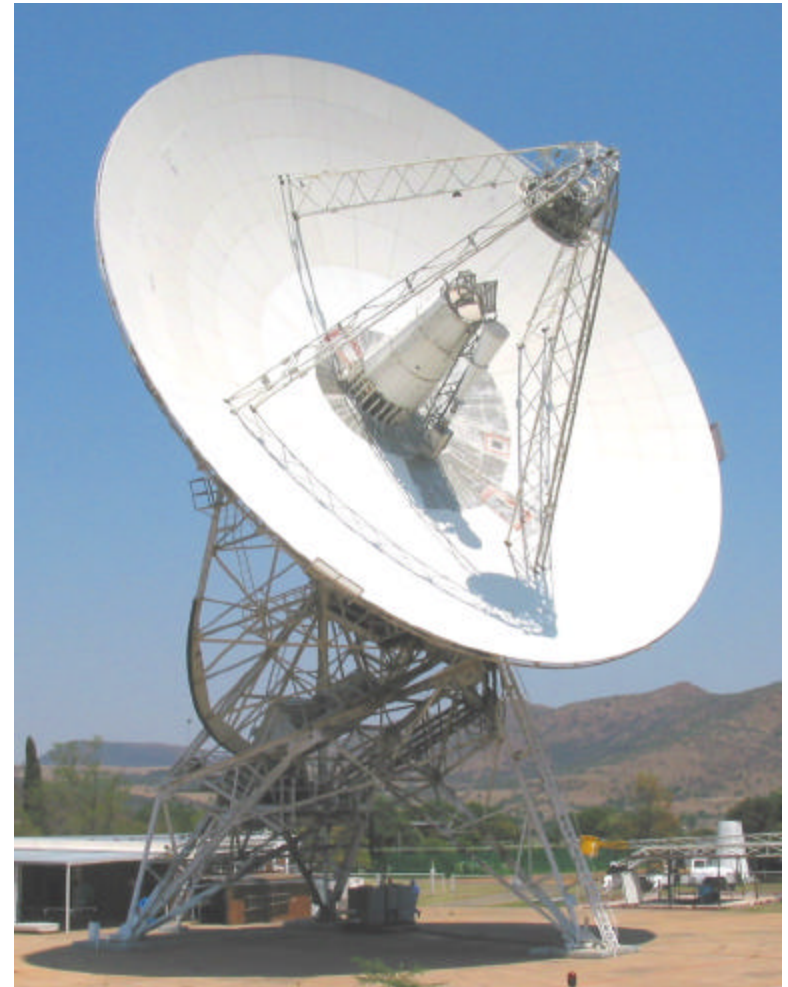


VOLUME 14

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**THE
BIBLICAL
ASTRONOMER**

SPRING 2004



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Cover: The radio telescope at Hartebeesthoek Radio Astronomy Observatory west of Johannesburg in South Africa is an example of a dish antenna. Dish antennas were invented by Grote Reber, the author of the article starting on page 33 in this issue.

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EDITORIAL

The leadoff article in this issue requires some explanation. Its author, Grote Reber, shown at his radio console at left, was a well-respected pioneer in radio astronomy. He was the inventor of the dish antenna. He died in Tasmania on 20 December 2002, two days before his ninety-first birthday.



The article presented here is an example of what science and scientists were like before science compromised truth for political and financial gain. The former is exemplified by global warming, (cf. “Panorama”); the latter by Carl Sagan. Reading it was, to your editor, a refreshing change from today’s new-morality drivel, which is nothing more than the old immorality. The pursuit of truth was then still evident. The likes of Sagan were the exceptions. Sagan, boyish face led to his appearance in a 1961 National Geographic special about astronomers, was held in low regard by astronomers through the 1960s.

The article also recalls the respect that the old generation of astronomers held for the Scriptures. Though I see no evidence that Reber was ever a believer of the Scriptures, the reader will find that he does not dismiss the Genesis account of creation off-handedly, as do most of today’s astronomers. Instead, he posits that time was accelerated during the creation week, a carefully thought-out stance that is akin to what has been proposed by several modern creationists.

Finally, the article belies the enviromyth that the ozone hole suddenly came into existence in the 1990s because of man’s use of fluorocarbons. Grote Reber moved to Tasmania in 1954 because he wanted to prove his theory of the redshift. His theory could not be proved from the surface of the earth, for the evidence he needed is blocked by the ozone layer. He moved to Tasmania to take advantage of the ozone hole over Antarctica. Even back in 1954, it was already known that the hole could extend over Tasmania! Furthermore, it was known to depend on the solar sunspot cycle.

A word about Reber's theory of the redshift is in order. He put it this way:

Electrons are continually losing energy to the low temperature ionized [stripped of its electron] hydrogen within galaxies. This is manifest by the low intensity region along the plane of the Milky Way. Since [the kinetic temperature of electrons] has stabilized on the order of 3.54×10^6 °K, some source of energy must be replenishing that lost to the galaxies. A suggested phenomenon is the interaction of a light photon with an electron known as a *Compton event*. Some of the energy of the photon passes to the electron and increases the latter's kinetic energy. The photon then leaves the event with a lower frequency [i.e., a longer or redder wavelength].¹

In effect, his was a tired light theory.

Reber's article defends the infinite universe model also advocated by creationist Henry Morris. We have exposed the errors in this belief in past articles and will not review them here.²

¹ Reber, G., 1968. "Cosmic Static at 144 Meters Wavelength," *Jml. of the Franklin Inst.*, **285**(1):5.

² E.g., Byl, J., 1996. "Some remarks on the cosmological argument," *B. A.*, **6**(76):5.

ENDLESS, BOUNDLESS, STABLE UNIVERSE

GROTE REBER

Honorary Research Fellow, CSIRO, Hobart, Australia
UNIVERSITY OF TASMANIA OCCASIONAL PAPER 9
University of Tasmania
December 1977
ISBN 0-85901-051-1

Dr. Grote Reber graduated from the Illinois Institute of Technology in 1933 and for the next ten years, while he pioneered the field of radio astronomy, was employed as an engineer by a Chicago radio corporation. He designed and built the world's first radio telescope and during this period was the only active radio astronomer. He arrived in Tasmania in 1954 and has spent much of his time since then making low frequency radio astronomy observations at various sites in the Tasmanian midlands. He has published many scientific papers in radio astronomy and also in other fields. In 1962 he was awarded the Catherine Wolfe Bruce Gold Medal by the Astronomical Society of the Pacific. *Endless, Boundless, Stable Universe* is the text of a lecture delivered by Dr. Grote Reber in the University of Tasmania on Wednesday, 8 September 1976.

Introduction

According to modern mysticism,³ the radius of the universe is 10.4×10^{22} kilometres, corresponding to a symbolic time of 1.1×10^{10} years. The radius of the earth is 6.38×10^3 kilometres. The ratio of the former to the latter is 1.63×10^{19} .

When the Hubble variable was discovered in 1926, it had a value of 500 kilometres per second per megaparsec.⁴ During the past half century, this variable has gradually declined to 50.3 kilometres per second per megaparsec.⁵ The radius of the universe is inversely proportional to the magnitude of this variable. Accordingly, the universe is expanding by a factor of 100 per century. Dividing this factor into the above ratio discloses that the expansion began here on earth 961 years

³ Halton Arp, "Extragalactic Astronomy," *Science*, 17 Dec. 1971, vol. 174, p. 1189.

⁴ R.H. Baker, *Astronomy*, first ed. 1930, p. 497.

⁵ M. Rowan-Robinson, "Extragalactic Distance Scale," *Nature*, 16 Dec. 1976, vol. 264, p. 603.

ago, or A.D. 1015, during the dark ages. Obviously, western cosmology was born in the dark and has been there ever since.

The Doppler Shift

Johann Christian Doppler worked in Vienna as a mathematical physicist during the first half of the nineteenth century.⁶ During 1842, he predicted a shift in observed wavelength would be caused by relative motion between the source and an observer. When the two are approaching, the wavelength will be shorter. When the two are separating, the wavelength will be longer. This was confirmed experimentally for sound by Buys Ballot in 1845. The optical confirmation had to wait until 1871 when the phenomenon was observed in Fraunhofer lines using solar rotation, about 0.1 angstrom in the red. In 1901, Belopolsky verified the effect in the laboratory using a system of rotating mirrors.

During the latter half of the nineteenth century, there were great improvements in telescopes, spectrographs and photography. By the turn of the century, the Doppler effect was being used to study very close double stars. These are pairs of stars rotating about a common centre of mass. See Fig 1. Usually the two stars have different spectra. When star A moves toward the observer its spectrum is shifted toward blue. Simultaneously the star B is moving away from the observer. Its spectrum is shifted toward red. Half an orbit later, the two spectra A and B are shifted oppositely toward red and blue respectively. Any observed red shift is always accompanied by an equal and opposite blue shift. The magnitude of these shifts varies widely. It is dependent on the spacing between stars A and B. The closer they are the greater the shifts. On the average the shifts are independent of the distance from the pair to the observer.

A decade later the motion of the sun among all the other stars was being studied using the Doppler phenomenon. The stars in front of us appear to be approaching and have a blue shift. The stars behind us appear to be receding and have a red shift. See Fig 2. Again, the magnitude of these shifts varies widely because each star has its own peculiar motion. However, these motions are random. On an average there are just as many blue shifts from stars in front of us as there are red shifts from stars behind us. The magnitude of the shifts is not dependent on distance.

⁶ *Encyclopedia Britannica*. "Johann Christian Doppler".



FIGURE 1: Double stars rotating about a common centre of mass



FIGURE 2: Motion of sun, earth and observer among other stars

By 1920 the rotation of our galaxy, the Milky Way, was being examined using the Doppler phenomenon. See Fig 3. The farther it is from the centre of the galaxy, the slower does material rotate. In quadrant A the inside material is catching up with us. We are catching up with material in quadrant C. Thus objects in quadrants A and C show dominantly blue shifts. Similarly, material in quadrants B and D show dominantly red shifts. There is a large scatter because all the material has its own peculiar random motion. However, on the average, the shifts are independent of the distance from the source to the observer.

