions when Adam first saw them after Day Six. These functions include being used to mark seasons and the passage of time (we still do this today with the day, month, and year). The passage of the year and the seasons are reckoned by how the sun appears to move against the background stars as the earth orbits the sun. Absent these background stars, it would not be possible to determine the passage of the year and of the seasons. Therefore, to truly solve the light travel time problem, light from stars even a few light years away must have been visible only days after their creation (and it is likely that the light of all the astronomical objects reaching the earth today also reached the earth at this early time). Any realistic solution to the light travel time problem must explain how Adam could have seen any stars on the evening following Day Six. Once that issue is resolved, the light travel time problem for truly distant objects

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probably is solved as well. At any rate, we ought to properly formulate the light travel time problem in all discussions of this issue.

Previous Solutions to the Problem

At least seven distinct kinds of solutions for the light travel time problem have been proposed in the creation literature. We will not discuss them in much detail here, for this has already been done in various places. Instead, we will merely list them in the roughly chronological order in which they have been proposed, followed by the briefest of discussion. They are:

1. Question the distances
2. Light created in transit as part of a fully functioning universe
3. Light follows some peculiar non-Euclidean space so that light from the entire universe can arrive in just a few years, regardless of great distance
4. A decrease in the speed of light, allowing for light from the entire universe to reach the earth very quickly, within the Creation Week
5. Biosphere model, or, as some critics of this model call it, the soft gap
6. Cosmological models using general relativistic effects to get light to reach the earth very quickly during the Creation Week.
7. Time convention

Few creationists have aggressively pursued solution one. The reasoning for this solution has been that if the distances of astronomical objects are not known that well, then astronomical bodies may be far closer than generally thought, and hence there is no light travel time problem. This solution amounts to defining the problem away, but there are additional problems with this solution. First, creationists who have suggested this solution do correctly point out that trigonometric parallax, the only direct method of measuring stellar distances, yields distances that at most are only a few hundred light years. So this could explain why we see all the stars for which we have directly determined distances. One might further reason that since the distance determination methods that give very great distances that cause the light travel time problem today are indirect, those indirect methods are somehow suspect. However, one cannot dismiss the indirect methods so easily. Most of these methods are based upon well understood physical principles, and many of the indirect methods are calibrated to trigonometric parallax. See Faulkner (2013) for a discussion of distance determination methods. Second, this solution relies upon the incorrectly formulated light travel time problem. While today we can see stars such as Alpha Centauri, the closest star similar to the sun, with this solution it would not have been visible to Adam at the conclusion of the Creation Week, because it is 4.3 light years away. For this solution to work, even the well determined trigonometric parallax method must be abandoned, but this is not physically supported.

For a long time, solution two was very popular, and while it is less popular today, it continues to have a wide following (the late Henry M. Morris, Jr. was fond of this solution). Proponents argue that by its very nature, creation must include some "appearance of age", for plants, animals, and people were not made as embryos or infants, but as mature adults, even though they did not go through the normal process of growth to reach adulthood. We certainly see this is true of Adam and Eve, but it also would seem to be true of plants, or else they could not fulfill their God ordained purpose of providing food only 2–3 days after they appeared if they were not mature (Genesis 1:29–30). Similar reasoning applies to many animals. Thus, the stars could not fulfill their purposes unless they were visible right away, so God made them with their light already en route to earth. This has a certain amount of appeal to it, but it also could be construed as deceptive on the part of God to make light containing a tremendous amount of information of physical processes that never happened. Since the vast majority of the universe is more than a few thousand light years distant, it would seem that we will never see light that actually left these distant objects, and hence much of the universe amounts to an illusion. This concern has been the primary motivation of those seeking other solutions to the light travel time problem.

The third solution is not much discussed anymore. It relied upon some speculative hypothesis about the nature of light that has never been demonstrated. Very few creationists embraced this solution anyway, and those who once did mention this solution normally offered it as a hypothetical possibility not necessarily with endorsement. For a critical discussion of this theory, please see Akridge (1984).

