Starlight, Time and the New Physics
By John Hartnett (Australia: Creation Ministries International, 2007), 231 pp., $12.95

Hartnett holds a Ph.D. From the Department of Physics at the University of Western Australia and works with the Frequency Standards and Metrology research group at the same university, where he holds the rank of Associate Professor (the equivalent of Reader in the UK, which would be Full Professor in the USA). He has published more than 120 papers in scientific journals and holds two patents.

This reviewer and many other Christians have faithfully upheld a straightforward reading of the Genesis account—with creation in 6 literal days only 6,0000 or so years ago—often at the cost of considerable ridicule. The reason we have done so, despite secular science's belief otherwise, is because we see evidence in the Bible of supernatural revelation—as demonstrated by predicted and fulfilled prophecy (e.g., Ps. 22; Isa. 53). This convinces us that where the interpretation of secular science and the clear meaning of Scripture disagree, the authority and perspicuity of Scripture must supersede the interpretation of secular science. (As an aside, I have always wondered why so many Christians are ready to twist Scripture in an attempt to get it to agree with the current understanding of secular science when the secular scientific community they so wish to placate completely rejects essentials of the Christian faith such as the virgin birth, miracles, and resurrection from the dead.)

Even though many of us have upheld Scripture in the face of apparent disagreement with interpretations of secular science, *Starlight, Time and the New Physics*, is immensely helpful because it shows how well-accepted tenets of today's science—such as Relativity—can provide answers to some of these apparent discrepancies. Long-term observers of the tension between science and the Scriptures will recognize that where disagreements occur, it is science rather than the Scriptures which must eventually yield. Hartnett comments (pp. 12-13):

> *Science is a wonderful tool, but scientific explanations, even ones that seem as straightforward as the notion that light must take ten billion years to travel ten billion light-years, are always tentative. The history of science is littered with instances in which a previously assured 'fact' was overturned in a subsequent generation. And the universe, including the created laws that describe the way it normally operates, often turns out to be far more ingeniously constructed, and at the same time elegant, than previously imagined. . . . In a world in which we have been stunned by the notions of relativity, and mystified by the counter-intuitive results of quantum mechanics, is it not more likely that there is an explanation we have not thought of yet? . . . In short, when there is an apparent conflict between science and a clear teaching of the Bible, we need to humbly assume that it is more likely that our understanding of the universe is deficient.*

Hartnett's book discusses, among other cosmological topics, how it could be that a literal reading of Genesis, complete with a 6-day creation and universe only thousands of years old, could fit with the observational reality of visible light emitted from galaxies billions

of light-years away is only now arriving to the Earth? Similar to Russel Humphreys' book, *Starlight and Time* (1994), the solution involves application of Einstein's relativity which recognizes that clocks in different parts of the cosmos need not always run at the same rate. Although sharing the concept of time dilation with Humphreys, Hartnett's approach is significantly different.

The first seven chapters (120 pages) will be the most accessible for most readers containing material presented at the level suitable for those of us who only have the ability to peek in on the great thinkers of cosmology from the sidelines. Six appendices (111 pages) provide background discussions complete with supporting mathematical equations for those who have the necessary background and interest to delve more deeply.

Hartnett describes the development of a new physics based upon extensions to Einstein's relativity theories to account for large-scale "cosmological" factors such as variation in velocity, both with time and space. This development was the work of a theoretical physicist by the name of Moshe Carmeli in the early 1990s (p. 43):

> *Carmeli's new* spacevelocity *is an extension to Einstein's general theory, which incorporates a new dimension, the velocity of the expanding fabric of space itself. His general theory incorporates all of Einstein's theory that has been found valid for our solar system at least, but extends it to the larger scales of the Galaxy and the cosmos.*

A simplified way to look at it is this: in a similar way in which Einstein's relativity corrects classic Newtonian physics when dealing with atypical situations involving significant gravitational effects or high rates of travel, Carmeli's "cosmic relativity' corrects Einstein's physics when applied to large-scale structures such as the expanding universe.

