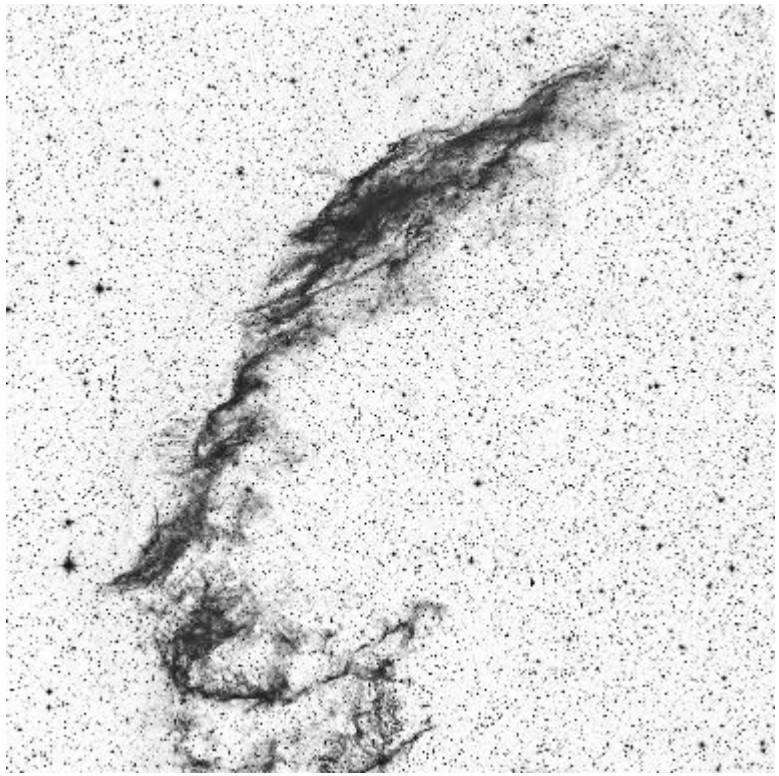
VOLUME 11 NUMBER 96

THE

BIBLICAL ASTRONOMER

SPRING 2001



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Cover: The Veil Nebula in the constellation of Cygnus is a suspected supernova remnant. Using a base line of nearly fifty years, astronomers have recently measured the motion of some of the wisps in this photo. The measurements reveal that the supernova occurred much more recently than hitherto advocated by evolutionary astronomer. The Palomar Schmidt Camera in California took this photo, printed as a negative, in 1953. (See “Panorama” in this issue.)

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EDITORIAL

As I write this, this issue is almost an entire quarter late. I've had thoughts of doing a combined issue, but that would take even longer.

The lead-off article is by James Hanson, Professor Emeritus of the Cleveland State University's Department of Computer Science. Entitled "Cassini, His Ovals and Geocentricity," Prof. Hanson looks at one of the most maligned geocentrists of all time, Jean Dominique Cassini (1625-1712). Cassini was director of the Paris Observatory and was succeeded by his son, also a geocentrist, who was succeeded in turn by his son, who eventually denied the geocentric faith. In so doing, the Cassini family domination of the Paris Observatory came to an end after roughly 150 years.

Among Jean Cassini's contributions to astronomy was the discovery of the gap in Saturn's ring which gap still bears his name. Another contribution was that under his tutelage the first accurate determination of the speed of light was made. This latter was done using eclipses of Jupiter's satellites. The eclipse times can be predicted with great accuracy, but if the earth is further from Jupiter than average, then the eclipse will be behind schedule by the amount of time it takes light to travel that extra distance. If Jupiter is closer than average, the eclipse will happen ahead of schedule, again by the time it takes light to travel the lesser distance. This experiment, conducted by his assistant Roemer, and it is still the only one-way speed of light determination.

Cassini was interested in developing a theory of planetary orbits, and in the course of that he developed the mathematics of the ovals which bear his name. Cassini Ovals may sometimes look like ellipses, but there is a difference. An ellipse is the set of all points the sum of whose distances from two fixed points (the foci) is a constant (see Figure 1, lines d_1 and d_2). By contrast, a Cassini curve may involve more foci than two, and instead of the sum of the distances being constant, their product is constant. This means that Cassini curves are more "natural" in that they readily handle orbits about multiple bodies. But because of his geocentric bent, Cassini was to some degree ostracized, and especially in the nineteenth century, vilified by antigeocentric astronomers, the Newtonians, who thought that the motion of the earth had been proven once and for all simply because their equations worked.[1]

[1] By the way, although the Newtonians believed that, Sir Isaac Newton was not as convinced as those who took his name after him.

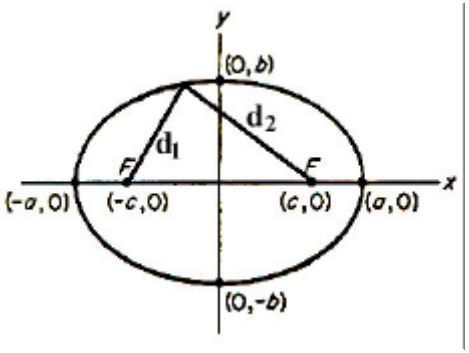

Figure 0: An ellipse is the set of all points for which the sum of the distances from the two foci are constant, i.e., $d_1+d_2=\text{Const}$.

That article is followed by "Readers' Forum," where several comments sent to your editor are presented, along with rebuttals as necessary. The first and longest is a letter written by Martin Selbrede in response to one written by Prof. Cyril Domb of Jerusalem. The editors of the magazine which printed Prof. Domb's rebuttal of an earlier paper published by the geocentric Jewish gadfly, Amnon Goldberg, did not print Mr. Selbrede's letter, for whatever reason.

Erratum

Just read your BA (Biblical Astronomer) article on negative parallaxes. In fact the posting I forwarded you from the BA (Bad Astronomer!) forum on the 917 parallaxes was written by our old friend "Wicked Son" (a.k.a. David Rosen), not myself! In future I'll make it clear who is the author!

–Amnon Goldberg

CASSINI: HIS OVALS AND GEOCENTRICITY

James Hanson[2]

Cassini's geocentricity

Gian Domenico Cassini (also known as Jean Dominique Cassini or Cassini I, (1625-1712), was a geocentrist as, apparently, was his son Jacques Cassini (Cassini II, 1677-1756). He objected to:

1.The universality of Newton's inverse-square law of gravity;
2.the finite speed of light, and to
3.Tycho's model of geocentricity.

In addition to Tycho's theory, he objected to Kepler's (1571-1630) heliocentric ellipses for the orbit of the earth, and sought to find a geometry that was faithful to Tycho's observations but kept the earth stationary and has the sun moving.

I have long been aware of Cassini's aversion to heliocentrism since it is often mentioned in a sentence or two. For example, we often encounter words such as:

> In 1680 he studied the Cassinian curve which is the locus of a point the product of whose distances from two fixed foci is constant. He worked on this as part of a study of the relative motions of the Earth and the Sun.[3]

Dreyer, in *A History of Astronomy from Thales to Kepler,* writes:

> [T]hat J. D. Cassini suggested that the orbit of a planet is not an ellipse but a curve like it, in which the rectangle of the distances of a point from two fixed points or foci is a constant quantity. [4]

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[3] See www.www-groups.dcs.st-and.ac.uk/~history/mathematicians/cassini.

[4] Dryer, 1905. *A History of Astronomy from Thales to Kepler*, (Cambridge Univ. Press). P. 421. Available from Dover in paperback.

Figure 1: J. D. Cassini

Dryer references are: *De l'origine et du progres de l'astronomie* (1693) and *Mem. de l'Acad. R, des Sciences*, 166-1699, vol. VIII, page 43. Dreyer further adds that: "As a native of Italy, Cassini was afraid to pronounce publicly in favour of the earth's motion, even after his removal to Paris."[5]

The most thorough, but not very, discussion of J. D. Cassini, in English, that I have encountered is found in the *Dictionary of Scientific Biography*,[6] (likewise for Cassini II, III, and IV). In that reference, on page 103, we read:

> Likewise, Cassini was a determined opponent of the theory of universal gravity. Moreover, while he seems to have renounced Tycho Brahe's planetary system, his Copernicanism remained very limited, especially as he proposed to replace the Keplerian ellipses by curves of the fourth degree (ovals of Cassini), a locus of points of which the product of the distances to two fixed points is constant.