The fourth solution is that the speed of light has decreased since Creation Week (Norman and Setterfield 1987; Setterfield 1989). This is often called "cdk" for "c decay," where "c" is the letter that physicists usually use to represent the speed of light. Undoubtedly, this solution has sparked the hottest debate amongst recent creationists. When the possibility that light might have decreased was first proposed in the creation literature three decades ago, it was immediately met with great interest. However, much of the early interest soon turned to opposition. Opponents do not believe that the data adequately support this hypothesis; supporters do. Opponents point out that any significant change in the speed of light would alter the structure of matter that ought to be visible in distant objects. Supporters agree, but

argue that other factors have changed to compensate for this. There is a great divide on this solution, and we will not discuss this controversy anymore here.

The fifth solution, the biosphere model, proposes that the Creation Week applied to the biosphere of the earth, but that the earth itself, and the rest of the universe, are much older (Gray 2005). In this view, God made the stars prior to Day Four (even billions of years prior), but the stars did not become visible upon the surface of the earth until Day Four, for the earth's atmosphere was opaque up to that point. This is very similar to the reasoning of day-age theorists with regards to the meaning of the Day Four account. However, we ought to point out that, unlike the day-age theory, the Creation Week of the biosphere model is a normal six day week. This solution has met with much opposition among recent creationists.

The first solution of type number six is the white hole cosmology (Humphreys 1994). The white hole cosmology posits that God initially made the universe as a white hole with the earth somewhere near the center of the white hole. The white hole eventually evaporated and ceased to exist during the Creation Week, probably on Day Four. Relativistic time dilation near the event horizon of the white hole allowed for great periods of time to pass elsewhere in much of the universe while only days elapsed on and near the earth. The much greater time elsewhere would allow light from the most distant portions of the universe to reach the earth in just days. Hartnett (2003) has pursued a somewhat similar yet very different solution by using a modified metric for general relativity. This metric has an additional dimension (for a total of five). He has acquired some very interesting results when applied to large structures, such as galaxies and quasars, suggesting that today we are seeing these objects in their infancy, despite their tremendous distances and consequent light travel times. The general relativity solutions have gained much following, but admittedly many supporters do not fully understand the sophisticated mathematics involved.

Solution number seven invokes common time conventions in astronomy (Lisle 2010; Newton 2001). In 1987, astronomers observed a supernova in a small, nearby galaxy, the Large Magellanic Cloud (LMC), so we say that the supernova happened in 1987 (the name, "SN 1987A", says as much). However, this was when we first saw the light from the supernova, but since the Large Magellanic Cloud is roughly 170,000 lt-yr away, we can say that the supernova actually happened 170,000 years ago. Thus, astronomers have two time conventions as to when something happened, when it actually happened, and when it is observable on earth. In the time convention solution, God made objects in the universe on Day Four, but the one-way infinite speed of light caused their light to reach earth instantly. It is amazing to me that this very interesting solution has not received more attention, particularly of the negative type.

A New Proposal

I spent more than 30 years looking for a solution to the light travel time problem, and recently I began thinking about a possibility that I find satisfactory. With so many other proposed solutions, one may legitimately ask why one more? I see that most of these solutions to the light travel time problem have advantages and disadvantages. If there were one solution that worked, there would not be so many solutions, and there would not be such sharp disagreement. Please consider my modest proposal. As I have previously argued (Faulkner 1999), I submit that God's work of making the astronomical bodies on Day Four involved an act not of creating them ex nihilo, but rather of forming them from previously-created material, namely, material created on Day One. As a part of God's formative work, light from the astronomical bodies was miraculously made to "shoot" its way to the earth at an abnormally accelerated rate in order to fulfill their function of serving to indicate signs, seasons, days, and years. I emphasize that my proposal differs from cdk in that no physical mechanism is invoked, it is likely space itself that has rapidly moved, and that the speed of light since Creation Week has been what is today.

This understanding does no violence to the meaning of other Hebrew verbs used to describe the formation of the stars. For instance, the word בָּרָא (*bārā'*; "to create"), which appears only with God as its agent (cf. Koehler and Baumgartner 2001, 153), is used in reference to the creation of the universe generally in Genesis 1:1, the creation of the stars in Isaiah 40:26, and the creation of the heavens in Isaiah 42:5 and 45:18. In referring to God's activity, בָּרָא *often* has the idea of making something totally new or of creating something out of nothing (early church fathers introduced the Latin term, *ex nihilo*, for the latter). However, this is not *necessarily* the case. The verb בָּרָא is also use of the creation of one who brings ruin in Isaiah 54:16, the creation of praise on the lips of redeemed Israel in Isaiah 57:19, and the creation of the Ammonites in Ezekiel 21:30. There is therefore no clear lexical data to suggest that בָּרָא may not be used to speak of a creative act involving the use of already-existent material, provided that God is the agent of that creative act.