All three of the above examples are correct interpretations of spectral shift caused by relative motion between the source and the observer. There are always equal and opposite blue and red shifts. The magnitude of shifts is independent of the distance to the source, and usually represents a few to a few tens of kilometres per second velocity.

Fuzzy Patches Called Nebulae

During the eighteenth century, telescopes improved in power and image quality. Soon it was found that all celestial objects are not point dots of stars. Some are diffuse irregular low surface brightness patches which resemble comets but do not move. Messier was an avid comet

hunter who found these fixed patches a nuisance. He compiled a list of over a hundred objects and their positions for ready reference of objects to be excluded during his searches for comets. His numbers are still in use today.



FIGURE 3: Rotation of material in Milky Way near observer

The nature of these objects was a matter of conjecture for many years. About 1923 George Ellery Hale organized the Shapley-Curtis debate as to whether the fuzzy patches were part of our own Milky Way or external thereto. Lack of evidence prevented any conclusion. They became known as *nebulae*.

The problem finally succumbed to data from the 100-inch telescope at Mount Wilson operated by Edwin Hubble.⁷ He was able to resolve several nebulae into stars of types familiar in our own Milky Way and demonstrate that the nebulae are separate stellar systems of comparable size. Using a boot-strap operation, distances were secured far beyond anything dreamed of in the past. The remarkable story is excellently told in his *Observational Approach to Cosmology*. When discussing these subjects before various astronomical gatherings and university departments I have asked for a show of hands by people who have read this book. The results have been trivial. The old masters deserve more direct attention. This book should be required reading for all young astronomers. It is good literature with fine style.

As early as 1913, V. M. Slipher had secured spectra of light from some of these fuzzy objects and noted the similarity to background light from unresolved stars in the Milky Way. Milton Humason followed up these data with observations using large reflectors at Mount Wilson. The unexpected and disconcerting finding was that the spectra showed only red shifts. These shifts were directly proportional to the distance of the object as determined by Hubble. Furthermore, by 1934 the shifts were up to 13 or 14 percent equivalent to a symbolic velocity, about 25,000 miles per second. The results were startling partly because of the magnitude of the phenomenon, but partly because no blue

⁷ *Lowell Observatory Bulletins*.

shifts were encountered. Clearly, the interpretation of these spectral shifts as representing relative motion was dubious.

Light Photons

If a light photon gains or loses energy, this is manifested by a change in wavelength respectively toward the blue or the red. A photon may lose energy during its travel through intergalactic space. The energy loss would be proportional to the distance traveled. Thus the lengthening of the wavelength, as measured by the shift, would be proportional to distance, as observed. Hubble concludes on page 30: "Light *may* lose energy during its journey through space, but if so, we do not yet know how the loss can be explained." He makes frequent reference to this dilemma on pages 2, 21, 26, 31, 43, 63. Finally he closes on page 66: "We seem to face, as once before in the days of Copernicus, a choice between a small, finite universe, and a universe indefinitely large plus a new principle of nature".

I met Hubble only once. It was 1952, the year before he died. I had gone to see him about another matter but could not help mentioning the subject his name is so closely connected with. He seemed only mildly interested and appeared to feel that everything possible to say had already been said many times over. Furthermore, if future progress were to be made it would require some new and different kind of evidence. Pursuing existing techniques would merely lead farther down a dead-end road. I asked him what kind of new and different observation should be made. He had no suggestion to offer. Perhaps I am giving an impression of an aging man.

Cosmology

Cosmology has been a philosophical football since time immemorial: about 500 B.C., Parmenides inferred that the universe had no beginning.⁸ Most modern speculation or theories are on a par with those of the ancient Hindus. The earliest discussion I have found about tired light is by Fritz Zwicky.⁹ He has several vague ideas. The deSitter universe is based on imaginary fabrication of a repulsive force varying directly with distance.¹⁰ J. Q. Stewart searches through a table of universal constants and comes up with the following numerology.¹¹

⁸ F. N. Magill, *Masterpieces of World Philosophy*, pp. 16-22, Allen and Unwin, London 1963.

⁹ F. Zwicky, "Red Shift of Spectral Lines," *Proc. Nat. Acad. Sci.*, 1929, v. 15, pp. 773-9.

¹⁰ R. H. Baker, *Astronomy*, 1st ed. 1930, p. 497, 3rd ed., 1947 p. 284.

¹¹ John Q. Stewart, "Red Shift and Universal Constants," *Phys. Rev. I*, Dec. 1931, vol. 38, p. 2071.

Shift = $\Delta\lambda/\lambda = d(h G m_0^3 c^3/e^6)$, where d = distance.

He wants someone to write and tell him why this is so. Apparently, the editor of *The Physical Review* did not bother to dimension the above. The left side of the equation is a pure dimensionless number. The reader can dimension the right side as a fireside exercise. Fred Hoyle proposed continuous creation where hydrogen atoms are made out of nothing by unspecified black magic.¹² After being talked out of this Fred now suggests masses of fundamental particles are increasing with time.¹³ Finlay-Freundlich opts for photon-photon encounters but does not explain how they work.¹⁴ He proposes an empirical formula, Shift = aT^4d , where T is the temperature of the radiation field.

This is placing the desired answer into the hypothesis, so the correct result is inevitable. Even so, he seems to have reservations or gets cold feet. On page 318 we learn "...light must be exposed to some kind of interaction with matter...in intergalactic space." No mechanism, details or comment are given.

Shelton and his opponents engage in desultory contests involving tired light produced by Compton transitions.¹⁵ The discussion fizzles out because no one can point to evidence for the existence of intergalactic material. They do not know how to handle low energy Compton transitions, and only Shelton realizes a "single effect (deflection)... would be very minute, and...be compensated by an equally minute diversion in the opposite direction." This is a problem in two-dimensional random walk. Mathematical ability to handle it may not have been available at that time. On page 171 Shelton says, "Dr. Hubble never committed himself to the theory of the expanding universe." The late Dr. R. A. Millikan told me thus in a letter dated 15 May 1952, and added: "Personally I should agree with you that this hypothesis (tired light) is more simple and less irrational for all of us."

Mansfield¹² imagines that gravity is not constant but increases with time.¹⁶ Malin suggests the mass of particles varies inversely as the

¹² R.H. Baker, *Astronomy*, 7th ed. 1959, p. 531.

¹³ Virginia Trimble, "Frontiers of Astronomy," *Science*, 24 Oct. 1975, p. 368. Contrary evidence in *New Scientist*, 26 Aug. 1976, p. 438, and *Physics Today*, Sept. 1976, p. 17.

¹⁴ E. Finlay-Freundlich, "Red Shifts in Spectra", *Phil. Mag.*, March 1954, p. 317. See also H.S. Shelton, *Observatory*, Dec. 1954, p. 252; and G.J. Whitrow, *Observatory*, June 1954, pp. 100-2, and in *Monthly Notices Roy. Astro. Soc.*, 1954, vol. 114 pp. 180-90. It has been resurrected by J. C. Pecker, *Nature*, 1972, vol. 237, p. 227 and 12 Jan. 1973, p. 109.

¹⁵ H.S. Shelton, "Red Shift in Spectra of Distant Nebulae", *Observatory*, April 1953 p. 84, Aug. 1953 p. 159, Dec. 1953 p. 243, Aug. 1954 pp. 169-71.

¹⁶ V. N. Mansfield, "Cosmologies with Varying Gravity," *Nature*, 17 June 1976, p. 560.

fourth dimensional radius of the curvature of the universe.¹⁷ Brush thinks that gravity is in fact merely longwave radiation pushing masses together.¹⁸ However, the best of these speculations is given by Hubble on page 44. I have not stumbled across his unstated source which he characterizes as “special pleading.” Time runs at variable speed. In the distant past time ran faster and much was accomplished. See Genesis 1.

Today the spacious universe has a much slower rhythm. I am sure many readers believe this unknown pleader has things backwards. Getting from 10 to 15 years old seemed an interminable time. From 55 to 60 years is a frighteningly short time. During the past half century a vast amount of paper has been expended on this kind of material as sensed by Kellerman (pp 541-2).¹⁹

Unspecified Assumption

The Astronomical Society of the Pacific has bumper stickers with various astronomical slogans. See Figure 4.

FIGURE 4: Bumper sticker from Astronomical Society of Pacific

How did this myth get into the textbooks? The cause lies in an assumption, always present but rarely mentioned or even implied. This



worrisome assumption can be seen in remarks by Zwicky, Freundlich, Shelton and others. The assumption is that intergalactic space is a void. By definition, a void lacks contents. Light cannot interact with a void. By making this assumption, the door is closed to all physical phenomena. The only possible explanation of shifts of spectral lines in light from distant nebulae becomes relative motion. This assumption is based on an anthropocentric view of our surroundings. If a person cannot hear, smell, feel or see an object, this object does not exist. Only recently has it been realized, even among the scientific community, that “absence of evidence is not evidence of absence.”²⁰ Until a few years ago, I had little interest in cosmology. It

¹⁷ S. Malin, *Phys. Rev. D.*, vol. 9, 1974, pp. 3228-34, and vol. 11, 1975, pp. 707-10.

¹⁸ Charles Francis Brush, “A Kinetic Theory of Gravitation,” *Nature*, 23 March 1911, vol. 86, pp. 130-2.

¹⁹ K. I. Kellerman, “Radio Galaxies, Quasars and Cosmology,” *Astronomical Journal*, Sept. 1972, vol. 77, pp. 531-42.

²⁰ Attributed to Martin Rees, Institute for Astronomy, Madingley Road, Cambridge, England.

seemed immersed in hocus-pocus and humbug, all rather dull. I was injected through the back door by chance.