Outside of these quotes, and many others like them, I know of nothing more of J. D. Cassini's thoughts on geocentricity. A copy of Cassini's bibliography, taken from Scribner's *Dictionary* reads as follows:

> I. ORIGINAL WORKS. Most of Cassini's publications and memoirs are listed in the *catalogue générale des matières contenues dans l'Histoire et dans les Mémoires de L'Académie Royale des Sciences*, I-III (Paris, 1729-1734). Almost complete lists are given in A. Fabroni, *Vitae Italorum doctrina excellentium*, IV (Pisa, 1779), and

[5] Pringré, *Cometographie*, I, p. 116.
[6] *Dictionary of Scientific Biography*, (New York: Scribners).

V. Riccardi, *Biblioteca mathematica italiana*, I (Bologna, 1887), cols. 275-285; the latter, which has been repr. [sic] in facsimile (Milan, 1952), does not cite the articles in the *Journal des Savants* or in the *Philosophical Transactions*.

A large part of Cassini's publications subsequent to his arrival in France are collected in *Reçueil d'observations faites en plusieurs voyages par ordre de S. M. pour perfectionner l'astronomie et la geographie avec divers traités astronomiques par Messieurs de l'Académie Royale des Sciences depuis 1666 jusqu'en1699* (Paris, 1730), vol. IX ("Oevres diverses"). Many NSS by Cassini or initialed by him are preserved in the Archives de l'Observatoire de Paris and at the Bibliothèque de l'Institut.

II. SECONDARY LITERATURE. On Cassini or his work, see F. Arago, *Notices Biographiques*, III (Paris, 1855), 315-318; F. S. Bailly, *Histoire de l'astronomie moderne*, II-III (Paris, 1779); J. B. Boit, in *Biographie universelle*, VII (Paris, 1813), 297-301, and in new ed., VII (Paris, 1844), 133-136; J. D. Cassini IV, *Mémoires pour servir à l'historie des sciences et à celle de l'Observatoire de Paris* ... (Paris, 1810); J. de Lalande, *Astronomie*, 2nd ed., I (Paris, 1771), 217-220, and *Bibliographie astronomique* (Paris, 1802); J. B. J. Delambre, in *Histoire de l'astronomie moderne*, II (Paris, 1821), 686-804, and table I, LXVII-LXIX; A. Fabroni, in *Vitae Italorum doctrina excellentium*, IV (Pisa, 1779), 197-325; B. Fontenelle, "Éloge de J. D. Cassini," in *Histoire de l'Académie royale de Sciences* [pour] *1712* (Paris, 1714, and *ibid*., 84-106; F. Hoefer, in *Nouvelle biographie générale*, IX (Paris, 1835), cols. 38-51; C. G. Jöcher, in *Allgemeines gelehrte Lexicon*, III (Leipzig, 1750), cols, 1732-1733; J. F. Montucla, *Histoire des mathématiques*, II (Paris, an VII [1798-1799]), 559-567; and J. P. Nicéron, in *Mémories pour servir à l'histoire des hommes illustres...*, VII (Paris, 1729), 287-322.

As can be seen, any further investigations into Cassini's geocentricity must be pursued in Italian or French. Perhaps some reader with this linguistic ability will pursue this.

Cassini's ovals

Because of lack of further knowledge, I will try to infer what Cassini's thinking might have been, and to extend this with some of my own observations, which may have been Cassini's thinking also. Ptolemy's, Copernicus', and Kepler's descriptions of planetary motion prescribed both time and position, i.e., they gave a geometric figure for the orbit and specified when a planet would be in a particular place in its orbit. Ptolemy's epicycles were referenced to the earth, whereas

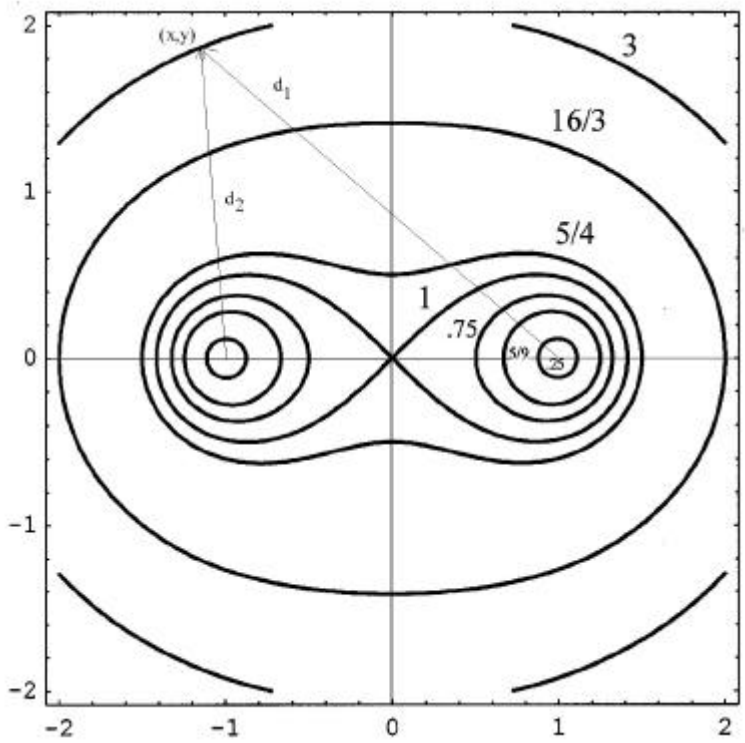

Figure 2: Cassini's ovals for two foci

Copernicus referenced them to the sun. Kepler's theory provided a means for constructing planetary ephemeredes (i.e., position tables) based on his three laws. I do not know how Cassini related his ovals to planetary positions other than to only describe their orbital shape, or at least, for the sun about the earth. It seems that in casting about for shapes, in 1680, he came upon the ovals that have acquired his name. The ovals are part of a system of curves, shown here, which collectively are called *Cassini's ovals*.

The ovals include nearly circular ovals about the foci, which grow into tear drop shapes, merging into a lemniscate (figure eight), and then growing into peanut shaped single curves, which flatten out into an oval approaching a circle at infinity. Of these curves it is the single large ovals that Cassini probably has in mind for his orbital paths. These curves follow a locus of points such that the product of the distances from the two foci is a constant. (This is analogous to the ellipse where the sum of the two distances is a constant.)

In the above figure the foci are at coordinates (-a, 0) and (a, 0) along the x-axis. The lemniscate is the locus such that $d_1d_2 = a^2$, the smallest double oval such that $d_1d_2 = (15/64)a^2$, and the largest single oval such that $d_1d_2 = 3a^2$. As the constant of the products approaches zero the curves approach double circles about the foci of zero radii. And, as the product constant approaches infinity, the curves become larger and larger ovals approaching an infinite circle about the origin. It must have been the outer ovals with quite large product constants that Cassini had in mind for the sun's orbit about the earth and, presumably, the planets orbit about the sun. Such an oval might well have fit Tycho's data as good as Kepler's ellipse.

I do not know what Cassini had in mind for specifying where a planet would be on such an oval at a given time. Nor do I know what physical significance he associated with the foci. Perhaps the earth occupied a focus of the sun's motion.

Extension of Cassini's idea

Though I do not know exactly what Cassini's ideas were, I note that the kernel of his thinking has merit in providing arbitrarily accurate orbits in the light of modern mathematical developments. The Cassini system of curves is given, in Cartesian coordinates, by:

$$K = d_1^2\, d_2^2 = [(x + a)^2 + y^2]\,[(x - a)^2 + y^2].$$

Here the foci are at points (-a, 0) and (a, 0). However, one may envision an arbitrary number of foci. For example, if three foci are placed at (-1, 0), (1, 0), and (0, 1),

$$K = d_1^2 d_2^2 d_3^2 = [(x\text{-}1)^2 + y^2]\,[(x\text{+}1)^2 + y^2]\,[(x^2 + (y\text{-}1)^2],$$

and the pattern in contours of constant K shown in Figure 3.