Even more significantly, the word עָשָׂה (*'āśâ*; "to do," "to make") is used specifically of the creation of the astronomical bodies in Genesis 1:16. The meaning of this verb is broader, semantically speaking, than בָּרָא, and may refer to acts of creative ingenuity by agents

other than God. That being said, it is indisputably evident that עָשָׂה is commonly used to refer to the act of fashioning something out of already-existing material (for example, the creation of man in Genesis 1:26; cf. 2:7). Granted, such is not always the intended meaning, even with respect to the astronomical bodies (for example, compare Genesis 1:1 with 2 Kings 19:15; Isaiah 37:16; 66:22; Jeremiah 32:17). However, the use of עָשָׂה in the Day Four creation record *apart from any contextual clues to suggest that it must bear the sense of creation out of nothing* suggests that there is a distinct possibility that the making of the astronomical bodies was instead a matter of fashioning them from material previously created on Day One. Just as the description of the earth in Genesis 1:2 is of something unfinished that God returned over the next several days to shape and prepare, perhaps the matter that would become the astronomical bodies was created on Day One but was shaped on Day Four, whereupon God brought forth their light to the earth.

In order to more adequately grasp my proposal, it is instructive to examine God's activities on the other days of the Creation Week to perhaps gain insight into patterns that might be useful to explore on Day Four. Of particular interest is the creation of plants on Day Three. In the New King James Version, verse 11 states,

> Then God said, "Let the earth bring forth grass, the herb that yields seed, *and* the fruit tree that yields fruit according to its kind, whose seed *is* in itself, on the earth"; and it was so.

Verse 12 goes on to state:

> And the earth brought forth grass, the herb *that* yields seed according to its kind, and the tree *that* yields fruit, whose seed *is* in itself according to its kind. And God saw that *it was* good.

Here, God issues a command that the earth "bring forth" and then the earth, in obedience, "brought forth." Genesis 1:11 employs the *hiphil* stem of דשא (*dš'*), which is used to express causative action with an active voice. The King James Version fittingly translates this as, "Let…bring forth." The New American Standard Bible renders it similarly, "Let…sprout." Lexically speaking, דשא does not indicate anything about *how* the earth brought forth plants; however, contextual clues indicate that the use of דשא in Genesis 1:11 involves a rapid-growth process. That is, on Day Three, plants did not instantly appear. Instead, plants grew up to become mature. It is clear from the blessing that God saw that it was good (v. 12b) and the immediate closure of the Third Day (v. 13) that this was not the usually slow processes that we see today in plants, but rather it was an abnormally very rapid growth and development of plants. At the very least, the plants (including trees with fruit) had to have mature fruit by Days Five and Six, for animals and people made then required them for food, which God ordained for them (vv. 29–30). It is very easy to imagine this very rapid Day Three sprouting and growing to maturity of plants as resembling a time-lapse movie of plant growth today.

Could this abnormally fast growth and development of plants on Day Three be anything like the pattern of making the astronomical bodies on Day Four? In my previous work on Day Four creation (Faulkner 1999), I had suggested such a rapid process, albeit without drawing the parallel to the creation of plants. The Day Three parallel can be very useful in solving the light travel time problem. The reason that plants made on Day Three could not develop at the rate that they normally do today is that they could not have performed their function of providing food on Days Five and Six. The quickest developing fruit require weeks or months, and trees require years to do this. In a similar manner, the stars could not fulfill their functions of marking seasons and days and years (v. 14) unless they were visible by Day Six. I propose that the light had to abnormally "grow" or "shoot" its way to the earth to fulfill this function. Notice that this is not the result of some natural process any more than the shooting up of plants on Day Three was. Instead, this is a miraculous, abnormally fast process. Rather than light moving very quickly, I suggest that it was space itself that did the moving, carrying light along with it.