Hectometre Radio Astronomy

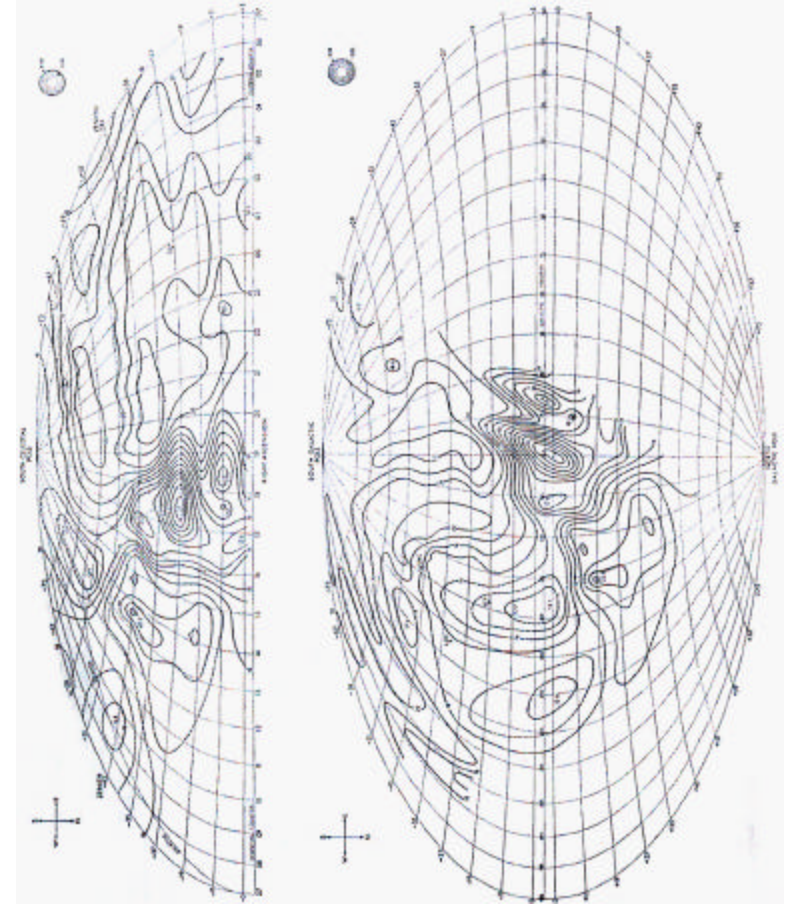
By the early 1950s radio astronomy was becoming respectable. Dishtype radio telescopes were being installed at several places. The march to ever-shorter wavelengths in search of ever-greater angular resolution was under way. The science seemed to be in good hands. I decided to try for observations of cosmic static at long wavelength simply as an exploratory search. Whatever the wavelength it must arrive at the observer on the surface of the earth. As the wavelength increases beyond twenty metres, the ionosphere becomes increasingly important.

The ionosphere is a mirror for radio waves, silvered on both sides. A man-made wave will be reflected back to earth allowing long distance radio communication around the curvature of the earth. A celestial radio wave will be reflected back into space. See Figure 6A. At wavelengths greater than 100 metres, the ionosphere is the dominant feature of the experiment. As the name implies, the ionosphere is a layer of ions 200 to 300 km above the surface of the earth. However, not the ions, but the associated free electrons are more effective, so the ionosphere becomes as a shield for long-wave cosmic static. Obviously, if observations of cosmic static at hectometre (hundred metres) waves are to be successful, the electron density must be as low as possible. Fortunately measuring characteristics of ionosphere had become a popular scientific fad, so data was available at scores of places around the earth. Furthermore, I had access to this vast mass of observations and I was not associated with any institution committed to long-term microwave studies and a resultant freezing of resources. Also, my past engineering experience was at long wavelengths; and I was not inhibited by any preconceived ideas about what was to be looked for. All this independence put me in a very preferred position. The situation was rather similar to that I enjoyed at Wheaton, Illinois, during the 1930s.

First the ionosphere data was perused. The lowest electron density was found to be near the minimum solar activity, during winter at night between latitudes 40° and 50° , near the agonic line where compass points true north. The most auspicious places are near Lake Superior in the northern hemisphere, and Tasmania in the southern hemisphere. The former looks out on the northern sky and the periphery of the Milky Way. The latter looks out on the southern sky and the centre of the Milky Way, a more interesting region.

FIG. 5: Cosmic static at 144 meters wavelength in galactic coordinates.

Before doing anything it seemed wise to consult assorted pundits and experts, self appointed and otherwise. This produced a psycho-



logical situation. Asking for advice is a form of flattery: the recipient feels he must rise to the occasion. Advice is provided which under more sober circumstances would probably be declined. Also, most people have their own pet hobbies which envelop their lives. A stranger comes and proposes something different. Obviously it cannot be much good, or they would have thought of it first. Consequently the advice is negative. I was informed that hectometre waves could not possibly get through the ionosphere and even if they did there would be a large, variable and unknown absorption. There would also be un-

known and variable bending of rays of cosmic static by refraction. Furthermore, I would have great difficulty locating an empty channel because of the huge number of transmitters. Finally, if I could find an empty channel, I would be swamped by atmospherics. After listening to these Cassandras it was obvious, none had any idea of circumstances. Clearly, hectometre radio astronomy was an excellent oppor-

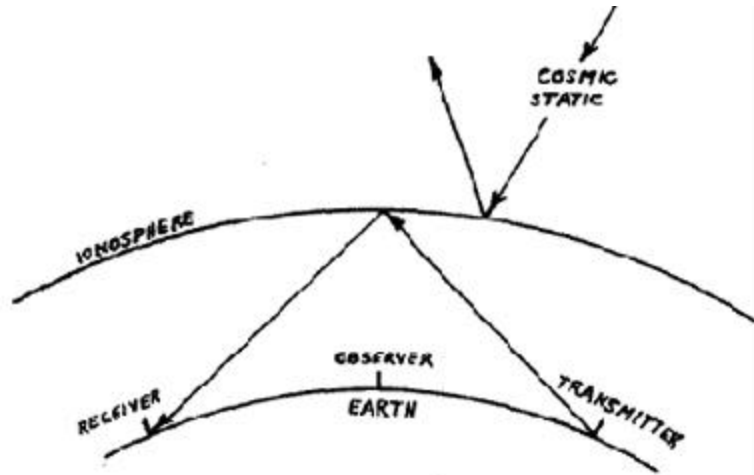


FIGURE 6A

Normal ionosphere. Cosmic static reflected into space.

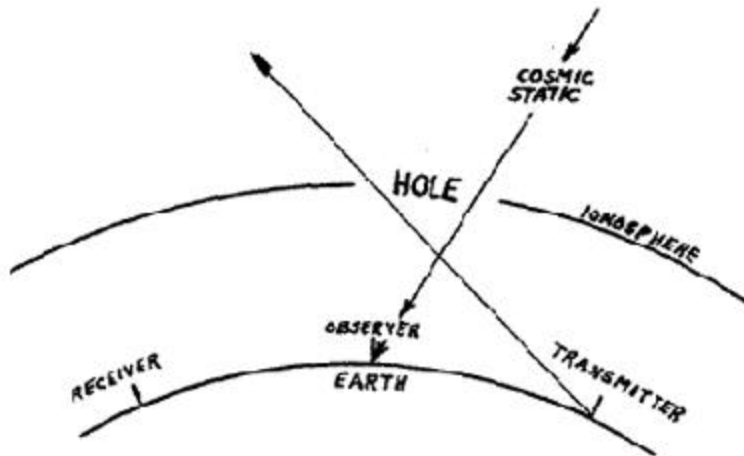


FIGURE 6B

Hole in ionosphere. Cosmic static reaches observer on earth

tunity to do new, different and fundamental research.

Tasmania

This large island off the southeast corner of Australia seemed a likely place to choose. I examined *Physics Abstracts* and found a paper about “Z” echoes by G. R. A. Ellis, now Professor Ellis. This seemed a likely contact with someone of similar experience and interests. I wrote explaining briefly my ideas and requesting comments and suggestions. His prompt reply disclosed that the ionosphere station had been recently moved from Cambridge to Mount Nelson. The old hut with phone, power and water was available plus some tall poles with cage antennas. Only suitable electronic apparatus for measuring cosmic static was needed.

Events proceeded and I arrived in Sydney on 1 November 1954 aboard the Orion with ten cases of electronic apparatus in the hold. The wharfies promptly struck. Only passengers and personal baggage were unloaded by the crew. The Orion then left for New Caledonia with my cases. Eventually I got to Hobart toward the end of November and my cases followed in a few weeks.

It was summer time, so observations were deferred until the middle of March. One afternoon the equipment was set to an apparently empty frequency near 2130KC²¹ and left operating. Three days later we returned and examined the recordings. Daytime showed low level station interference which increased in magnitude along with atmospherics toward evening. About 1 a.m., on the first night, the electron density of F layer decreased enough so that a transparent hole in the ionosphere appeared at 2130KC. See Figure 6B—The pen rose to a high level, about three-quarters full scale and continued smoothly until sunrise when the hole closed due to increasing electron density in F layer. The two following nights the hole opened partially in an erratic manner between midnight and dawn. During the first night when the hole was open, all man-made interference and atmospherics went out through the hole into space. The cosmic static came in without attenuation and had unexpectedly great strength. The Cassandras were wrong. Here was a new and interesting aspect of radio astronomy which should be followed up.

We made observations all winter using additional frequencies near 1400KC, 900KC, and 520KC from time to time. Some cosmic static was secured every night at 2110KC, and on fewer occasions at lower frequencies. A few partial openings of the hole were observed at 520KC. The antennas were pairs of dipoles, so directivity was meager.

²¹ Note by G.B. KC stands for “kilocycles per second.” Today one would say “kilohertz,” a rather nonsensical term where a “Hertz,” Hz, stands for one cycle per second.