Note that, as before, the contour value, K, goes to zero, the contours become ovals approaching circles of zero radius about the foci. And as K becomes large a single oval approaches a circle of radius infinity about the center of the foci. Intermediate values of K produces complicated contours such as the lemniscate with two cross-overs for a K of approximately 0.60. The cross-over points are called saddle points and their location as well as the value of K can be obtained from the identities $\partial K/\partial x = 0$ and $\partial K/\partial y = 0$. This example can be generalized to any number of foci, (a_i, b_i) for i = 1, ..., n (see Figure 4).

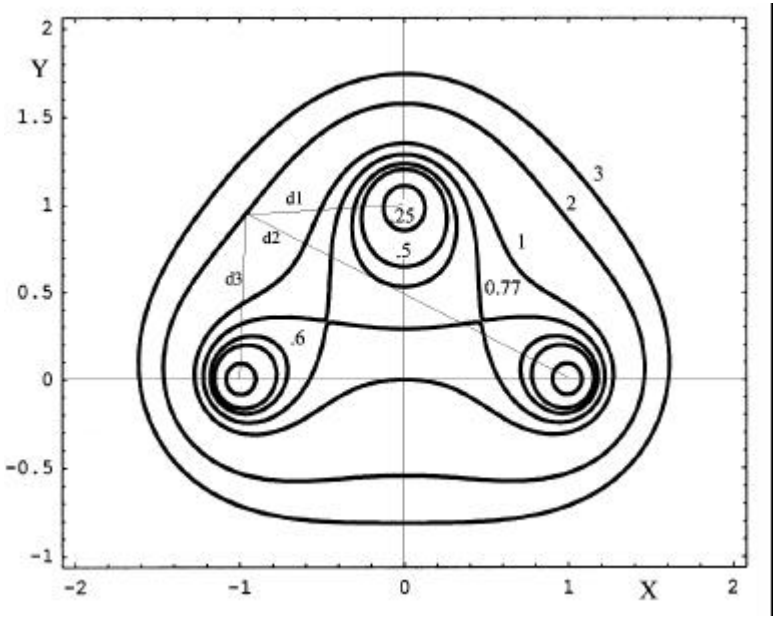

Figure 3: Cassini's ovals for three foci

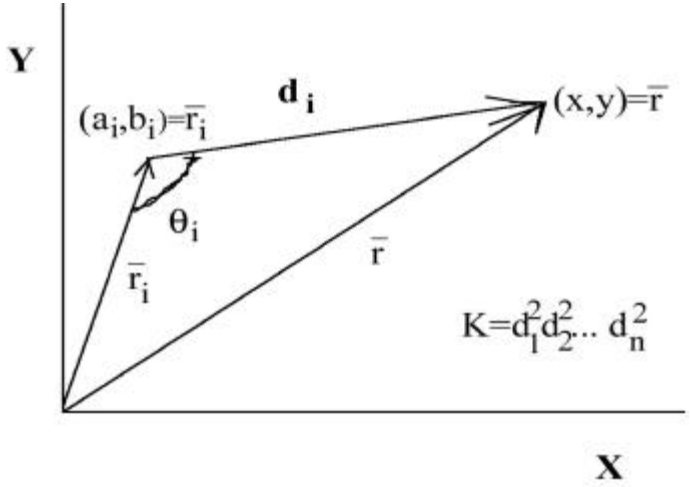

Figure 4: Generalized vector

In this case the Cartesian expression for the contours is:

$$K = d_1^2 d_2^2 \ldots d_n^2 = [(x-a_1)^2 + (y-b_1)^2]\,[(x-a_2)^2 + (y-b_2)^2] \ldots [(x-a_n)^2 + (y-b_n)^2].$$

Let us look at the ovals for large values of K when such curves are expected to be nearly circular.

$$K = \prod_i d_i^2 = \prod_i [(x-a_i)^2 + (y-b_i)^2]$$

$$= \prod_i [x^2 + y^2 - 2(a_i x + b_i y) + a_i^2 + b_i^2]$$

$$= (x^2 + y^2)^n \prod_i [1 - 2(a_i x + b_i y)/(x^2 + y^2) + (a_i^2 + b_i^2)/(x^2 + y^2)].$$

For large K the points (a_i, b_i) appear as a cluster each of which is about distance d from (x, y), i.e., $d_i \approx d$ and $K = d_1^2 d_2^2 \ldots d_n^2 \approx d^{2n}$. Then neglecting small terms: $d_i \approx d$

$$K \approx d^{2n} \approx (x^2 + y^2)^n (1 - 2\sum_i r_i r \cos \grave{e}_i / d^2)$$

$$K^{1/n} \approx (x^2 + y^2)(1 - 2\sum_i r_i r \cos \grave{e}_i / d^2)^{1/n} \approx (x^2 + y^2)(1 - (2/n)\sum_i r_i r \cos \grave{e}_i / d^2)$$

from which it is seen that the contour is nearly a circle of radius d and departing from this by a variable small multiple as the contour is traversed. A similar result would follow for the small ovals about each focus.

This does not answer the question: can such contours represent a planetary orbit, e.g., and ellipse, to an arbitrary accuracy? The answer is yes. Fekete, in 1933,[7] proved that any contour can be approximated with arbitrary accuracy by an appropriate number of foci appropriately placed (see Davis, *Interpolation and Approximation*, Dover, 1975, p. 93).

Physical Considerations

We can produce ovals (orbits) of arbitrary shape by using distributed foci two ways. Either by bunching foci together, say, at the origin or distributing them at a large distance from a particular focus, say at the origin.

These situations can be represented by a fluid analog in which the foci are fountains of water springing into an infinite shallow ocean. If

[7] Fekete, 1933. "Über den transfiniten durchmesser ebener punktmengen," 3te Mittleilung Math. Zeitschrift, vol. 37, pp. 635-646.

from these springs we were to simultaneously inject a pulse of dye, we would see these contours develop as the dye flows to infinity, i.e., these contours are precisely the lines of equal flow rate. For example, in the case of two springs (Cassini's system of curves) the number of gallons per minute crossing any unit length along the lemniscate (or any other contour) would be a constant anywhere on the lemniscate. In the first case, the earth might be thought of as containing many foci (springs) that impinge upon a body to somehow produce its orbit, or in the second case the earth is the target focus for fluid coming from distant space pushing against the earth's fluid, i.e., an equilibrium is established by opposite flows. This must occur in the first case, also, and could be accomplished by sources at infinity pushing against those of the cluster. I now close my wild speculation and posit that this analysis could also apply to three-dimensional orbits.

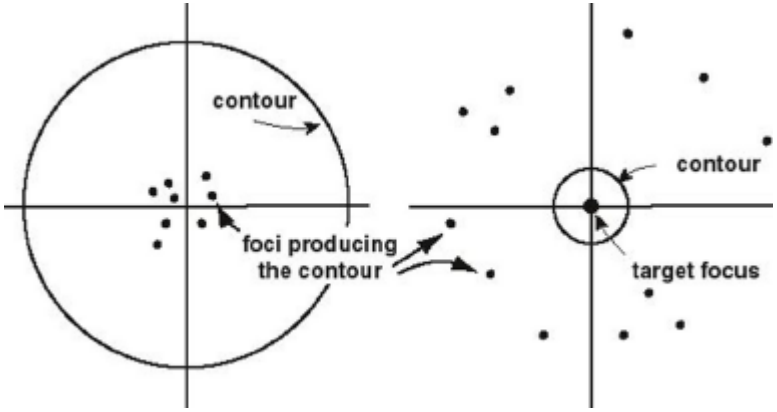

Figure 5: A sample distribution of multiple foci.

READERS' FORUM

The following pertains to an exchange of letters published in *B'or Ha'Torah: Science, Art and Modern Life in the Light of the Torah*. In this exchange, Amnon Goldberg took the geocentric perspective and was answered by Prof. Cyril Domb of Jerusalem. Space here does not permit the reproduction of the letters since they span

Selbrede's letter.

Professor Cyril Domb's critique of Amnon Goldberg's advocacy of geocentricity within this forum exhibits a considerable number of disturbing features that merit our corporate scrutiny.

Domb commends those who seek "a synthesis between their Torah outlook and scientific work," predicting "the ultimate convergence of Torah and science" in opposition to Goldberg's manifestly confrontational approach. One can perceive which of the two, Torah or science, will do the lion's share of backpedaling to achieve this convergence by recalling Domb's citations of Rabbi Hirsch's view that the Bible is not "a textbook of physical or even abstract doctrines" and should never "prejudice, in any manner, the findings of scientific research."