Hartnett builds upon the work of Carmeli in numerous ways, but especially in showing the result of applying Carmeli's work to a finite, bounded universe with a unique center and its ability to match observational data without appealing to invisible 'dark matter' or 'dark energy' as is required within big-bang cosmology.

Chapter 5 presents data from two astronomical surveys providing strong evidence that our very own galaxy appears to be near the center of an isotropic distribution of galaxies. In other words, when viewed from our galaxy, the observed data implies we are somewhere near the center of the universe because we occupy a region near the center of an observational pattern resembling the concentric rings of an onion. Bible-believers will not find this to be surprising, but this idea is strongly resisted by many cosmologists who are unwilling to accept the possibility that Earth and mankind both hold a special place in God's creative purposes.

Hartnett quotes Richard Feynman (p. 76):

> *. . . I suspect that the assumption of uniformity of the universe reflects a prejudice born of a sequence of overthrows of geocentric ideas . . . It would be embarrassing to find, after stating that we live in an ordinary planet about*

> *an ordinary star in an ordinary galaxy, that our place in the universe is extraordinary . . .*

When the observational data is permitted and a bounded universe with center near our galaxy is assumed, the new physics have a significant advantage over big-bang cosmology (which posits a homogeneous universe with no boundary or center) in that the so-far undetected 'dark matter' and 'dark energy' are not required in order to 'fudge' the results of the formulas when compared with observed data from distant galaxies.

It is Hartnett's application and adaptation of Carmeli's work to a finite, bounded universe with our galaxy near its center which provides what may be the most interesting result from the perspective of readers of Genesis: that time dilation is a necessary result as the heavens were "stretched" during God's creative process, causing an acceleration in the expansion velocity of space.

Hartnett suggests this time dilation was isolated to day 4 with the creation of the astral bodies (Gen. 1:14-18 cf. Ps. 104:2; Isa. 40:22; 42:55; 44:24). Hartnett explains (p. 115-116):

> *This very rapid acceleration of the cosmos during Day 4 of Creation Week caused Earth clocks to run very slowly compared to cosmic clocks . . . This, then, provides the massive time dilation needed to allow light to travel the vast distances of the universe, even billions of light-years* in a matter of days *—as measured by Earth Clocks.*

The result is that it was time *on the Earth* which slowed relative to time in the cosmos. As the accelerated stretching of space subsided, the rate of clocks running on the Earth would have increased until it came to match the rate of clocks running in the cosmos. Thus, light which arrives on Earth today, which was emitted from galaxies at distances as large as billions of light-years, arrives to the observer on Earth in the same rate of time as from when it was omitted. Thus, spectral lines in the light arriving from the stars does not evidence massive blue shift, but rather a smaller red-shift evidencing the continued expansion of space. This is because the time reference of the historically-emitted light matches that on today's Earth and no time dilation artifacts remain to be seen.

The Carmeli-Hartnett cosmology differs from other proposals which involve time dilation where clocks in the cosmos are said to have run faster than Earth clocks, but where Earth clocks have remained running at the same speed throughout history such that light now arriving from distant stars would have been emitted from a much higher rate of time than our rate on Earth today. Observations of starlight show that ancient light arriving today cannot have been emitted from a substantially different time rate than what we now experience on Earth or large blue shifts would be observed. But they are not.

I would recommend this book for anyone interested in the veracity of Scripture in relation to recent ideas in cosmology. The book is an exciting example of how God uses a gifted mind to grapple with observed reality in light of His special revelation. Dr. Hartnett is one such gifted mind and it is always a pleasure to watch a fellow believer operating in his

area of gifting. More than that, the work of Carmeli and Hartnett provides a promising new development in explaining how light from galaxies at such extreme distances as billions of light-years is arriving here on Earth within the span of only some 6,000 years of Earth time since creation.

Reviewed by Tony Garland of www.SpiritAndTruth.org.