The opening and closing of the hole as determined by cosmic static recorders was checked by the ionosphere recorder on Mount Nelson. Very close agreement was found. These results were published early in 1956.²² Solar activity was rising, so observing conditions were deteriorating. Our ways diverged. Ellis took a post in Queensland. I returned to the United States. In retrospect, the solar activity minimum of 1954-5 produced lower electron densities than the minimum of 1964-5. The recent minimum has been even poorer for hectometre radio astronomy. Observations at 1155KC during winters of 1974, 1975 and 1976 have been a complete failure. Not even one partial opening of the hole has been observed. The sunspot numbers for three minima are quite similar, so they are not a suitable indicator of ionosphere conditions. Perhaps examination of the size of the solar corona observed during solar eclipses will provide a more intelligent guide. If the corona is large, interplanetary space has a high particle density. These particles fall into earth's atmosphere creating high electron density at night. The reverse situation of a small corona may imply good observing conditions for cosmic static at hectometre waves.²³

A Hectometre Telescope

On the basis of success at Cambridge, I decided to return to Tasmania and build a more elaborate structure capable of being called a radio telescope. A large flat open area away from man-made electrical interference was needed. By good fortune, I contacted a sympathetic landowner, G. B. Edgell, whose Dennistown estate five miles north of Bothwell, was suitable. An array 3520 feet diameter comprising 192 dipoles was constructed. It was a meridian transit instrument with a beam capable of being adjusted along the north-zenith-south plane. Observations were made during 1963-7 at 2085KC, or 144 metres wavelength. Enough data were secured to make a map of the entire southern sky. See Figure 5. Results were published in 1968.²⁴

The Radio Sky

The radio sky at metre and shorter wavelengths is rather similar to the optical night sky. The background is dark with some bright objects scattered over it. Across the sky is a bright diffuse band caused by our

²² G. Reber and G. R. Ellis, "Cosmic Radio Frequency Radiation near One Megacycle," *Jrnl Geophys. Res.*, March 1956, vol. 61, pp. 1-10.

²³ M. Waldmeier, "Predicted and Observed Coronal Structure," *Nature*, 17 Feb 1977, p. 611 and *Z. Astrophysik*, 1955, vol 36, p. 275.

²⁴ G. Reber, "Cosmic Static at 144 Meters Wavelength," *Jrnl Franklin Institute*, Jan. 1968, vol. 285, pp. 1-12.

looking out along the plane of the Milky Way. The brightest area is near the galactic centre. Examination of Figure 5 shows the reverse situation. A very bright background exists with several darker patches along the plane of the Milky Way. The darkest area having the lowest intensity is at the centre of the Milky Way. Obviously, the bright background is outside the Milky Way. The low intensity regions are caused by clouds of ionized hydrogen within our galaxy. These absorb the hectometre wave energy from outside. At first glance, the absorbing regions seem most interesting. However, a little reflection suggests the background is more important.

Bright Background

This background appears to be radiation from an electron gas pervading intergalactic space. At 144 metres wavelength the gas becomes opaque at about 330 megaparsecs. The gas has a density of about 0.01 electron per cubic centimetre. The electrons must have some energy input to replace the energy lost by radiation and maintain equilibrium. This puzzle seemed unexplainable until I had the happy thought that the energy going into these electrons might be energy lost by light photons during their travel through intergalactic space. Further consideration disclosed the most likely phenomenon as Compton transitions.²⁵ Calculation showed that the suggestion of Shelton was tenable.²⁶ Also, perhaps, here was the kind of thing Hubble might be looking for. The electrons in intergalactic space act as transducers of energy from light waves to hectometre waves. These are absorbed by ionized hydrogen gas clouds within the galaxies. The clouds are building blocks for making stars. Thus, the light energy from old hot stars is recycled into un-born stars.

Intergalactic Material

Up to now I have discussed only intergalactic electrons. These are active material for radio waves. However, the intergalactic gas must be neutral, so an equal number of positive ions must be present. These ions are probably hydrogen nuclei, namely protons. Choosing suitable numbers for the size and spacing of galaxies, it turns-out that nearly all the material in the universe is still in its most primitive state of electrons and protons spread throughout space. Less than one percent has condensed into galaxies, stars, planets, you and me.

²⁵ R.H. Stuewer, "Compton Effect: Turning Point in Physics", *Science History Publication*, Neale Watson, New York 1975.

²⁶ Cf. footnote 13.

The intergalactic material will have small irregularities of density. Gravity will cause these to build up into immense blobs. As they build up, internal motion will probably cause smaller concentrations. These broken blobs are the building blocks for clusters of galaxies. Since intergalactic material is constantly being drained off into clusters of galaxies, some material must be replenishing that lost to the blobs. During the past couple of decades a variety of peculiar galaxies have been discovered as byproducts of radio surveys. Several show jets coming out of the nucleus.²⁷ Why and how the jets form is still speculative. A galactic nucleus slingshot is proposed.²⁸ In any case, these jets provide the necessary material to replenish intergalactic space.

Other evidence for intergalactic material is provided by tails found on galaxies by the Dutch.²⁹ The observations are at 1420MC and represent the proton of neutral hydrogen dropping to its lowest energy state in the atom. This neutral hydrogen is probably due to the recombination of some of the electrons and protons discussed above. The relative amounts of free electrons and protons to neutral hydrogen is unknown.³⁰

Further evidence is from dynamical studies of galaxies in clusters. These clusters are very old. The internal random motions are large. In order for the clusters to remain intact, a lot of invisible mass is required to provide the necessary gravity.³¹ This missing mass is several times the mass of visible galaxies. It probably is the blob of intergalactic material discussed in a previous paragraph.

By chance on 24 March 1976, I met an old friend, Richard Wielebinski, at Socorro, New Mexico. He is a product of Tasmania and is now associate director of Max Planck Institute for Radio Astronomy at Bonn, West Germany. Their main instrument is the world's largest movable dish, 100 metres in diameter. He showed to me an assortment of observations made at decimetre waves on the subject of Faraday rotation. Many of these objects are outside our Milky Way. Free electrons are required to produce Faraday rotation. Since the rotation is not related to direction within our galaxy, the electrons must be the inhabitants of intergalactic space. Pulsars are rather feeble sources of radio waves. All known pulsars are within our Milky Way. When a pulsar is discovered in a neighbour galaxy, the dispersion of pulse will give some idea of the density of free electrons between the galaxies.

²⁷ W. Baade, "Polarization in Jet of Messier 87," *Astrophys. Jnl.*, 1956, v. 123, pp.550-1.

²⁸ W.C. Saslaw, "Dynamics of Dense Stellar Systems," *Pub. Astro. Soc. Pacific*, Feb. 1973, vol 85, pp.5-23.

²⁹ G.K. Miley et al., "Extragalactic Radio Sources," *Nature*, 1972, vol. 257, pp.269-72.

³⁰ Using the context and the date this was written, I have taken the liberty of reworking the paragraph as Grote Reber suggested to the original editor that it should be. G. B.

³¹ A. Solinger, P. Morrison and T. Markert, *Astrophys. Jnl.*, vol. 211, p. 767.

Another bit of evidence is from x-ray astronomy. The entire sky seems covered by weak diffuse energy having a peak 30 to 50 angstroms. This is readily explained by free-free transitions among the intergalactic electrons and protons.

These developments are not surprising. Up to the end of the nineteenth century, interstellar space was considered vacant. Now it has electrons, protons, gas, dust, magnetic fields, cosmic ray particles etc. By the end of the twentieth century, intergalactic space will probably be similarly populated. "Absence of evidence is not evidence of absence."³²

Endless, Boundless, Stable Universe

Time is merely a sequence of events. There is no beginning nor ending. The material universe extends beyond the greatest distances we can observe optically or by radio means. It is boundless. The energy from hot material is recycled by electrodynamic (not thermodynamic) means. The material from dying galaxies is recycled into new galaxies. Details of material and energy distribution change on a small scale. Over any large volume and long time, the gross features of the universe remain stable. I am not offering a finished product. I am attempting to instill thinking about the Endless, Boundless, Stable Universe.

³² Cf. note 18.

THE GEOCENTRIC COSMOLOGY OF GENESIS 1:1-19

by
Dr. Thomas M. Strouse³³

Background

The man who almost single-handedly de-throned the Biblical teaching of geocentricity from its rightful place in Christian cosmology was Nicholas Copernicus (1473-1543). Copernicus developed the heliocentric model based on philosophical assumptions as expressed in his manuscript “*De revolutionibus orbium coelestium*” in 1542. He followed the influence of the teaching of Greek philosophers such as Pythagoras, Aristarchus and Plato, rather than that of the teaching of Bible exegesis. Since the time of the Reformation, the Christian world, for the most part, has acquiesced to man’s reasoning rather than Biblical explication for its cosmology. Early Christians interpreted their Bibles literally and maintained that the earth was the center of the planetary system as well as of the “universe.” They recognized that the Bible was consistently and singularly geocentric throughout in its cosmology. Post-Reformation Christians have overturned biblical exegesis for human wisdom. This essay is an effort to exegete the Hebrew text of Gen. 1:1-19 with the purpose of demonstrating the Christ-honoring geocentric structure of the heavens and earth. This Biblical demonstration of geocentricity should challenge Christians to return to the authority of the Bible in all areas including cosmology.

The Bible is the self-revelation of God. The first verse of the Bible begins with God as the subject and main theme. This theocentric theme culminates in the Lord Jesus Christ of Whom Paul revealed: “*For of him, and through him, and to him, are all things: to whom be glory for ever. Amen*” (Rom. 11:36; cf. also Rev. 4:11).³⁴

Structure

Moses makes obvious his literary style as he reveals the Lord’s creation week in a series of three couplets including eight creative acts culminating in the creation of man *imago Dei*. Days one and four record the creation of light and lightbearers. Days two and five record the creation of the face of the firmament and water that are filled with

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³⁴ It should be noted that the Lord Jesus Christ, during His earthly ministry, believed in the literal creation account and the historicity of Adam and Eve (Mt. 19:4-5).

the fowls and fish, respectively. Days three and six, revealing two creative acts each, record the creation of land and vegetation for the created animals and man to consume. The Lord God, through Moses, enumerates the days with ordinal numbers and the expression “*the evening and the morning.*” Moses permeates the account of the creation week with the adjective good (*tov bAj*) to reveal the nature of the Good Jehovah, Who has always had man’s ultimate good in the divine plan (vv. 4, 10, 12, 18, 21, 25, and 31; cf. Gen. 50:20; Rom. 8:28).