Claiming that Scripture is thus disconnected from physical reality and focused primarily on ethics and morality is a far cry from making good on that claim. The domains Domb and Hirsch seek to sunder can be found inextricably united in Scripture itself. Jeremiah records that "if heaven above can be measured, and the foundations of the earth be searched out beneath, I will also cast off all the seed of Israel for all that they have done, saith the Lord." The opening double protasis has its feet planted firmly in the physical sciences, the concluding apodosis in the ethical realm. David regarded the Torah as being "exceedingly broad," and no compelling Scriptural reason ahs been advanced by either Domb or Hirsch to vitiate David's confidence. The 19th Psalm likewise juxtaposes astronomy and ethics, predicating as freely and authoritatively in the one sphere as in the other. It is the *a priori* commitment to Copernicanism that alone inspires the intellectual divorce imposed between the two parts of this Psalm.

Moreover, Domb's claims concerning Scripture are based squarely on assumptions concerning the purpose of the authors, i.e., are teleological claims. The authors allegedly did not intend to be scientifically accurate. This imposes a manufactured teleology on Scripture,

turning Moses and others into the objects of a psychoanalytic exercise in second-guessing. This artificial construct presupposes multiple planes of meaning, disturbing scriptural utterances among them according to its own subjectively-grounded canons. A flat-footed circularity of arguments thus obtains. An obvious implication of this position should be noted: if a given scripture should happen to accurately describe the physical situation, as modern science understands it, this would be a completely unintended circumstance! Perhaps Job could thereby have justified protesting against God's interrogation by replying, "Bus these are scientific questions which aren't even important enough for You Yourself to describe accurately in writing!"

Domb recoils at the "confrontational scenario advanced by Amnon Goldberg." Is there something disturbing about Goldberg's exhibiting some of the "concrete convictions" Hirsch extols? Where in Scripture is accommodation and expedience and "following the multitude" commended? Although Domb assumes the debate to be all but over, his cavalier dismissal is utterly inadequate. Domb is merely rephrasing his thesis in different words – such question-begging does little to advance the debate to a conclusion, but goes far in politicizing the matter. Domb's critique is shot through with these reflexive weaknesses, starting with his disdain for resurrecting a "medieval controversy of no relevance [to modern Judaism]." Setting aside the loaded language, it is clear Domb is assuming what he wants to prove, since Goldberg's point is that, medieval or not, the controversy is relevant because it was "settled" erroneously. But Domb, unwilling to debate on a level playing field, simply treats Copernicanism as a "*res judicata*," a matter already settled – as if this alone were sufficient reason to accept it and to confidently ignore evidence in conflict with the scientific status quo.

The upshot is that Domb and Hirsch effectively treat science as an uncontested authority despite the provisional nature of all scientific pronouncements, while Goldberg reserves such status to the infallible, unchangeable Scriptures alone.

Domb accuses Goldberg of "misleading" readers, presenting "a distorted picture of the results of scientific research," and trying to "overwhelm the average reader with indigestible strings of unexplained technical phrases." Working backward, it should be noted that while Domb imputes medieval irrelevance to Goldberg's position, Goldberg cites fifteen experimental results taking us up nearly to the present day that are favorable to the geocentric thesis. No effort was made to interact with any of Goldberg's citations, which he marshaled to support the nondetection of the Earth's velocity. This isn't surprising, however, since the only cited physical effect (in an earlier paragraph of Goldberg's) that could be equivocal and thus overstated by Goldberg is the

Sagnac effect. Over against Goldberg's summary of results, Domb simply reiterates fundamental tenets of a status quo. Reaffirming the status quo hardly constitutes a tenable defense against a litany of known theoretical failures found in it.

Domb himself misleads his readers in implying that centrifugal forces appear only when the earth is taken to be in rotation. For someone who cites relativity theory favorably, this statement is either disingenuous or emblematic of incomplete understanding of relativity theory. Relativity teaches that the centrifugal and Coriolis forces on the Earth "considered at rest" are generated by a universe in observed daily rotation around the Earth, an explanation found as early as Einstein's June 25, 1913 letter to Mach, in standard relativity textbooks like Møller's volume, up to present day journal articles in *Physical Review of General Relativity and Gravitation* (e.g., Col. 21, No. 2, pp. 105-124, among others). This is why Hoyle regarded geocentricity and heliocentricity as physically indistinguishable.

Although Domb states that "Newton's simple laws of motion are valid" only if the Earth is in rotation, he is mistaken there as well. The complete Newtonian force equation in geocentricity is almost indistinguishable from the accepted one: the angular velocity term in the centrifugal, Coriolis, and Eulerian force components is referred to the universe rather than the earth. We can therefore safely set aside this red herring.

But why should geocentrists line up behind Newton, or Einstein? Both models of gravitation fail, and they fail terrestrially, here on Earth. Long's ultrasensitive Cavendish torsion balance experiment from the 1970s exhibited systematic discrepancies in measuring the gravitational contant, *G*, of 0.35% – a startlingly large figure (Nature, April 1976, Vol. 206, pp. 417-418). The periods of pendulums change during solar eclipses and when taken into mine shafts – serious anomalies well-documented in the literature. Neither Newton nor Einstein can explain these effects. Their theories are defective and incomplete. Geocentrists offer a better explanation by extending the LeSagean model of gravitation (one too hastily discredited on thermal grounds in the 19th century when elastic particle collisions were poorly understood). This gravitational model, promoted from within geocentric ranks, predicts the error and its magnitude in Long's experiment, whereas Newton and Einstein did not. Such gravitational anomalies are not merely old artifacts one can safely ignore: they cropped up again and again in the mid-1990s when three geophysical teams were commissioned to measure "G" and none of their answers matched! There is a real, underlying desperation in modern physics, as Goldberg claimed – the physicists simply hide it real well, choosing to defend their paradigm rather than objectively consider the evidence contrary to it.

Thus, when Domb praises Newton's work and says that "this development would not have been possible in the geocentric frame," we reply that the opposite is true. Advocacy of Newton suppressed consideration of a better theoretical model for gravitation, and the current (and ongoing) work on this experimentally superior model would not have naturally arisen from within the accepted heliocentric paradigm. Suppression is part and parcel of the scientific enterprise – small wonder that paradigm-protective committees barred Halton Arp from continuing to use the Palomar telescopes (the same year he won the Humbolt Senior Scientist Award!) because his work was so damaging to conventional cosmological theory. Academia's tyranny over scholarly publication, mediated by referees pre-committed to the status quo, has been well documented.

One ought not accept Domb's casual affirmation of Einstein's greatness, for example, without keeping in mind how dissident physicists (like Andrew Sakharov, for one) are scornfully opposed by the relativity-enthralled physics community. Truth is not ascertained through *ad populum* means, by taking a simple nose count: such an approach merely collapses into a well-known informal logical fallacy. The appeal to "big name" scientists falls under the *ad verecundian* fallacy, faulty appeal to authority. Since the question at issue is precisely what authority these scientists' ideas have, one cannot respond by granting them this authority by fiat or popular vote: the grounds for the challenge to their models must be minutely examined and debated. Goldberg at least offers a big, fat, juicy target for his opponents to interact with. Sidestepping the challenge by proclaiming cosmology to be the proper domain of experts to whom the public must blindly yield is simply irresponsible, and is surely not good science in the purest sense of the term. Truth may often be uncomfortable, inciting us to exhibit moral courage in defending it, but it was never vouchsafed to elitists alone.

If Goldberg distorted something or misled the reader, Domb should have made this accusation specific rather than vaguely smearing his opposition. Scrutiny would reveal that, at worst, Goldberg could have brought out a counter-explanation in one or two instances. His citing of Yatendra Varshni's quasar distribution challenge omitted to mention the alternative of 57 concentric spherical shells of quasars distributed around our position, namely, the abandonment of the Hubble law for quasars. But that is more distasteful to cosmologists than are the quasar shells. Thus, the two possible alternatives are equally damaging to conventional cosmology, while they are positive and neutral, respectively, toward geocentric cosmology. In light of the fuller account provided herein, it is obvious that Goldberg's abbreviated account hardly distorted the record, especially since modern cosmology

persists in applying the Hubble Law to quasars, vindicating the citation of the quasar shelling phenomenon by geocentrists.

