

farthest tens of billions. Yet evolutionary astronomical textbooks admit that these distances are only 'estimated', 'apparent', 'approximate', 'inferred', 'indicated', 'assumed', or 'guessed'!

Genesis calls the Sun the *Me'* or *Hagadol*, the Great Luminary, 'like a mighty man running a race' (Psalm 19), with the stars referred to almost *in passim* (Genesis 1:16). Evolutionists revel in labelling the Sun as an insignificant Type G' star set at the corner of a minor galaxy somewhere at the edge of the universe. But evidence is accumulating that the Sun may be unique in the universe, and should not be classified as a star. The stars may be much smaller and closer than heretofore believed. Not even the Hubble Telescope shows them to be anything more than point-sources of light, which is all they may turnout to be!

A reading of 'Quasars, Redshifts and Controversies', Halton Arp, 1987, gives compelling evidence that quasars are not at the cosmological distances claimed for them, and that the use of the redshift as a measure of cosmic distance is invalid. Moon and Spencer ('Binary Stars and the Velocity of Light', 1953) argued for a universe between two and 15 light-years in size. Cogent geocentrists like Walter van der Kamp, Harald Heinze and James Hanson believe that the parallax and aberration circlet described by the stars are **real**, not apparent. Through simple trigonometry they have the diameter of the universe down to 120 light-days and all the stars being arranged in a huge equidistant *stellatum*.²

As for Barry Setterfield, the main proponent of a decrease in the speed of light, he has good personal reasons for not as yet replying to criticisms of *c* decay. In past issues of the **Technical Journal** and elsewhere he has amply demonstrated his ability to answer all criticisms of the theory, and it is understood that more discoveries on this subject and others are soon to emerge from his stable.

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It should be noted that the Moon and Spencer 'model' has since been widely discredited, most astronomers cannot conceive how simple trigonometry could measure the diameter of the universe, and Setterfield has, unfortunately, so far not been able to answer all criticisms of his theory in this or any other creationist journal.

— Editor.

HOW MUCH DID THE ANCIENTS KNOW OF THE HEAVENS?

Dear Editor,

I just finished reading Dr Bergman's article Teaching evolution through science fiction¹ and found it most informative. However, one point piqued my interest. Dr Bergman states,

*'The enormous size of the universe was not fully understood until this century and, even in the last few decades, our views of its vastness and complexity has been revolutionized.'*²

I recall C. S. Lewis, in one of his essays on apologetics,³ made reference to the fact that Ptolemy (Claudius Ptolemaeus) was well aware of the size of the earth in relation to the visible stars. Lewis's point was that science had not undermined the 'naive' view of the universe held by the medieval theologians. In his **Almagest**⁴ Ptolemy wrote:

'Now, that the earth has sensibly the ratio of a point to its distance from the sphere of the so-called fixed stars gets great support from the fact that in all parts of the earth the sizes and angular distances of the stars at the same times appear everywhere equal and alike, for the observations of the same stars in

the different latitudes are not found to differ in the least.

Moreover, this must be added: that sundials placed in any part of the earth and the centres of armillary spheres can play the role of the earth's true centre for the sightings and rotations of the shadows, as much in conformity with the hypotheses of the appearances as if they were at the true midpoint of the earth.

And the earth is clearly a point also from this fact: that everywhere the planes drawn through the eye, which we call horizons, always exactly cut in half the whole sphere of the heavens. And this would not happen if the magnitude of the earth with respect to its distance from the heavens were perceptible; but only the plane drawn through the point at the earth's centre would exactly cut the sphere in half, and those drawn through any other part of the earth's surface would make the sections below the earth greater than those above.'

I would like to know if Dr Bergman is aware of this and have him elaborate on his understanding of the state of cosmological knowledge during the Middle Ages.

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2. Bergman, Ref. 1, p. 177.
3. Lewis, C. S., 1970. **God in the Dock: Essays on Theology and Ethics**, William B. Eerdmans Publishing Company, Grand Rapids, Michigan, p. 74.
4. **Great Books of the Western World**, Number 16: Ptolemy/Copernicus/Kepler, R. M. Hutchins (Editor in Chief), Encyclopedia Britannica, Inc., Chicago, London, Toronto, 1952.