Moses uses his repetitious formula “*Let there be...*” following “*and God said*” throughout including 1) the divine fiat, 2) the divine creation, 3) the divine evaluation, 4) the divinely given parameters of the created object, and 5) the divine nomenclature. The Lord reveals the creative events He utilized to change the earth from a formless and void sphere of water to a formed (livable) and voidless (living) home for man. The creation account is obviously and purposefully geocentric, grammatically and Biblically, giving the divine (and therefore absolute)³⁵ perspective of the creation of heaven and earth.

Exegesis: the first day

In the beginning God created the heaven and the earth. (*Gen. 1:1*)

Moses uses very simple yet specific terms to describe the initial creation “in the beginning” (*bere’shith tyvärB*)³⁶ of the heaven³⁷ and earth to his Jewish audience. His description of divine activity moves

³⁵Moses, the human writer of Genesis, obviously was not alive during the creation week and so the perspective of Genesis 1 and 2 is not from man’s vantage point (phenomenological), but from God’s vantage point, Who was outside of the heavens and earth. The phenomenological hermeneutic devastates the supernatural when applied to other doctrines. This interpretative system destroys the supernatural teaching about Christ’s birth, miracles, and resurrection, and therefore Bible believers should shun it in Biblical cosmology.

³⁶Before creation all there was was the triune God. Nothing existed before creation including time, space, heaven, etc. (Jn. 1:3). There was no infinite space before creation and obviously God did not create any infinite space or universe because the Bible teaches that the third heaven was a finite creation (cf. I Ki. 8:27), that the first and second heavens had boundaries (Gen. 1:7-8), that the creation of something infinite would never be completely created (cf. Ps. 90:2), and that infinity is a characteristic of God alone (Gen. 21:33; cf. I Tim. 6:16).

³⁷The Hebrew word *hashshamayim* ~*shamajim* has a dual, not a plural ending on it consistently throughout the OT (cf. Gen. 2:1). This dual ending indicates that this account is about the creation of the physical heavens including the “*open firmament*” (immediate atmosphere; v. 20) and the “*celestial*” heaven (outer or stellar space; vv. 14-16; cf. also I Cor. 15:46). The second heaven apparently is divided from the first by the absence of oxygen. Paul indicates that the realm of God’s presence is the “*third heaven*” (II Cor. 12:2). This third heaven was created as well (cf. I Ki. 8:27; Dt. 10:14), and it is divided from the second by the waters above (cf. Ps. 148:4; Ezk. 1:26), but its creation is not recorded in the first chapter of Genesis.

toward the creation of the earth³⁸ and its suitability for man's habitation (cf. Isa. 45:18). His introductory statement begins with God's creative role in the creation of all things. God ('*elohim* *yhwh*)³⁹ created (*bara' arB*)⁴⁰ *ex nihilo* ("from nothing" according to Heb. 11:3) all creation including the heavens and angelic realm (cf. Ps. 104:4; Col. 1:16; Neh. 9:6), and earth,⁴¹ by His word.⁴² The first verse is the introduction and parallels Gen. 2:1 as the conclusion of this section (through v. 2:3). This *inclusio* (Gen. 1:1-2:1) refers to the creation of the two physical heavens ("the atmosphere" and "the stellar space") only, and not the third heaven, as the context demands and Ex. 20:8-11 confirms.

And the earth was without form, and void; and darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters. And God said, Let there be light: and there was light. And God saw the light, that it was good: and God divided the light from the darkness. And God called the light Day, and the darkness he called Night. And the evening and the morning were the first day.

Moses records the initial day of creation. Since he moves the revelatory narrative immediately to focus upon the earth one must recognize the centrality of it in God's creative plan. He uses three clauses to describe the conditions needing God's creative action. First, the earth "was without form and void" (*tohu wavohu* *Whw' Wtp*).⁴³ The word *tohu* occurs twenty times in the OT referring to something that is futile.⁴⁴ It identifies with "desert" and "wilderness," and consequently

³⁸Hebrew was the original divinely given language (e.g., Gen. 2:23) and the etymological root for "earth" bares out this truth in the Hebrew '*eret* #ra.

³⁹The form for God is a plural noun suggesting but not proving the Trinity doctrine (cf. Isa. 48:16-17; I Jn. 5:7). When '*elohim* *yhwh*' is used with a singular verb it refers to the God of the Bible. When it occurs with a plural verb, it refers to the "deities" or "gods" of paganism.

⁴⁰This verb *bara' arB* is translated "created" and God is always the subject of the verb. Other words for the creation process are *yatzar rcy* ("formed") and '*asah hf*' ("made"). Isaiah employs these three words in Isa. 45:7.

⁴¹The Biblical author of Hebrews designates Heaven and Earth as "worlds," stating: "by whom also he made the worlds" (Heb. 1:2) and "Through faith we understand that the worlds were framed by the word of God" (Heb. 11:3).

⁴²The Apostle John gives obvious parallel to the Mosaic creation week, and thereby emphasizing Christ as Creator, by using similar language ("In the beginning was the Word") and recording the Lord Jesus Christ's first week of public ministry (cf. Jn. 1:19, 29, 35, 43; 2:1).

⁴³These two masculine, singular (m.s.) nouns taken together may be a *hendiatys* (one through two) or a *farrago* (two alliterative words meaning something different when together than when independent).

⁴⁴The Authorized Version (AV) translates *tohu* as "desert," "nothing," "confusion," "vain," and "vanity" (cf. Isa. 40:17, 23).

with that which is barren or unlivable. In Dt. 32:10-11, the Hebrew word *tohu* accompanies the verb “fluttereth over” (*rachaph* @XT), which Hebrew verb translates into “moved upon” in Gen. 1:2. The word *bohu* ~~WB00~~ occurs also in Jer. 4:23 and Isa. 34:11, suggesting that which is lifeless. Together these words seem to indicate that God was beginning to make inhabitable and living the un-inhabitable and lifeless earth that He ultimately called good (Gen. 1:31). Moses states in the second clause that “darkness was upon the face of the deep,” apparently paralleling the deep (*tehom* ~~~WT~~) with the earth. The creation Psalm 104 identifies the deep with the waters upon the earth (v. 6). The Lord God created and named the darkness (*choshhek* %VX)⁴⁵ which was over the face (*peney* ~~YE~~)⁴⁶ of the deep. The third clause parallels the waters (*mayim* ~~~YH~~)⁴⁷ with the deep and contrasts the Spirit (*ruach* x~~W~~) of God⁴⁸ with the darkness. God created the waters, with the associated darkness, as His un-furbished but presumably spherical earth.⁴⁹ The good corrective for the darkness was the creation of light, which source was the Spirit of God⁵⁰ Who moved upon (*merachepheth*)⁵¹ the face of the waters.

The Lord’s creative fiat “let there be...and there was” (*ye-hiy...wayehiy* ~~YHYWH~~)⁵² produced the light (‘or ~~RA0~~). This light, distinct from sunlight, moonlight and starlight (vv. 15-18), is the light to which

⁴⁵“I form the light, and create darkness: I make peace, and create evil: I the LORD do all these things” (Isa. 45:7). This created darkness was not evil nor a symbol for evil at this point.

⁴⁶The Hebrew word for “face” indicates that all of God’s creation had boundaries and is therefore finite. The face of the earth (vv. 2, 29) meets the face of the heavens (v. 20). The face of the earth is the abode of man (cf. Gen. 11:4; Lk. 12:56; and Acts 17:26) and the face of the heavens is the abode of the fowl (v. 20).

⁴⁷This masculine noun (*mayim*) is dual and seems to be connected etymologically to the Hebrew word for heaven (*shamayim*).

⁴⁸This additional name of God elaborates on the plural ‘*elohim*’ (v. 1) and anticipates the plural pronominal suffixes in Gen. 1:26 (“our image...our likeness”). The Spirit of God was active in creating earth (Ps. 104:30), garnishing the heavens (Job 26:13), and creating man (Job 33:4).

⁴⁹The shape of the earth is a three-dimensional circle (sphere) according to Isa. 40:22. On this “circle” the Lord “set a compass” (Prov. 8:27) indicating the creation of the spherical earth.

⁵⁰“And there shall be no night there; and they need no candle, neither light of the sun; for the Lord God giveth them light...” (Rev. 22:5). The psalmist states that God, during the creation week, covered Himself “with light” (Ps. 104:2) and Habakkuk declares that His brightness is “as the light” (Hab. 3:3-4).

⁵¹This *Piel* participle, indicating intensity, emphasizes the rotational movement of the Spirit around the earth giving the effect of His light encroaching upon the darkness or the day upon the night.

⁵²Both Hebrew words come from the *hayah* ~~HYH~~ verb (“to be”), the first conjugated as *Qal* jussive and the latter as *Qal* imperfect (conversive) and occurs ten times in Gen. 1 (vv. 3, 6, 9, 11, 14, 20, 24, 26, 28, and 29). The *tetragrammaton* (*JHWH* ~~HYWY~~) or name for Jehovah ~~HYWY~~ comes from this *hayah* verb (cf. Ex. 3:14).