Unfortunately, Domb's critique contains so little appeal to evidence controverting Goldberg's experimental citations that a rebuttal on the merits would have little of substance to interact with. We are, in actuality, left with Domb's opinion that conventional science is the ultimate arbiter on matters naturalistic. Since Domb holds that Goldberg "is entitled to put forward his own views on science," the converse can charitably be granted to Professor Domb. However, Domb is not entitled to equate the consensus of modern science with truth itself. The scientific enterprise sees truth existentially, and Domb himself belies a utilitarian approach to truth (e.g., special relativity "works" in the laboratory, etc.). Neither view is consistent with truth as conceived scripturally. Pray that we are not living in the kind of age Isaiah lamented, where "truth staggereth in the street … and faileth." The kind of cavalier dismissal lurking in Domb's somewhat smug reply to Goldberg exhibits "the fallacy of thinking an opponent's position has been handled when in fact it has merely been written off" [Carson].

In an e-mail, Tuomas Laine writes:

> Well, first of all, I would like to make clear two things: first, I believe in God, and second English is not my mother tongue, so some of my expressions may look foolish. But just one point that I can't get over: if the Sun is orbiting Earth, what is the power that keeps it in its orbit? It can't be gravitation because we just weren't able to live on Earth if it was (we would weigh about 1000 times as much as we do).

My reply:

It is gravity, but not the earth's. It's the gravitational force of the rest of the universe. This phenomenon is generally known as "Mach's Principle" among physicists and astronomers, and is why you experience inertial phenomena such as being pushed back in your seat when an auto or train accelerates.

Tuomas continues:

> Also, why would God have used such hunk of energy to stop Sun, which is lots heavier than just stopping rotation of Earth?

He did more than stop the sun. He stopped the moon, too, and may well have stopped the universe. No matter how much energy it took, it is finite and so nothing to our all-powerful God.

After all, it has been proven that heliocentrism is closer relative to truth than geocentrism, (rotating Milky way, etc.)

No such proof exists unless one assumes, in the words of P.F. Browne who wrote a paper entitled "The Relativity of Rotation" for the journal *Physics A*, that "the universe is the smallest isolated system." In other words, unless one assumes that there is nothing beyond the universe, particularly, that there is no third heaven.

In other words, the only proof one way or the other is to go outside the universe, look around there, and then report the true state of affairs back to earth's inhabitants who, of course, will reject it for the most part. Either God spoke the truth in Joshua 10:13 when he said that "the sun stood still and the moon stayed," or he did not speak absolute truth, in which case he is not the God of Truth, is he?

The following was written in response to an e-mail asking for my input on how to answer a Bible critic's opposition to geocentricity on the grounds that the Bible's language is phenomenological or poetic and is not meant to be taken literally:

> In Joshua 10:13 God the Holy Ghost (not Joshua) says that "the sun stood still..." and repeats it a second time. Now if God did not really mean it, but spoke to accommodate the ideas of the time, then isn't that the same as claiming that "God goes along with the accepted story even though he really knows it isn't true?" Doesn't this make a liar of God? Why wouldn't he simply say "And the earth stopped its turning, so that the sun appeared to stand still.…"

As the nineteenth century mathematician Augustus de Morgan wrote:

> The question of the earth's motion was the single point in which orthodoxy came into real contact with science. Many students of physics were suspected of magic, many of atheism: but, stupid as the mistake may have been, it was bona fide the magic or the atheism, not the physics, which was assailed. In the astronomical case it was the very doctrine, as doctrine, independently of consequences, which was the corpus *delicti*: and this because it contra-

> dicted the Bible. And so it did; for the stability of the earth is as clearly assumed from one end of the Old Testament to the other as the solidity of iron. Those who take the Bible to be *totidem verbis* dictated by the God of Truth can refuse to believe it; and they make strange reasons. They undertake, a priori, to settle Divine intentions. The Holy Spirit did not mean to teach natural philosophy: this they know beforehand; or else they infer it from finding out that the earth does move, and the Bible says it does not. Of course, ignorance apart, every word is truth, or the writer did not mean truth. But this puts the whole book on its trial: for we can never find out what the writer meant, unless we otherwise find out what is true. Those who like may, of course, declare for an inspiration over which they to be viceroys; but common sense will either accept the verbal meaning or deny verbal inspiration.[8] (Luke 16:8.)

If this doesn't wash, then consider Malachi 4:2 – "But unto you that fear my name shall the Sun of righteousness arise with healing in his wings;..." If the word "rise" when applied to the sun is not literal, then how can one insist that it is literal in contexts such as this (Sun) and in Num. 10:35? Note, too, that Christ came and arose, we did not come to him (Psalm 19:4-6).

In Mal. 4 the motion of the sun is tied to the resurrection of Christ. If one is literal and the other is not, on what basis would one claim to know which is which?

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[8] Augustus De Morgan, 1872. *A Budget of Paradoxes*, second edition; edited by E. Smith, 1915, (Chicago & London: The Open Court Publishing Co.), Vol. 1, p. 36.

THE TWELVE MOONS OF EARTH

"Hey, earth has only one moon!" I hear some reader say. Yet, every farmer knows that the earth does have twelve moons, one per month. In these United States of America, according to the *Old Farmer's Almanac*, the twelve moons are as follows:

MONTH	**NAME**
January	Wolf Moon
February	Snow Moon
March	Worm Moon
April	Pink Moon
May	Flower Moon
June	Strawberry Moon
July	Buck Moon
August	Sturgeon Moon
September	Harvest Moon
October	Hunter's Moon
November	Beaver Moon
December	Cold Moon

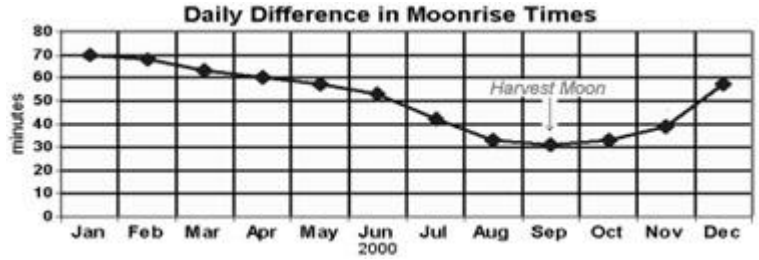
These names have been handed down throughout the years, and they are still a part of modern moon lore. Most, if not all, originate from the traditions of various American Indian tribes.

The most famous of the "moons" is the Harvest Moon. This year, the harvest moon falls on the second of September. What makes the Harvest Moon so special? And why is it called "Harvest Moon" in the first place?

The Harvest Moon is no ordinary full moon. It behaves in a special way. Throughout the year the Moon generally rises about 50 minutes later each day, but near the autumnal equinox (September 22, 2001), the day-to-day difference in the local time of moonrise is only about 30 minutes. That comes in handy for northern farmers who are working long days to harvest their crops before autumn. The extra dose of lighting afforded by the full moon closest to the equinox is what gives the Harvest Moon its name. In the Southern Hemisphere, this full moon behaves in exactly the opposite way. South of the equator, there will be an extra long time between moonrises from one evening to the next. Of course, they are not harvesting since it is their first day of spring. The Southern Hemisphere will have its "Harvest Moon" near March 20, the time of the Vernal Equinox. So the inclination of the moon's orbit to the plane of the sun's annual motion about the earth is the reason why we have the twelve different moons, and shows God's

provision for men on earth. (Scientists grudgingly call such phenomena – demonstrating the earth's special place in creation – by the term "Anthropic Principle."

Like all full moons, this year's Harvest Moon will be bright and beautiful. The rising or setting Moon looks much bigger than it does when it's high in the sky – a trick of the eye known as the "Moon Illusion." By curling one's fingers to the palm of the hand and looking through the resulting tunnel, one can convince one's self that the effect is an illusion. All of a sudden, the moon looks small again, just as it does when high in the sky.