The Author Replies ...

Historically, although some individuals have taught that the universe extends to infinity, before the advent of

telescopes (especially the larger complex telescopes produced around the turn of the century) scientists could not see very far into the universe. Now we realize that hundreds of galaxies besides our own exist, as well as white and red dwarfs, red giants, neutron stars, double and triple stars, and possibly even black holes as well as pulsars. We also now have an understanding of what supernovae really are, and the many other objects in the universe which were unknown or not understood historically. Quasars were discovered only in 1963, and we could not understand neutron stars (where the pressure from gravity is so great that it is essentially a solid mass of neutrons packed as densely as in an atomic nucleus, with a cupful weighing a few tonnes) until neutrons were discovered in 1932, while neutron formation was not understood until much later.

It was once believed that the physical heavens consisted of only a large number of stars, all of which were very much alike. We can see about 6,000 stars in the evening and, aside from biblical revelation which does not speak much about the physical heavens except its large number of stars, I know of no ancient record which discussed galaxies, galaxy clusters, or super-clusters, all of which were discovered only recently. The closest and one of the most visible galaxies from the earth, Andromeda, was thought to be a star, and it was only Simon Marius, a contemporary of Galileo, who gave the first description of it which even indicated that it was something more than an ordinary star. Of course, it was not until much later that we realized what galaxies were — even Galileo thought that the heavens were populated only by individual stars. It took his successors to realize that there are many patches of sky which would not 'disintegrate' into stars when enlarged under high magnification as previously expected. It was only in 1700 that clear nebulae were discovered, and they were treated as

merely curiosities.

Further, I know of no historical record which gives any hint of such celestial objects as pulsars or neutron stars, which were not known until very recently. While I respect C. S. Lewis — especially because of his clear later statements in favour of creationism against evolution (something that is not widely known) — I do not think that the history of astronomy was an area of his expertise. In many ways, astronomy has advanced so much that even our knowledge before 1900 would be considered somewhat primitive. It is true that some early Greeks and other astronomers were aware of the size of the earth in relationship to visible stars, but the visible stars are only a minute part of the presently-known universe — and how much is out there that we today do not yet know about? Every time a new and bigger telescope is developed, we end up discovering much that we never even dreamed existed. Will this ever end? A new telescope a thousand times more powerful than the ones we have with equally improved resolution may open up wonders that we cannot even imagine. This, at least, is what has happened for the past hundred years. Even our knowledge of how the sun functions, what stars are, the actual conditions on our local planets, has been revolutionized in the past few decades. The new Hubble Telescope can resolve images an estimated 12 billion light years away, three times as far as before the wide field planetary camera was installed.

My reading of a number of works on astronomy written in the Middle Ages forces me to conclude that, while the people then knew a great deal about what could be observed on the earth, it took a Johannes Kepler to figure out the actual orbits of the planets as described in Kepler's famous laws. Progress then was slow and difficult because most people were preoccupied with making a living and survival — only a few rich people could then afford the luxury of doing astronomy. Today this, of course,

has drastically changed. Governments and industry support astronomical research to the tune of billions of dollars annually, and there are more living professional astronomers today than have lived throughout all of history combined. These factors alone give us a tremendous advantage. Also, we now have 6,000 years of research to build upon, and communication among scientists today is far more effective than ever before in history. We also have the advantage of technological revolutions that began with Shockley and his team's invention of the transistor in the late 1940s. Thus, I would say that the knowledge of the heavens during the Middle Ages was probably a minute fraction of one percent or less of our knowledge today.

As a collector of old science books, I am intrigued about the advances in knowledge from the turn of the century alone, and am forced to conclude that our knowledge about science in 1910 was primitive compared to what is known today (although many of the basics taught at high school and college were known at this time). Nonetheless, the word 'revolution' is used for good reason to describe the progress of science today, all of which clearly renders the Paley's watchmaker hypothesis infinitely more viable in our age than ever before in history. Ironically, among scientists, even though we have more evidence for design and thus a Creator than every before, proportionately fewer scientists than ever before believe in Him — something I find enormously ironic. Evidently, many scientists learn more and more about less and less until they know everything about nothing! The problem of unbelief among scientists, though, has much more to do with our educational indoctrination than the facts of science.

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