Solomon refers, stating “*While the sun, or the light, or the moon, or the stars, be not darkened*” (Eccl. 12:2; cf. I Cor. 15:41). This created and good light was the first of three divisions during the first three days (cf. vv. 6, 9). God divided (*wayyavede* לִדְבַר)⁵³ the light from the darkness and called or named (*qara’ arq*) them both, thus indicating His creative and authoritative power over them. He defined the day (*yom* $\sim\text{אֵי}$)⁵⁴ and night (*layelah* לַיְלָה) with regard to the movement of the light (from the Spirit) upon the dark earth, affecting simultaneously on opposite sides of the earth the presence or absence of light. Since the Lord God created darkness first, the light presumably came twelve hours later (cf. Jn. 11:9) to dispel the evening (*erev* בְּרֵאֵי) and bring in the light of the morning (*boqer* בֹּקֶר),⁵⁵ producing the first day (*yom* ‘*echad* דְּאֵא , $\sim\text{אֵי}$)⁵⁶. At the end of day one, all that God had created was the mass of darkened water, with the light moving around it. This movement initiated time, making the creation of time earth-centric, and therefore all time “earth-time.” There was no heaven, and consequently the earth had no relationship with the uncreated sun, moon or stars. God’s creation was exclusively geocentric.⁵⁷

Exegesis: the second day

And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters. And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament: and it was so. And God called the firmament Heaven. And the evening and the morning were the second day. (*Gen. 1:6-8.*)

God’s second division of creation, which was spatial, was the division of the waters of the watery sphere called earth. He created the firmament (*raqiya’* רָקִיעַ) to divide the waters under from the waters above the firmament (Cf. II Pet. 3:5). The waters under the firmament

⁵³This *Hiphil* imperfect 3 m.s. singular verb from *badal* לִדְבַר emphasizes causation of separation on the Lord’s part.

⁵⁴God defined day as a period of light. From day four on this temporal period is based on the sun’s movement with respect to the earth, and may be termed a “solar day.”

⁵⁵Scripture refers to this as “morning light” elsewhere (I Sam. 14:36; 25:22, 34, 36; II Sam. 17:22; II Kings 7:9).

⁵⁶Moses, under the Holy Spirit’s guidance in the process of inspiration (II Pet. 1:21) defines the days of the creation week as literal days, as he declares “*For in six days the LORD made heaven and earth, the sea, and all that in them is, and rested the seventh day: wherefore the LORD blessed the sabbath day, and hallowed it*” (Ex. 20:11; cf. also 31:17).

⁵⁷In the eternal state, earth will be the spiritual and physical center of all of God’s creation (Rev. 21:1-3).

constituted the earth (cf. vv. 9-10) and the waters above constituted the edge of the outer limits of the firmament (cf. Ps. 148:4). This firmament, named heaven (*raqia` = shamayim*),⁵⁸ came into existence the second day, and its parameters include the earth (below) and earth water (above).

The word “firmament” comes from the Latin Vulgate word *firmamentum* (cf. *stereoma* στερεωμα in the LXX) and is a good translation because the “emptiness” of space has substance, which Isaac Newton called aether. The Biblical writers used the verb *raqa`* to refer to the spreading out silver (Jer. 10:9) or gold (Isa. 40:19) as beaten metal. Elihu likened the firmament to a strong, molten looking glass (Job. 37:18) which suggests the reflective powers of the outer layer of water over the heaven. Presumably the waters above the firmament are the same as the “a sea of glass like unto crystal” before the Lord’s throne (cf. Rev. 4:6). God’s throne (Ps. 11:4), which is in the third heaven, is “above the firmament” (Ezk. 1:22-26). The firmament, as days four and five will bear out, contain both the stellar realm of the heavens with the sun, moon, and stars (vv. 14-18), and also the atmosphere (v. 20) in which the fowl fly.⁵⁹

Moses records the conclusion of day two with the familiar refrain “and the evening and the morning” were the second day. The light source was the same Spirit Who moved around the earth creating the effect of night replaced by day. The earth is the fixed focal point around which all movement consists. The Lord, Who is the Wisdom of God (cf. Prov. 8:12, 22, 35 with I Cor. 1:24, 30), confirms this hermeneutic by averring, “When he prepared the heavens, I was there: when he set a compass upon the face of the depth” (Prov. 8:27). The psalmist corroborates that the earth is the absolute, fixed point, stating, “the world also is stablished, that it cannot be moved” (Ps. 93:1).⁶⁰ The Bible records that the earth is the fixed divine footstool: “Thus saith the LORD, The heaven is my throne, and the earth is my footstool: where is the house that ye build unto me? And where is the place of my rest?” (Isa. 66:1).⁶¹

⁵⁸That the firmament refers only to the atmosphere or “sky” (NW) is easily refuted by the dual ending on heaven and the immediate context of v. 14.

⁵⁹The expression “the open firmament of heaven” translates the literal Hebrew “the face of the firmament of heaven.”

⁶⁰The Lord’s throne (v. 2) is established or stationary as well as the earth. Both the verbs “is stablished” and “is established” come from *cun* !W and are defined by the negative *bal timmot j* !W!i B; (“cannot be moved”). The only movement of the earth recorded in the Bible is the Lord’s eschatological judgment upon earth (e.g., Isa. 13:13; 24:1, 20).

According to Job, God shakes “the earth out of her place” (*mimmaqomah* HnqMti) in judgment (Job. 9:6).

⁶¹Cf. I Chr. 28:2; Acts 7:49.

At the end of day two⁶² God had separated the Earth's waters with the firmament between the water below and the waters above. The movement of light necessary to establish day two was relative to the fixed, geocentric earth. Earth was the center of the heavens and had no relationship with the uncreated sun, moon or stars.

Exegesis: the third day

And God said, Let the waters under the heaven be gathered together unto one place, and let the dry land appear: and it was so. And God called the dry land Earth; and the gathering together of the waters called he Seas: and God saw that it was good. And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so. And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was itself, after his kind: and God saw that it was good. And the evening and the morning were the third day.

Day three concludes the first half of the creation week with the third division. The Lord separated the waters on earth from the dry land (*hayyabashah* חַיְיָבָשָׁה)⁶³ and named the waters Seas and the land-mass Earth.⁶⁴ Solomon refers to the boundaries of God's created seas and land, stating, "When he gave to the sea his decree, that the waters should not pass his commandment: when he appointed the foundations of the earth" (Prov. 8:29). Furthermore, the Lord created foundations for the earth and asked Job if he had knowledge about them, stating, "Where wast thou when I laid the foundations of the earth?... Whereupon are the foundations thereof fastened? Or who laid the corner stone thereof?" (Job 38:4, 6).⁶⁵ The Lord also created the fountains of the deep according to Solomon: "When he established the clouds above: when he strengthened the fountains of the deep" (Prov. 8:28).⁶⁶ The Lord declared that the land⁶⁷ and seas were good.

⁶²Two (*sheniy* שְׁנַיִם) is a masculine, ordinal number.

⁶³Since the text states that the dry land appeared (*wethera'eh* וַתֵּרָא חַרְטוּמָּה reflexive *Niphal* verb from *ra'ah* רָאָה), and was not created, its elements may have been present since day one.

⁶⁴By defining the words "water" and "earth" more precisely in this verse (v. 10) than the former (v. 2), the Lord God gives an example of His expected hermeneutic for the Bible. The words of Scripture must be interpreted literally and contextually.

⁶⁵Cf. also Ps. 102:25; Isa. 48:13; 51:13; and Zech. 12:1.

⁶⁶Cf. also Gen. 7:11; 8:2; and Rev. 14:7. The Bible implies that there was a vapor canopy surrounding the earth, which was "the heavenly ocean," or flood (*hammabbul* חַמְבּוּל), not mentioned until Gen. 6:17.

⁶⁷The creation of land anticipates the "promised land" the Lord would ultimately give Israel (cf. Gen. 12:1; Dt. 1:8, *et al*; Josh. 1:2 ff.).

The second creative act on Day three was the creation of life-bearing vegetation.⁶⁸ This is the first example of indirect creation wherein the Lord created vegetation through the life-bearing earth. The vegetation (*deshe* 'avD) included plants ('esev bf,[ø and trees ('etz # [ø with seeds (*zera* [rʔ).⁶⁹ The light from the Spirit of God was sufficient for the growth of this vegetation prior to the creation of the sun on day four. The Lord God set boundaries for the vegetation to produce “after his kind” (cf. Gen. 1:21, 24-25; 6:20; 7:14). Through day three the Lord had created sufficiently to turn the formless (watery “wasteland”) earth into one which was livable.

At the conclusion of day three, which was still based on the time reference of night and day, evening and morning, and was produced by the rotating light from the Spirit of God, the earth was a fixed, livable sphere, with no relationship to the uncreated sun, moon or stars.

The fourth day

And God said, Let there be lights in the firmament of the heaven to divide the day from the night; and let them be for signs, and for seasons, and for days, and years: And let them be for lights in the firmament of the heaven to give light upon the earth: and it was so. And God made two great lights; the greater light to rule the day, and the lesser light to rule the night: he made the stars also. And God set them in the firmament of the heaven to give light upon the earth, And to rule over the day and over the night, and to divide the light from the darkness: and God saw that it was good. And the evening and the morning were the fourth day.

Moses introduces the creative activity on the fourth day with the divine fiat “*Let there be.*” The fourth day begins the second series of days and is the middle day of the first week.⁷⁰ This second series gives the divine remedy for the formless earth. Not only did God make the earth livable but He now gives it living creatures. Day four parallels day one with regard to the creation of light. On the first day God created light which emanated from the Spirit of God (Ps. 104:2), and on the fourth day He created the two great light bearers (*hamme'oroth traMh*).⁷¹

⁶⁸Vegetation life is not conscious life as animals and men possess.

⁶⁹This first reference to seed anticipates the great theme of the seed promise of the Messiah (cf. Gen. 3:15; 12:7; 13:15; Gal. 3:16).

⁷⁰This lengthy narrative, second to the narrative for the creation of man (vv. 26-31; 2:7-25), focuses on God's emphasis for the subservient purpose of the sun, moon and stars relative to the earth.

⁷¹This noun is a masculine plural with an article. The word “light [bearer]” (*ma'or traM*) in v. 16 must be distinguished from the word “light” (*'or tra*) in v. 3.

This fourth day of creation repudiates any notion of heliocentricity. First, the creation formula *yehiy...wehayu* (*Let there be...and there was*) demands that the two great light bearers were created on day four, and were not hidden since day one.⁷² Second, there was no heaven on day one for the placement of the two great light bearers. Third, since time hitherto had been determined by the movement of light around the earth, hermeneutics demands that time still be determined by the movement of light, whatever its source, around the earth. Fourth, if the earth began to orbit the sun, this passage fails to indicate that teaching, and it fails to record any change from a geocentric to a heliocentric creation.