The above plot shows the daily difference in moonrise times for a mid-northern latitude observer around the time of each Full Moon in the year 2000. For example, if the year's first full moon rose at 6 p.m. on January 21st, it would rise approximately 70 minutes later (7:10 p.m.) on the next night. Near the time of the autumnal equinox (Sept. 21st), this daily difference is at an annual minimum. The nearly full Moon that arose on Sept. 14, 2000, appeared only thirty minutes later than the full Harvest Moon did the day before. The September minimum is caused by the small angle that the ecliptic makes with the eastern horizon in early autumn.

This year (2001), there are two such favorable full moons. Because the new moon falls on September 17, close to the autumnal equinox, the full moons of September 2nd, which is the Harvest Moon, and October 2nd will both have successive rising times less than 35 minutes later each day.

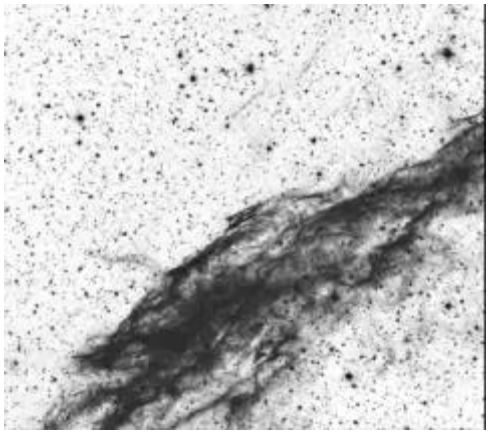
Once again we see that the earth was created for man. Indeed, as implied by the anthropic principle, the whole universe appears to be uniquely created for man. To understand why, see Romans 9:22-24 in a King James Bible. There you will find the reason for creation, if you can receive it.

PANORAMA

Age of the Veil Nebula

In the constellation of Cygnus the swan is a supernova (the most violent of exploding stars) remnant called the Veil Nebula. The nebula itself is made up of stringy wisps of glowing gas. Conventional theory has it that the supernova which threw off its outer shell to produce the Veil Nebula, exploded 20 to 30 thousand years ago.

Now William Blair et al. of Johns Hopkins University have measured the angular expansion (proper motion) of a particular wisp by comparing its position relative to stars in a 1953 plate and images from the Hubble telescope. The team derives an age of about 5,000 years. This age is independent of the distance the nebula is from earth because they measured angular velocity from the center instead of radial velocity which requires a distance to give an "age."



The figure at left shows part of the Veil Nebula. The wisp measured is in the middle of the picture, about a quarter of the way down from the top. (From the 1953 Palomar Observatory Sky Survey plate used in the analysis.)

Joshua's Long Day: Did the sun really stand still?

The following was posted by an atheist in the sci.skeptic newsgroup. The full text is given below, exactly as it was posted except for the correction of some spelling errors:

Subject: The REAL meaning of Joshua's command to the sun.
Date: 12/12/1999
Author: Avital Pilpel <ap241@columbia.edu>

I wish to propose a interesting theory about Joshua stopping the sun. This theory was proposed by an Israeli linguist, Dr. Avshalom

Kor, and (as far as I know) was not published in English.

1). The King James version says “Sun, stop THOU in Gibeon”, etc. making it appear as if Joshua was addressing the sun and the moon. This is a translation error. The word “thou” is not in the original Hebrew. What Joshua literally said was “[The] Sun in Gibeon stopped; and [the] moon [is] in the valley or Ayalon.” This is not – says Dr. Kor – a command to the SUN AND MOON, but rather to Joshua's OWN TROOPS.

What is he saying to them?

2). At the time, battles were fought only by day, and only in one place. The army that first broke ranks was routed from the field of battle and lost. Now: the sun was about to set, and Joshua saw that the Israelites would win – if they only continue fighting and not break off the engagement for the night. The first part of his command, then, is to his troops, telling them to KEEP FIGHTING AS IF IT IS STILL DAY: as if the sun stands in Gibeon, which was the field of battle.

Till when will they fight?

3). Here comes the second part of the command - about the moon - which is rather meaningless if Joshua was addressing the sun and the moon. First of all, why would he want BOTH the sun and the moon to stop? And, second, in the original Hebrew, while the first part can be interpreted as a command to the sun, the second part (“*ve'yareach be'emek ayalon*”) is simply a statement of fact, not an imperative addressed to the moon. Are we supposed to believe that Joshua just stopped the sun (and the earth’s rotation) and to top it off just remarked on what a nice moon there is there, over the valley of Ayalon?

Instead, the solution is simple.

4). The first part of the command tells Joshua's troops to keep fighting in Gibeon as if it is still day. The second part tells them TILL WHEN they should fight – until they routed the enemy from the field of battle in Gibeon, and the enemy ran off to the valley of Ayalon. When they (in pursuit) reach that valley, THEN they can “Call it the day” – there they will find their moon (=night), and break off the battle which they won. Joshua, telling them that “the moon is in the valley of Ayalon,” is telling them – “keep fighting

until you get to the valley of Ayalon, and THEN you can rest."

I must say that this interpretation is not only much more reasonable and fits with the historical facts, it also ensures Joshua's place in military history: in the middle of a crucial battle, Joshua finds the correct strategy – to keep fighting at night – despite it flying in the face of everything military knowledge recommended at the time; he employs this revolutionary method and scores a crucial victory.

Your editor disagrees. In my book, *Geocentricity*, the subject of Joshua's long day takes up the longest chapter in the book. When it comes to heliocentric apologists, the book categorizes them into: the fiction faction, language adjusters or Hebrew "experts," accommodaters, eclipse advocates, refraction rationalizers, advocates of close encounters of the planetary kind, and the Tippie-Top faction. Each is countered with the same laws of physics and grammar that these "experts" try to defend. In this case, we have a case of "Hebrew expert." Like just about all of the language adjusting Hebrew experts who apologize for this "error" in the word of God, Dr. Kor manages to "save" Joshua from the geocentric "error," but he fails to rescue God from making the error.

Consider for a moment: according to Dr. Kor, Joshua spoke not to the sun, but to his army. The command he gave supposedly told his army to fight as if it were still day. This may get Joshua off the hook, albeit in a most obscure way, but it doesn't get God, the Author off the hook in verse 13. There it says that "The sun stood still and the moon stayed... ." Besides, Dr. Kor ignores all the accounts around the world of a long day, a long night, and even a long sunset. There are so many of these that the time of day in Jerusalem can be determined to an accuracy of within about twenty minutes. Avital Pilpal may feel comforted, but then, ignorance is bliss.

Keeping dense stars in shape[9]

In research with the potential to help study stars and improve space navigation, scientists have successfully used lasers to cool a cloud of lithium atoms sufficiently to observe unusual quantum properties of matter. Although current technology does not permit humans to

[9] Juhans, Renee, and Jane Platt, 2001. "NASA research simulates how cold stars stay in shape", NASA press release 01-38.

travel to the stars, scientists can create a simulated star laboratory on Earth.

The scientists, at Rice University in Houston, TX, successfully simulated and photographed the process by which white dwarfs and neutron stars retain their size and shape, a mechanism called Fermi pressure. White dwarfs and neutron stars are dense, compact objects created when normal stars use up their fuel, cooling and succumbing to the forces of gravity.

Fermi pressure, named for Dr. Enrico Fermi, a Nobel Laureate prominent for his contributions in nuclear physics, has been theorized as the star stabilization mechanism, which keeps white dwarfs and neutron stars from collapsing further. NASA's Hubble Space Telescope and Chandra X-ray Observatory have observed such objects but this is the first time Fermi pressure has been directly observed in an Earth laboratory. The research by the Rice team, led by Dr. Randall Hulet, was conducted under a grant from NASA's Biological and Physical Research Program through NASA's Jet Propulsion Laboratory, Pasadena, CA.

Hulet's team cooled lithium to less than one-fourth of a millionth of a degree above absolute zero. Absolute zero is the point at which scientists believe there can be no further cooling. At these ultra-low temperatures, the researchers were able to view and photograph two stable lithium isotopes, identical except for the number of neutrons they contain. They were thus able to demonstrate the star-stabilizing pressure. However, on Earth this type of research is hampered by gravity. The microgravity environment on the International Space Station, when it is completed, will eventually serve as an ideal location to study the transition to a superfluid.