This understanding is consistent with the concept of the stretching (נטה; *nṭh*) or the spreading out (מתח; *mtḥ*) of the heavens found in the Old Testament (for example, Job 9:8; Psalm 104:2; Isaiah 40:22; 42:5; 44:24; 45:12; 51:13). Many Christians today identify this stretching with expansion of the universe, something that I did for some time but am much more skeptical of now. There are several possible problems with this understanding. First, we often think of stretching in terms of some elastic substance such as rubber in a rubber band or a bungee cord, and this is similar to universal expansion. However, elastic stretching is not how the stretching of the heavens is described. Notice that Isaiah 40:22 likens the spreading out of the heavens as to spreading out a tent or curtain. In ancient times tents and curtains likely were made of animal skins. When stored, a tent would be rolled up, and then be unrolled to set up. Thus, the stretching was the unrolling and spreading of the tent material. Interestingly, Scripture mentions that at the end of this world, the heavens shall be rolled up like a scroll (Isaiah 34:4), the reverse of unrolling a tent or scroll. Another problem with the stretching of the heavens being universal expansion is that many of these verses seem to imply that the

stretching is a past event, not an on-going stretching. Note, for example, the parallelism in Isaiah 51:13:

> And you forget the LORD your Maker,
> Who stretched out the heavens
> And laid the foundations of the earth;
> You have feared continually every day
> Because of the fury of the oppressor,
> When he has prepared to destroy.
> And where is the fury of the oppressor?

In this verse, the statement that the Lord "stretched out the heavens" is paired with the statement that He "laid the foundations of the earth." Since the latter act is certainly to be understood as an action completed in the past, the former should be as well. Thus, it is most likely that this past stretching is related to creation. I propose that the stretching of the heavens may refer to rapid stretching of space to get starlight to the earth on Day Four, the same day that stars were made.

Of course, it must be remembered that the aforementioned biblical references to the stretching of the heavens appear in poetic passages that are unlike the record of Day Four in Genesis 1:14–19, which bears all the markings of prose (Boyd 2005). Consequently, "stretching" in these instances may be a metaphorical device that refers to nothing more than the creation of the heavens in their expanse. In other words, the language employed is likely not specific enough to enlist as certain evidence for the defense of my view. Nevertheless, the language surely does not preclude the position I have advanced; indeed, if the text does intend to convey the idea of light travelling at an abnormally accelerated rate in order to reach the earth on Day Four (or, at the very latest, Day Six), then reference to God stretching out the heavens is quite appropriate.

This proposed solution to the light travel time problem has some similarities to some of the other solutions. Since the light is miraculously brought to the earth on Day Four, some may see a parallel to the light created in transit theory. However, the large difference is that with this new proposal, the light from distant objects actually left the distant objects that we see; in the light created in transit theory, the light that we see from very distant objects never was emitted by those objects. Some may see that this new proposal is similar to cdk, but there are at least two distinctions. First cdk follows a mathematically described decay; this new solution hypothesizes that light getting here was more of the stretching of space that commenced abruptly and ended abruptly. A second difference is that cdk relies upon physical mechanisms whereas this new proposal relies upon God's miraculous intervention. One may see an even stronger parallel in this proposal to the white hole cosmology in that the white hole cosmology could provide the physical mechanism for the stretching to get starlight to earth. However, I wish to emphasize that I do not require a physical mechanism for this proposal.

Discussion

Admittedly, I have left much unsaid. Since my modest proposal appeals to a miracle, there may be no physical predictions and hence nothing that we can test. Still, even a miracle can leave some observable evidence. For instance, Jesus' disciples and many others saw (and even touched) our Lord's risen body. Many people saw other bodies healed or raised from the dead. Thousands of people ate miraculously produced fish and bread, and many tasted the wine at the marriage feast of Cana. Might my proposal yield effects that we might observe today? Perhaps. Consider light leaving a distant star shortly after its formation on Day Four. In my view the intervening space was stretched to bring the light rapidly to earth. Soon after this event, probably still on Day Four, space assumed the properties that it appears to have today. Were properties of the light, such as wavelength and frequency, altered during this process? I would suppose not. If it did, then it likely would produce an observable change of some sort.