God placed the sun, moon and stars “in the firmament of the heaven” (*bireqiya` hashshamayim* ~יְרִיבֵּי; [yqir-B]) or in the celestial heaven, on day four. Moses utilizes this expression three times (vv. 14, 15, and 17) to emphasize the divine placement and celestial location of these light bearers. The Lord revealed the three-fold purpose of the light bearers (vv. 17-18) with the Hebrew conjugation of the *Hiphil* infinitive construct: to give light (*leha'iyr ryahl*), to rule (*welimeshol l vnl iy*), and to divide (*ulahavediy l yDbhl W*). The narrative repeats the purposes of the celestial lights, all of which are for the benefit of the earth. The earth needs physical enlightening,⁷³ celestial governing, and temporal dividing. Moses gives four functions for the temporal separation that the celestial light bearers provide. Their functions are for signs (*le'othoth ttad*),⁷⁴ for seasons (*ulemo`adiym ~ydI Anl W*),⁷⁵ for days (*uleyamiym ~mjl W*)⁷⁶ and for years (*weshaniym ~ym/vy*). Because of Moses' linguistic de-emphasis on “the stars” (*hacocaviym ~ybk'Kh*),⁷⁷ the divine account indicates they are relatively insignificant in God's overall redemptive plan for earth (Mt. 19:28) and mankind (Jn. 3:16).⁷⁸ The movement of light on the earth, now from new

⁷²It may be argued that the elements for the land mass were created on the first day since the verb “let appear” (*wethera'eh*) refers to the land mass, and Ps. 104:6-7 suggests the same.

⁷³The light from these light bearers reached the earth on day four since that was one of their purposes. Regardless of the speed of light and distance of the stars, the celestial heavens were created with the appearance of “age,” just as Adam and Eve were (Gen. 1:27-28; 2:7-24). Those who reject this Biblical revelation are open to divine deception (Ezk. 14:9).

⁷⁴These signs include God's control over His geocentric creation (Isa. 38:7-8) as well as for His prophecies of the coming of the Lord Jesus Christ (Joel 2:30-31; Mt. 24:29-30).

⁷⁵“He appointed the moon for seasons: the sun knoweth his going down” (Ps. 104:19).

⁷⁶Cf. Ps. 136:8-9.

⁷⁷Moses places this one reference to the masculine plural noun for stars in a non-stressed location of v. 16.

⁷⁸Pagans, on the other hand, place heavy emphasis on the worship of and knowledge from the stars (Isa. 47:9; Jer. 27:9; Dan. 2:2). God condemned astrology among the Jews (Dt. 18:10-11). Sun worship was so prevalent in the days of Job that he denied any act of paganism, stating, “If I beheld the sun when it shined, or the moon walking in brightness;

sources, the sun, moon, and the stars, constituted day four. The celestial light bearers, primarily the greater light and lesser light, encroached upon the darkness of earth, dispelling the evening and giving morning throughout the world.

The literal and contextual interpretation of Gen. 1:1-19 demands the only possible understanding that God created the geocentric earth surrounded by the three heavens, regardless of any scientific ramifications.⁷⁹ Other Biblical passages are consistent with this interpretation. For instance, the classic case for geocentricity is Joshua's statement, *Sun, stand thou still upon Gibeon, and thou, Moon, in the valley of Ajalon*" (Josh. 10:12). Joshua did not cry out to the earth to stop rotating, because from his vantage point the sun and moon not only looked like they were moving phenomenologically, but they were in actuality.⁸⁰ The verse following gives the divine and therefore absolute perspective that *"the sun stood still, and the moon stayed..."* (v. 13).⁸¹

Another passage corroborating geocentricity is Eccl. 1:5-7: *"The sun also ariseth, and the sun goeth down, and hasteth to his place where he arose. The wind goeth toward the south, and turneth about unto the north; it whirleth about continually, and the wind returneth again according to his circuits. All the rivers run into the sea; yet the sea is not full; unto the place from whence the rivers come, thither they return again."* Solomon lists three objects that move continually⁸² relative to the earth: the sun, the wind, and the rivers. Hermeneutically, it would be difficult if not impossible to interpret these verses to teach that the earth moves relative to the sun but is stationary relative to the wind and rivers. Alternatively, would one want to interpret the pas-

And my heart hath been secretly enticed, or my mouth hath kissed my hand" (Job 31:26-27).

⁷⁹God is the author of His scientific laws about which man knows little without the help of Scripture. In fact, the Lord God said to Job: *"Knowest thou the ordinances of heaven? Canst thou set the dominion thereof in the earth?"* (Job 38:33). Again, the Lord stressed the limitations of human knowledge by stating, *"If heaven above can be measured, and the foundations of the earth searched out beneath, I will also cast off all the seed of Israel for all that they have done, saith the LORD"* (Jer. 31:37).

⁸⁰As atheists, agnostics, evolutionists, and heliocentric creationists consistently apply the phenomenological hermeneutic to accounts such as the Lord Jesus walking upon the water, their anti-supernatural interpretation must be *"And when the disciples saw him walking on the sea [from the disciples' vantage point]?"* (Mt. 14:26).

⁸¹The psalmist refers to the rising sun in relation to the stationary earth stating, *"The mighty God, even the LORD, hath spoken, and called the earth from the rising of the sun unto the going down thereof"* (Ps. 50:1).

⁸²Solomon lists two verbs (*zarach* זָרַח ["ariseth"] and *bo'* אָבַד ["goeth down"]) and eleven active participles (*sho'eph* שׁוֹעֵף ["hasteth"], *zoreach* זֹרֵחַ ["arose"], *holeche* הֹלֵךְ ["goeth"], *sovev* סוֹבֵב ["turneth about"], *sovev* סוֹבֵב סוֹבֵב ["whirlth about continually"], *holeche...shav* שׁוֹבֵב ["returneth again"], *holeciym* הֹלְכִים ["run"], *holeciym* הֹלְכִים ["come"], and *shaviym* שׁוֹבֵבִים ["return again"]), indicating habitual motion in these three verses.

sages as saying that the earth moves relative to the sun, wind and rivers?

The most significant object of the Lord's creation in the firmament is the sun (*shemesh* מִשְׁמֶשֶׁת) according to David (Ps. 19:1-6). The psalmist uses four descriptive terms, three Hebrew conjugations and one noun, to refer to the movement of the sun. God has set (*sam* ~f)⁸³ a tabernacle in the firmament for the sun. This bright orb, comes out (*yotze'* יָצָא)⁸⁴ as a bridegroom comes from his nuptial chamber, rejoices as a strong man does to run (*larutz* לָרַץ)⁸⁵ his race, and goes forth (*motza'o* מוֹצְאוֹ)⁸⁶ throughout its complete circuit to the ends of heaven.

Other passages confirm the geocentric teaching of Gen. 1:1-19. The Scriptures teach that the earth is stationary (I Chr. 16:30; Job 26:7), that the stars have their courses (Judg. 5:20), and heaven has its circuit (Job 22:14). There are no consistent and compelling arguments from the Bible for heliocentricity. Proof for this false view must be sought outside of the Bible and then forced upon Bible texts.

Conclusion

The Lord gave revelation about His geocentric creation through His servant Moses (Gen. 1:1-19). The details of the narrative of the creation account clearly and consistently teach God's geocentric creation. He made the earth into a livable and living world for His special redemptive purposes. On day one He created the earth as a darkened sphere of water and commenced time with light moving across the face of earth. On day two He created the Heavens which separated the earth's upper waters from the earth's lower waters. On day three He separated the land from the seas and created life-bearing vegetation. On day four, He placed the light bearers in the firmament to benefit the geocentric earth. Of course, day five records the creation of animal life and day six focuses on the creation of man *imago Dei*. The Bible consistently teaches the centrality of earth in God's physical creation for His redemptive purposes.⁸⁷

⁸³This is a *Qal* perfect 3ms verb, connoting completed action, past tense.

⁸⁴This *Qal* active participle connotes present tense.

⁸⁵This part of speech is the *Qal* infinitive construct.

⁸⁶The noun completes the series of four parts of speech to emphasize the sun's movement from start to finish.

⁸⁷Christians should recognize that Christ came to save the earth's fallen mankind. Paul states, "Wherefore, as by one man sin entered into the world, and death by sin; and so death passed upon all men, for that all have sinned...For if by one man's offence death reigned by one; much more they which receive abundance of grace and of the gift of righteousness shall reign in life by one, Jesus Christ" (Rom. 5:12, 17). Christ did not die for aliens, extra-terrestrials, or other demonic manifestations. Biblical Christianity is exclusively geocentric soteriologically.

The earth is preeminent in the Lord's creation and not the sun. The Bible never teaches that the earth moves around the sun or that it is ever in the heavens to do so. Christianity, and fundamentalism within, has embraced, for the most part, a fallacious cosmology based on man's reasoning rather than Bible exegesis. Rather than looking to the Scriptures which the Creator wrote for absolute cosmology, many receive the philosophy of men (Col. 2:8) and are severely benighted. Will Christianity follow the philosophical rationale of Copernicus or the Biblical revelation of Christ? Jeremiah of old stated the tension between man's words and God's when he said, "*Yet a small number...shall know whose words shall stand, mine, or theirs*" (Jer. 44:28).

SIR ISAAC NEWTON AND THE END OF THE CHURCH AGE

“Newton set 2060 for end of world,” proclaimed the religion correspondents around the world in a news account that was released 22 February of 2003. Not, so, as we shall see below.

Sir Isaac Newton, Britain’s greatest scientist, wrote more about the Scriptures, Biblical chronology, and prophecy than he wrote about scientific matters. His theological writings have long been ignored, but in recent years, academics have started to study some little-known handwritten manuscripts deposited in a library at Jerusalem.

The thousands of pages show Newton’s attempts to decode the Bible, which he believed contained God’s secret laws for the universe. Newton, who was also a theologian and alchemist, predicted that the return of the Lord Jesus Christ would follow plagues and war, and would precede a 1,000-year reign by the saints on earth—of which he would be one. His most definitive date for the return, which he scribbled on a scrap of paper, was 2060.