Big bang alternatives[10]

Jim Peebles of Princeton and Michael Turner of U. of Chicago were invited to conduct a "debate" on the origin of the universe at the Smithsonian Museum of Natural History in Washington, DC two years ago. The occasion was the 80th anniversary of the Curtis-Shapley debate on the same subject. However, both invitees merely argued for different versions of the Big Bang. Turner argued that we already know almost everything, and that cosmology will come to an end in about 15 years when we finally fill in the few remaining missing pieces of the puzzle. Peebles argues for a humbler approach, indicating there was still room for surprises, perhaps even some drastic ones, with the basic Big Bang model. The audience was self-selected for its interest

[10] Email by Dr. Tom van Flandern.

in the subject, and numbered about 500.

In concluding the debate, the moderator, Margaret Geller, turned to the audience and commented that, 80 years ago in the first debate, the Big Bang hadn't even been conceived yet. She posed a hypothetical question to the audience: “80 years from now, if another debate is held on this subject, how many think a model something like one of these two viewpoints will be represented in that debate?” I was sitting in the front row and turned around, and I could not see a single hand in the air. Frustrated, Geller suggested they must be like a Harvard class, where no one volunteers to answer a question. So she posed its opposite: “How many think that neither of these models will be represented in such a future debate in 80 years?” The room was filled with hands in the air. So much for the public's confidence in the leading proponents of the Big Bang!

The ...[claim] that the “Steady State”[11] theory was dropped in 1965 is disingenuous for two reasons. It’s successor, “Quasi-Steady-State Cosmology,” is in excellent standing, as are several of the half-dozen other Big Bang alternatives, such as Plasma Cosmology (Alfven), Variable-mass Cosmology (Arp), and the Meta Model (Van Flandern). But more significantly, Lerner showed from radio absorption of quasars that the optical depth of the universe was too great for the cosmic microwave “background” to be coming from the background. And the only quantitatively correct prediction of those microwaves was that of Eddington in 1926, who showed that the temperature of anything in isolated space would cool to three degrees Kelvin (the temperature of microwaves), and no colder, because it would be constantly bathed in the radiation from distant star-and-galaxy light.

Personally, I think the most significant point to mention is that the consensus of most recent evidence is that the universe is not expanding at all. The redshift of galaxy light is an energy loss phenomenon rather than a velocity phenomenon, as indicated by eight experiments now. See details in my paper “Did the Universe Have a Beginning?” at <http://metaresearch.org> at the “Cosmology” tab. This paper has now been published in two technical journals and in my book, all peer-reviewed.

Finally, I would make note of the list of the “Top Ten Problems with the Big Bang,” also available at the mentioned web site.

Best wishes. –Tom –

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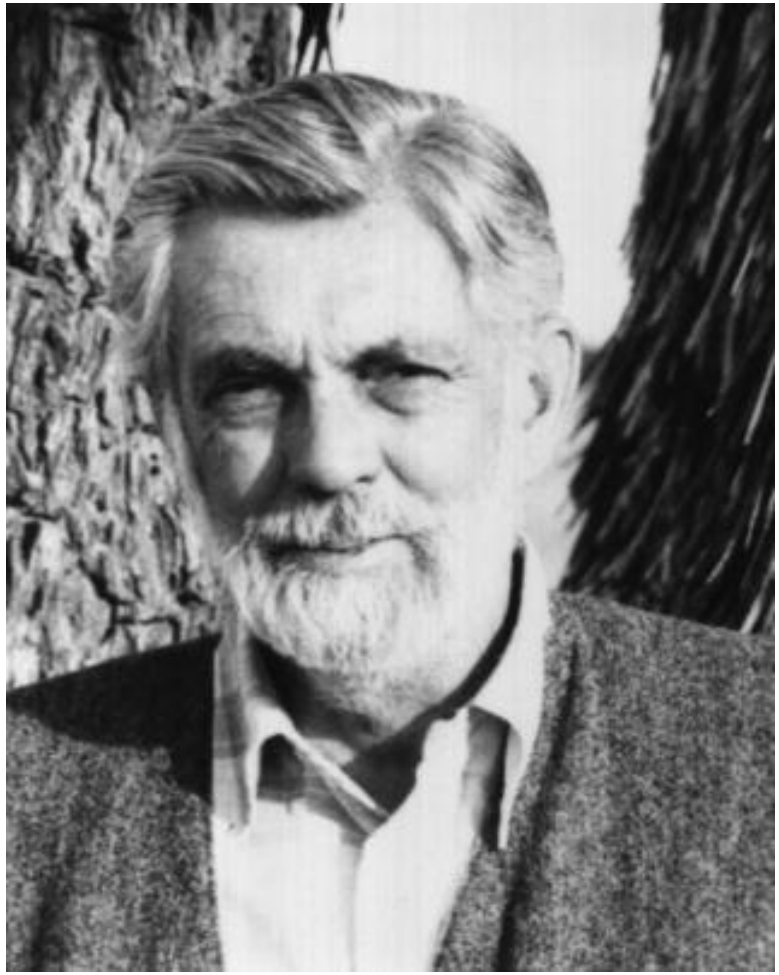
[11] The Steady State theory, championed by Herman Bondi, advocated an infinite, eternal universe in which matter was created and destroyed over long periods of time, thus keeping the universe “steady.”

Charles K. Johnson, 1924-2001[12]

The president of the International Flat Earth Research Society died this past January. Johnson was a feisty character who, though also a geocentrist, staunchly opposed the Tychonian Society in the early 1980s. The Tychonian Society is the forerunner of the Biblical Astronomer.

According to Johnson, the known, inhabited, world is flat. The



dome of heaven is about 4,000 miles above, and the stars are about as far away as San Francisco is from Boston. The sun and moon are about

[12] This article draws from Robert J. Schadewald's article, "The Flat-out Truth: Earth Orbits? Moon Landings? A Fraud! Says This Prophet," *Science Digest*, July 1980.

32 miles in diameter and they circle above the earth near the equator. Sunrise and sunset, as well as moonrise and moonset, are, according to Johnson, tricks of perspective, such as how railroad tracks appear to meet in the distance. Furthermore, the moon shines by its own light, not by reflected sunlight. How then does he explain lunar eclipses? Johnson claimed that lunar eclipses are caused by a dark, unseen body occasionally passing in front of the moon.

In his view, the known earth is as circular and as flat as a phonograph record. The North Pole is at its center, and it is bordered at its edge by an ice wall 150 feet high, which no one has ever crossed. What lies beyond it is unknown.

Johnson was convinced that the earth was flat while yet a child. It was common sense to him. He made appeal to the Scripture, too. For instance, Jesus ascended "up" into heaven. In other words, Johnson assumes that heaven is flat, and so the earth must also be flat.

Johnson was named The Flat Earth Society's president through the last wishes of its founder, Samuel Shenton, an Englishman who died in 1971. The society stems from the Universal Zetetic Society, which flourished in England in the nineteenth century. Under Johnson's leadership, the society's paid-up membership has grown from a few persons to a few hundred. Membership is open to anyone who is regarded as sincerely seeking the truth; prospective members must sign a statement agreeing never to defame the society. This statement has an interesting connection to the Tychonian Society.

Sometime in the late seventies or early eighties, Charles Johnson was introduced to the *Bulletins of the Tychonian Society*, the forerunner of *The Biblical Astronomer*. At the time, Walter van der Kamp was the president of the Society, so Johnson struck up a correspondence. Well, Walter turned out not to be, in Johnson's opinion, a "reasonable man." To this day, the Society and its descendents fail to subscribe to the flat earth doctrine. With the failure of the Tychonian Society to become "reasonable" flat earthers, Johnson banned his members from having membership in the Society. At least one of his members was "excommunicated" for supporting the Tychonian Society.

Johnson was married to an Australian who he met in San Francisco in 1959 when both went into a record store to buy the same record, Acker Bilk's "Stranger on the Shore."[13] They were both vegetarians with an intense interest is geography. Marjory, too, has always known that the earth is flat. She was rather shocked when she arrived in the States and found people speaking of Australia as being "down under." She took it as an offence. So much so that she once swore in an affidavit that she had never hung by her feet in Australia. Marjory

[13] A tune based on Borodin's "Polovetsian Suite."

died in May of 1996, eight months after their high-desert home burned down to the ground, taking with it all the Flat Earth Society's records and library. For years, she had served as secretary of the Society.

