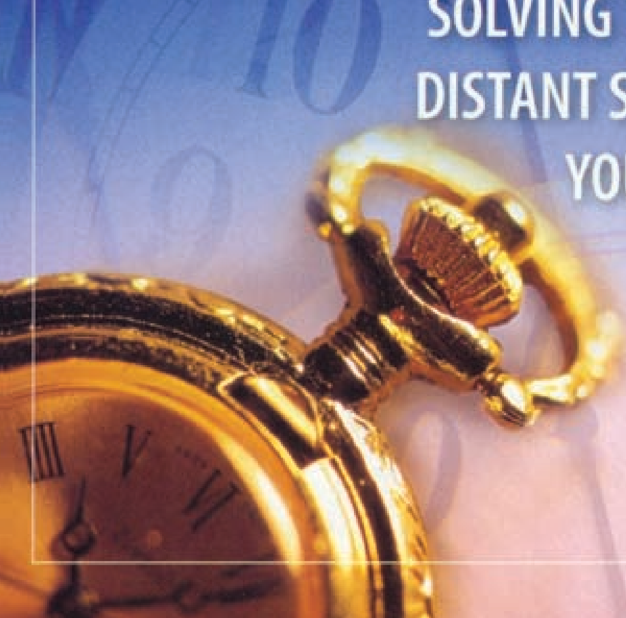
D. RUSSELL HUMPHREYS, PH.D.

STARLIGHT & TIME

SOLVING THE PUZZLE OF DISTANT STARLIGHT IN A YOUNG UNIVERSE



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About the Author

D. Russell Humphreys, B.S., Ph.D.

Dr. Humphreys was awarded his Ph.D. in physics from Louisiana State University in 1972, by which time he was a fully convinced creationist. For the next 6 years he worked in the High Voltage Laboratory of General Electric Company, designing and inventing equipment and researching high-voltage phenomena. While there, he received a U.S. patent and one of *Industrial Research Magazine's* IR-100 awards. Since 1979 he has worked for Sandia National Laboratories in nuclear physics, geophysics, pulsed-power research, and theoretical atomic and nuclear physics. Since 1985 he has been working with Sandia's Particle Beam Fusion Project, and was co-inventor of special laser-triggered "Rimfire" high-voltage switches, now coming into wider use.

The last few years have seen a greater emphasis on theoretical nuclear physics and radiation hydrodynamics in an effort to help produce the world's first lab-scale thermonuclear fusion. He has published some 20 papers in secular scientific journals, as well as many creationist technical papers. Besides gaining another US patent, he has been given two awards from Sandia, including an Award for Excellence for contributions to light ion-fusion target theory. Dr. Humphreys is an adjunct professor of the Institute for Creation Research in San Diego, a board member of the Creation Research Society, and is president of the Creation Science Fellowship of New Mexico.

Chapter 1

Solving the "Unsolvable Problem"

Whenever I have spoken on the positive physical evidences for a recent creation, an extremely common question which many people ask is this: "If the universe is so young, how can we see light from stars that are more than 10,000 light-years away?" A light-year is the distance that light travels at its present speed in one year, about ten trillion kilometers.

For example, consider the most frequently observable very distant objects that astronomers can see in the sky—galaxies. Galaxies are large clusters of stars, typically 100 billion or so, roughly 100,000 light-years in diameter. There are about 100 billion galaxies within the viewing range of our best telescopes. The galaxy we are a part of, the Milky Way, is a very typical galaxy.

A relatively close neighboring galaxy, M31 in Andromeda, is supposed to be so distant that light traveling at today's speed would take about two million years to reach us. At that speed, if the universe were only six to ten thousand years old, the first light from the Andromeda galaxy could hardly have traveled more than a few percent of its way toward earth. Yet stargazers in the northern hemisphere can see it with binoculars.

In the southern hemisphere, people can see our nearest neighbor galaxies, the two Magellanic clouds, with the naked eye. Yet they are supposed to be on the order of 100,000 light years away. The most distant galaxy astronomers have observed to date is supposed to be about 12 billion light-years away. If the universe is young, people ask, how can we be seeing the light from such distant objects?