Newton’s fascination with the end of the church age, which has been investigated by a Canadian academic, Stephen Snobelen, was explored in a documentary, *Newton: The Dark Heretic*, on BBC2 in 2003. Though he is often regarded as a heretic, his writings are more Baptist than any other denomination or Christian group. He is particularly accused of Unitarianism, but evidence that he denied the deity of Christ, a characteristic of Unitarians and Gnostics alike, is absent from his writings; leastwise, this author has not come upon any such denial.

“What has been coming out over the past 10 years is what an apocalyptic thinker Newton was,” Malcolm Neaum, the producer, said. “He spent something like 50 years and wrote 4,500 pages trying to predict when the end of the world was coming. But until now it was not known that he ever wrote down a final figure. He was very reluctant to do so.” Scripturally literate readers will recognize that the return of Christ is most emphatically *not* the end of the world, but it sells news.

Thousands of Newton’s papers had lain in a trunk in the house of the Earl of Portsmouth for 250 years. They were sold by Sotheby’s in the late 1930s, when the economist John Maynard Keynes bought many of the texts on alchemy and theology. But much of the material went to an eccentric collector, Abraham Yahuda, and was stored in the Hebrew National Library. It was among these documents that the date was found.

Perhaps some light on Newton’s date can be shed by a recent analysis of dates done by Prof. James Hanson. In a study entitled “Where are We in Time?” and subtitled “What does B. C. or A. D.

mean?" he looks at the disparity between the secular and sacred dates. He starts with the following table:

483	years from Cyrus's commandment (Dan. 9:25) to the birth of Jesus
- 33	Age of Jesus at his death
450	No. of years from end of exile till birth of Jesus
+ 70	No. of years of exile, fm. destruction of temple to commandment.
520	No. of years fm. Temple destruction to birth of Jesus
586	Secular no. yrs. fm. Temple destruction to birth of Jesus
520	Biblical no. yrs. fm. Temple destruction to birth of Jesus
66	Secular error.

He writes: "Dionysius Exiguus (A.D. 525?-600?), under the direction of Emperor Justinian (483-565, reigned 527-565) established a chronology using Julius Africanus' (160?-240?) chronology so that the millennium would be initiated by Justinian's reign. To do so, he may have been the first to establish the 586 B.C. date for the destruction of the Temple. This puts subsequent dates 66 years too late, e.g., our A.D. 2000 should really be $2000 - 66 = 1934$ years since the Nativity."

Prof. Hanson admits this argument is weak, but it is interesting in light of the fuss made by Newton's document.

NEWS FROM THE GEOCENTRIC FRONT

As I write this, the sun is shining outside the window, and the sky is blue. Though the temperature is still chilly, there is a definite hint of spring (with apologies to our southern hemisphere readers). With three weeks left in the semester, teaching and class work are reaching a climax that will culminate with the final exam. Then it's summer break, until August.

That is in a normal year, but this next academic year will be different. Your editor is taking a year off from teaching responsibilities at the College, and will devote most of the next year to affairs geocentric. The only hiatus will be fifteen weeks devoted to affairs computric, to coin a word. Since those weeks do not have to be contiguous, my schedule is my own.

On the agenda for the year are:

1. Create a new DVD video
2. Transfer videos to DVD format
3. Revise and reissue *Geocentricity*
4. Expand the geocentricity.com web site
5. Promote the preservation and inerrancy of Scripture
6. Publish Jim Hanson's book
7. Learn Mathematica for modeling and animation
8. Write other Bible-science and Bible-geocentricity works
9. Attend meetings and speaking engagements around the nation.

This may not seem like a lot, but it is quite ambitious. If anyone would like to help in arranging speaking engagements, organizing meetings, or to help financially to achieve any one particular goal, please do so. All help is greatly appreciated.

Last year, Gordon Bane distributed about 30,000 copies of *The Geocentric Bible*, which includes a condensed edition of *Geocentricity*, to Baptist churches around the nation. We had some response to that, most quite positive. Gordon is encouraged to do a second, broader mailing. Readers of the last several issues of *The Biblical Astronomer* may have noticed that we are publishing more articles by other authors. This is not due to a change in policy, mind you, but due to and upsurge in articles submitted for publication, and web sites suggested for our perusal by our readers. Thank you one and all.

PANORAMA

The coming enviroterrorist attack

There is no room for a Panorama in this issue, but this is important enough to present in this issue.

Enviroterrorists are people who frighten the general public into giving up their rights, money, and their liberty to “save the planet.” The American public will face several waves of attack this year, all designed to force Bush to implement the Kyoto protocol, the largest suction of wealth from the United States yet devised by man, larger even than the income tax. The forced economic decline of Kyoto could cause much greater social and political instability than current terrorist organizations, wrote Roy Spencer.⁸⁸ “Al Qaeda would become a minor player in a chaotic world where political and social unrest are the norm.”

The first wave hit a few months ago when a British tabloid claimed a secret “Pentagon report” advised Bush that global warming will destroy us. Actually, this was a contract study on “imagining the unthinkable” by two “experts” lacking any credentials in atmospheric science. One of the “experts” is Robert Gagosian, who is the president and director of the Woods Hole Oceanographic Institution. The reader should bear in mind that no scientist can expect to get a piece of the \$10 billion recently thrown at climate modeling research by saying global warming *is not* a problem.

The “experts” scenario has the retreating arctic ice changing ocean currents, particularly the Gulf Stream. It is envisioned to shut down, which is presumed to turn Western Europe into Siberia. As an oceanographer, it makes sense to Gagosian that the Gulf Stream should be responsible for Europe’s temperate climate, after all, it allows palm trees to grow in a couple of areas along the coast east of Land’s End. Nevertheless, the mild European climate is caused by the perturbation of atmospheric circulation induced by the Rocky Mountains.

The scenario continues by positing that the Siberian peat bogs may thaw and release all the carbon dioxide trapped there over the centuries. Then the temperature might increase 10°F in the next century, under economic forecasts in which Libya, Algeria, and North Korea overtake the U. S. A.

The second terrorist wave will hit May 28 with the release of a climate horror film *The Day After Tomorrow*. The film shows the icy destruction of New York City. The wave will crest in time, hope the

⁸⁸ Spencer, R., 2004. In *Tech Central Station* for Feb. 12.

Hollywood stars and producers, to force the White House to sign the Kyoto Accord in a vain effort to win re-election.

Enviroterrorists trumpet the support of the Union of Concerned Scientists, which claims to have 1,000 signatures of whom about 40% appear to be physicists, geophysicists, climatologists, oceanographers, meteorologists, or environmental scientists. By comparison, the anti-Kyoto petition posted at www.oism.org/pproject has nearly seven times as many scientists from the same disciplines, out of a total of more than 17,000 signatories.

On a personal note, your editor was once a member of the Union of Concerned Scientists back in the days when its chief concern was nuclear proliferation and war. The founders were Marxist and Socialist Humanists including Sagan and Asimov, as I recall.

Closest asteroid encounter yet

An asteroid about the size of a small house passed by just 53,000 miles (88,000 km) from the earth on 27 September 2003—the closest approach ever recorded for an asteroid. By comparison, geostationary communication satellites circle the earth 25,000 miles (42,000 km) from earth's center.

The asteroid, designated 2003 SQ222, came from the daylit side of the earth and thus was not spotted until after it had passed by. The first sighting was on Sunday, the 28th, by the Lowell Observatory's Near-Earth Object Search program in Flagstaff, Arizona. The asteroid's 1.85-year orbit is quite eccentric, indicating it cannot be a man-made object. Its diameter is estimated to be less than 30 feet (10 m). This is too small to have posed a danger to earth, although it would have made a spectacular meteor.

Man was blindsided by this asteroid. True, it was small and would have done comparatively little damage, but we would have had the same difficulty detecting an asteroid several miles in diameter coming in from the same direction. It only goes to show how dependent we truly are on the grace of God to protect us from real catastrophes.

CREDO

The Biblical Astronomer was founded in 1971 as the Tychonian Society. It is based on the premise that the only absolutely trustworthy information about the origin and purpose of all that exists and happens is given by God, our Creator and Redeemer, in his infallible, preserved word, the Holy Bible commonly called the King James Bible. All scientific endeavor which does not accept this revelation from on high without any reservations, literary, philosophical or whatever, we reject as already condemned in its unfounded first assumptions.

We believe that the creation was completed in six twenty-four hour days and that the world is not older than about six thousand years. We maintain that the Bible teaches us of an earth that neither rotates daily nor revolves yearly about the sun; that it is at rest with respect to the throne of him who called it into existence; and that hence it is absolutely at rest in the universe.

We affirm that no man is righteous and so all are in need of salvation, which is the free gift of God, given by the grace of God, and not to be obtained through any merit or works of our own. We affirm that salvation is available only through faith in the shed blood and finished work of our risen LORD and saviour, Jesus Christ.

Lastly, the reason why we deem a return to a geocentric astronomy a first apologetic necessity is that its rejection at the beginning of our Modern Age constitutes one very important, if not the most important, cause of the historical development of Bible criticism, now resulting in an increasingly anti-Christian world in which atheistic existentialism preaches a life that is really meaningless.

If you agree with the above, please consider becoming a member. Membership dues are \$20 per year. Members receive a 15% discount on all items offered for sale by the *Biblical Astronomer*.

To the law and to the testimony: if they speak not according to this word, it is because there is no light in them.

– Isaiah 8:20

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The Book of Bible Problems. The most difficult “contradictions” in the Bible are answered without compromise. “A classic,” writes Gail Riplinger. 266 pages, indexed. \$12

Geocentricity. The best, most comprehensive book on the topic of geocentricity. 400 pages, 45 figures, scripture and general indexes. **Geocentricity is only available** for £12.50 (postpaid in the U.K., write him for cost elsewhere) from Brian V. Lamb, Quarryside, Castletown, Caithness, Scotland KW14 8SS. **Sold-out in the USA**

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(Continued on the inside front cover.)

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