The short, dizzying life of Phobos

Mars has two moons, Deimos and Phobos. Deimos is further out and smaller, shining as a bright star at magnitude –6. Phobos, on the other hand, orbits well below the synchronous orbit radius for Mars (the radius at which one revolution of a satellite would exactly equal the length of a Martian day). It shines at magnitude –10, as bright as a quarter moon. That's bright enough to cast a shadow, but not bright enough to read by. Phobos's orbit is so close to Mars that the tidal forces cause it to lose altitude at about 6 feet (1.8 meters) per century. In about 50 million years, Phobos will either crash onto the surface of Mars or, more likely, break up into a ring.

Now consider for a moment how "fortunate" we are to find ourselves in that short time span where Phobos is still in orbit. Indeed, as far as we know, no previous satellites were broken up into rings, so Phobos is likely the first. If we "evolved" 50 million years later than we did, then there'd no longer be a Phobos and Mars would be just another of the ringed planets. It's one of those "coincidences" which fall under the loose category of "anthropic principle"; that is, that the cosmos seems to be made for man. Another part of that principle is that it appears young.

And here is the unspoken aspect of that doomed moon's dilemma. Within the Roche limit, no bodies can form because they would be torn apart by the tidal force. That means that Phobos had to have been formed outside the Roche limit, evolutionarily speaking – and I am not an evolutionist. Of course, one could postulate that Mars captured two errant asteroids, but that does not alter the uniqueness of the timing. It would be interesting for someone to compute how long a captured asteroid would orbit the earth before being ejected by the moon. More, or less than 50 million years? If more, why aren't there any about the earth? After all, the earth is more massive than the sun and more likely to capture an asteroid insofar as gravitational size is concerned.

Mars rotates on its axis once every 24.6 hours. If we were to stand on the surface of Mars, we would see Phobos arise in the **west** and set in the east three times each Martian day. Its synodic[14] period is 7 hours and 39 minutes.

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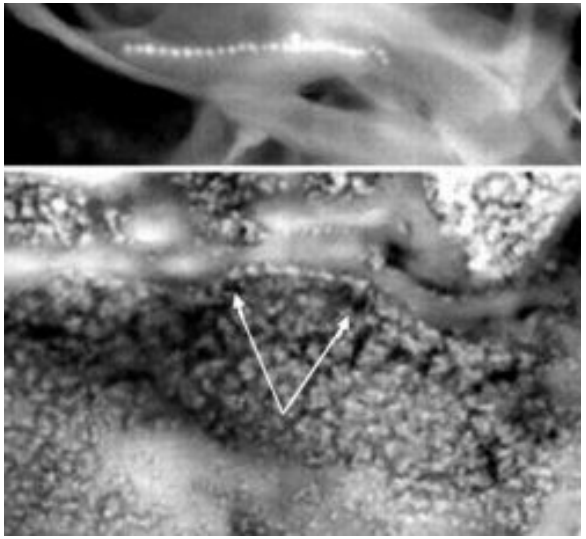
[14] The synodic period is defined relative to the sun, so the time elapsed between Phobos passing over the face of the sun until the next time it passes over its face is 7 hours and 39 minutes.

Magnetic chains from Mars?

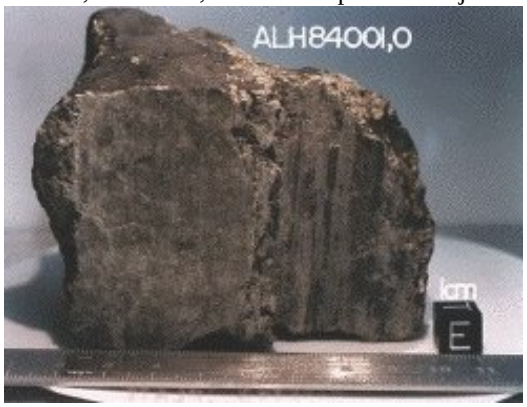
On earth, chains of magnetic crystals are kept in alignment by microbes. These chains appear to play a role in the migration of several animals and birds. Now such chains have turned up in a supposed meteorite from Mars. The question then is: why didn't the single-file crystals collapse long ago into a magnetized clump? Scientists say ancient Martian microbes may have kept them in line. The news was released February 27th in the *Proceedings of the National Academy of Sciences*. The researchers proposed that "early" microbial life is responsible.



Left: Backscattered scanning electron microscope images of (above) a modern magnetotactic bacteria with a chain of magnetite crys-tals and (below) magnetite crystals and chains of magnetite crystals in the Martian meteorite. One conspicuous chain is indicated by arrows. The diameter of a single crystal is approximately one-millionth of an inch.

The "Martian meteorite" is ALH84001 (which was involved in the life-on-Mars brouhaha several years ago). "The chains we discovered are of biological origin," asserted Dr. Imre Friedmann, who was also the discoverer of the Martian bacteria in 1996 (see photo next page). Friedmann is an NRC senior research fellow at NASA's Ames Research Center and leader of the research team. "Such a chain of magnets outside an organism would immediately collapse into a clump due to magnetic forces."

Friedmann's team says the magnetite chains in the meteorite probably were flushed into microscopic cracks inside the Martian rock after it was shattered by an asteroid impact on Mars' surface "about 3.9 billion years ago." The supposed impact is also presumed to have killed the bacteria. The same, or a later, asteroid impact then ejected the rock into space.



So much for the official story. But another NASA research group, led by Kathie Thomas-Keprta of NASA's Johnson Space Center (JSC), report in the same issue of PNAS that the magnetite crystals inside the meteorite are similar to those formed by magnetite-wielding bacteria now living on earth. "These magnetites (from the meteorite) are basically indistinguishable from certain biogenic (i.e., biologically-produced) magnetites on Earth. And furthermore, we know of no other mechanism to make them, either on Earth or Mars," said Dr. Everett Gibson, an astrobiologist at JSC, who also participated in the Thomas-Keprta study. In other words, it seems far more likely that they are due to terrestrial magnetite-wielding bacteria than identical Martian bacteria.

The report continues to strengthen that conclusion. The crystals made by magnetite-producing bacteria are chemically pure and free from defects in crystalline structure. They are slightly elongated along a particular crystalline axis, and they range in size from 35 to 120 nanometers (a nanometer is one-billionth of a meter). They also show a particular pattern of faceting – like a cut diamond. These properties are so unusual that they have only been seen in magnetite crystals produced by biological processes. Yet, the fossils of the chain-producing bacteria are absent. The researchers have started to search for that.

The debate over life on Mars illustrates how politicised science has become over the past two hundred years. Time was that science was practiced by men who were paid by wealthy patrons. Research results had to be reproducable and verifyable. The most realistic and likely explanation was to be preferred. Today, when science is funded by governments, the results of science must match the world-view of the government in power. The Soviet example of Lysenko is a case in point. But the western nations have suffered similar deterioration. The governments of the nations no longer have use for the God of Truth

(John 14:6) so it should not surprise anyone that the Truth is victim to the rival god, Mammon. And this bacterial issue is no exception. Money to justify Mars exploration is no longer based on knowledge for knowledge's sake or a quest for truth. It must be justified in the socialistic atheistic paradigm of the U.S. government. "Prove" that life evolved. "Disprove" the Holy Bible at any cost. Replace its Ten Commandments with a Humanist Manifesto. Propagate its gospel of fear, uncertainty, and doubt. The means of man all end in death.

Quote

A little girl was talking to her teacher about whales. The teacher said it was physically impossible for a whale to swallow a human because, although it is a very large mammal, its throat is very small.

The little girl mentioned that Jonah was swallowed by a whale.

The teacher reiterated that a whale could not swallow a human; it was impossible.

The little girl then said, "When I get to heaven I will ask Jonah."

The teacher asked, "What if Jonah went to hell?"

The little girl replied, "Then you ask him."

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

TITLES AVAILABLE FROM THE B.A.

Orders can be honored only if accompanied by payment in United States currency either by cheque drawn on a U.S. bank or cash. All prices are postpaid. Orders outside North America please add $5 per item, $2 per audio tape (sorry, the US Postal Service quadrupled postage in January).

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