Some laymen pondering this question wonder if the astronomers' estimates of distances might be greatly in error. I don't think so. Astronomers have dozens of methods for estimating such distances, all of which generally agree with one another. Many of the methods, especially for closer objects such as the Andromeda galaxy, are based on very reasonable assumptions, such as the overall size or brightness of a galaxy.

For that reason, I am convinced that the large distances are generally correct, at least within a factor of two or so. Certainly, it is hard to imagine how correcting errors in all these methods could somehow shrink, say, the twelve billion light-years mentioned above down to ten thousand light-years. Thus, the question represents a problem which is very real and needs to be answered.

Because of the testimony of Scripture and the weight of other evidence favoring a recent creation, young-earth creationists have tried a number of theories to explain how the light from distant galaxies got here in less than 10,000 years. These have thus far not been very successful (Appendix A). Since 1985 I have been working on a new theory to explain this problem and other large-scale phenomena in the cosmos, such as red shifts in the light from distant galaxies and the cosmic microwave background radiation (Appendix C).

Two papers of mine on this new young-earth creationist cosmology (an alternative to the Big Bang) have had very positive peer review at the Third International Conference on Creationism (ICC). They are reprinted in Appendices B and C for those readers wanting more technical details. Cosmology is a very complex and subtle subject, but I will try to strip it down to the bare essentials here.

Gravity Distorts Time

Let me first briefly outline where I am heading. The theory utilizes Einstein's general theory of relativity, which is the best theory of gravity we have today. General relativity (GR) has been well-established experimentally, and is the physics framework for all modern cosmologies. According to GR, *gravity affects time*. Clocks at a low altitude should tick more slowly than clocks at a high altitude—and observations confirm this effect, which some call *gravitational time dilation*. (Not to be confused with the better-known "velocity" time dilation in Einstein's special relativity theory.)

For example, an atomic clock at the Royal Observatory in Greenwich, England, ticks five microseconds per year slower than an identical clock at the National Bureau of Standards in Boulder, Colorado, both clocks being accurate to about one microsecond per year. The difference is exactly what general relativity predicts for the one-mile difference in altitude (Figure 1).

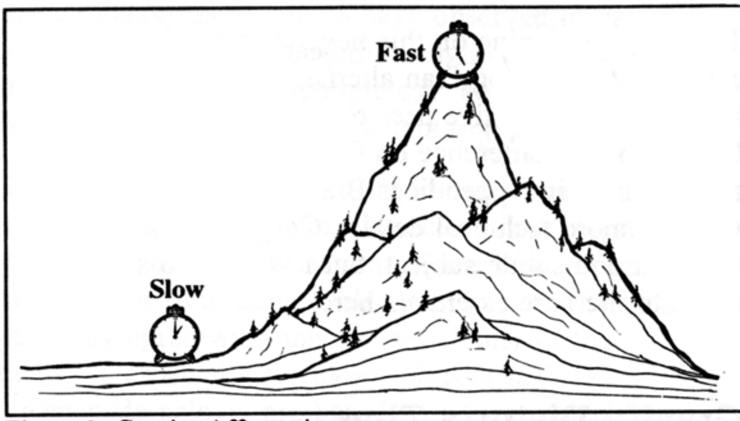

Figure 1 Gravity Affects time.

Which one is showing (or running at) the "right time"? Both are—in their own frame of reference. There is no longer any way to say which is the "correct" rate at which time runs—it all depends on where you are in relation to a gravitational field. A large variety of more precise experiments has confirmed gravitational time dilation to an accuracy of better than one percent—it's for real!

The effect applies to the rates of *all* physical processes—the earth rotating beneath your feet, decay of atomic nuclei in your bones, how fast you get old, the ticking of the watch on your wrist, and the speed of nerve impulses in your brain. This means that locally, the effect is unnoticeable. Whatever measurements were made at one altitude would not show the effect, because everything at that altitude