But what of the details of the transition between the miraculous transmission of light over great distances to the relatively slow pace today, all accomplished on Day Four? Would this imply a transition region that still might be reaching the earth today? Might there be some implication for the Hubble relation, the general trend of increasing redshift with increasing distance? Alas, I do not know. These and many other questions must be addressed for my proposal to be taken seriously by fellow creation scientists. I hope that with time to reflect, discussion with others, and perhaps the work of others on my proposals may yield some insight into these and many more questions. I place this proposal before others to stimulate discussion.

Conclusion

Recent creationists believe that the universe is only thousands of years old. The universe appears to be far larger than just a few thousand light years in size, suggesting the light travel time problem. However, by concentrating on the current age of the universe, we incorrectly formulate the light travel time problem. I recommend that we properly state the problem by noting that Adam had to see much of the universe at the conclusion of the Creation Week.

Here I have presented the beginning of a new proposal of a solution to the light travel time problem. I anticipate that this appeal to a miraculous solution likely will be the greatest criticism of this proposal.

As creationists, we ought not to be so resistant to believing in miracles. We might as well enquire as to the physical aspects of the virgin birth or resurrection of Jesus. Both of these events are objective reality, but both were miraculous. Creation by its very nature was a miraculous event/process. As scientists, we are so used to looking at physical mechanisms that we often want to box in the Creation Week in terms of physical/natural processes. While certain aspects of the Creation Week probably were physical and there likely are physical ramifications of creation even today, we ought to realize that there are certain things about the Creation Week that we as scientists cannot fully comprehend. I admit that I had spent more than 30 years thinking primarily in terms of a physical explanation for the light travel time problem, when the solution may be far simpler and more direct.

I ought to emphasize that one expectation of this solution to the light travel time problem is that we probably are looking at the entire universe in something close to real time, regardless of how far away individual objects may be. Exactly at what point we begin to see light from certain stars that have traveled to us in the "normal way" rather than in the Day Four miracle, I have no clue. Hopefully, further discussion along these lines may help, though, given the miraculous nature of this solution, no clear answer may be possible.

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References

Akridge, G. Russell. 1984. "The Universe is Bigger than 15.71 Light Years." *Creation Research Society Quarterly* 21, no. 1 (June): 18–22.

Boyd, Stephen W. 2005. "Statistical Determination of Genre in Biblical Hebrew: Evidence for an Historical Reading of Genesis 1:1–2:3." In *Radioisotopes and the Age of the Earth*, vol. 2, edited by L. Vardiman, A.A. Snelling, and E.F. Chaffin, 631–734. El Cajon, California: Institute for Creation Research.

Faulkner, Danny. 1999. "A Biblically-Based Cratering Theory." *Creation Ex Nihilo Technical Journal* 13, no. 1 (April): 100–104.

Faulkner, Danny R. 2013. "Astronomical Distance Determination Methods and the Light Travel Time Problem." *Answers Research Journal* 6 (June 12): 211–229.

Gray, Gorman. 2005. *The Age of the Earth: What Are the Biblical Limits?* Washougal, Washington: Morning Star Publications.

Hartnett, John G. 2003. "A New Cosmology: Solution to the Starlight Travel Time Problem." *TJ* 17, no. 2 (August): 98–102.

Humphreys, D. Russell. 1994. *Starlight and Time: Solving the Puzzle of Distant Starlight in a Young Universe*. Green Forest, Arkansas: Master Books.

Koehler, L. and W. Baumgartner. 2001. *The Hebrew and Aramaic Lexicon of the Old Testament*. Vol. 1. Revised edition. Translated and edited by M.E.J. Richardson. Leiden, The Netherlands: Brill.

Lisle, Jason. 2010. "Anisotropic Synchrony Convention—A Solution to the Distant Starlight Problem." *Answers Research Journal* 3 (September 22): 191–207.

Newton, Robert. 2001. "Distant Starlight and Genesis: Conventions of Time Measurement." *TJ* 15, no. 1 (April): 80–85.

Norman, Trevor, and Barry Setterfield. 1987. *The Atomic Constants, Light, and Time*. Menlo Park, California: SRI International.

Setterfield, Barry. 1989. "The Atomic Constants in Light of Criticism." *Creation Research Society Quarterly* 25, no. 4 (March): 190–197.