

The 'tone' of contributions

As a relative newcomer to CEN Tech. J., I am glad to find an excellent publication, though marred for me personally, and I suspect others, by the 'tone' of responses and counter-responses to some articles. I would like to ask your correspondents to consider a little more carefully how they word what they write, and avoid getting so carried away with 'winning' their adversarial point that they lose their hallmark of Christian charity.

Whatever our sober estimates of ourselves and the importance of the message that we 'burn' to get across, the truth is that ... none of us is omniscient, and any lasting value our work has is attributable to Christ — no one else! If our communication is corrupted with self-justification or invective, it fails to glorify Jesus and is useless — 'though I have ... all knowledge ... and have not charity, it profiteth me nothing' (1 Cor. 13:2).

I can appreciate that it is galling for many hours of carefully crafted work to be ignorantly rubbished, misconstrued or misunderstood. God's word insists that all things happen for good and so, dear Author, whether your work makes an impact or not, God's purpose will be being achieved, and we should rejoice in that. None of us should try to 'prove' our worth, because God is no 'respector of persons', and, to the contrary, we have an obligation to love and esteem others better than ourselves [Phil. 2:3].

I'd like to appeal to all writers to look through back issues of this journal and determine whether or not this appraisal is a fair one and act accordingly. Perhaps, if felt appropriate, the editor could add a suitable phrase or two to the 'Instructions to Authors' printed on the inside back cover of each issue.

As Job's comforters discovered, truth does not perish with us: God delights in the good work of writing

A note from the editors — play the ball, not the man

We are in broad agreement with the sentiments in the first letter, and (as our instructions to authors now indicate) we do wish to actively discourage this sort of thing henceforth. We have already resisted publishing some contributions for that very reason.

We were in a dilemma with this TJ issue, having already received the letters (following) on the 'Starlight and Time' controversy. In the end, we decided to publish them this once, especially since various authors were claiming to be defending themselves against similar personal attack.

However, in future, submitted items which feature similar ad hominem statements will almost certainly be either rejected or require rewriting.

Speaking of ad hominem, we

received an item for publication from Del Ratzsch, of Calvin College, the author of the book *The Battle of Beginnings*. Ratzsch is critical of the review of his book by Carl Wieland which we published in 12(1):23–28, 1995. Among other things, the item claimed that the reviewer repeatedly cast doubt on the author's integrity.

We decided not to publish the submission. First, because it had already been published elsewhere (intending contributors take note). Secondly, because (as stated) we are trying to pare down/eliminate emotive issues in this journal. Dr Wieland says, 'My comments concerned what I perceive as the author's bias (not necessarily all conscious) toward theistic evolution (the view stridently pushed by his College). While standing by my general opinion of the book, no personal offence was intended.'

He's prepared some of us to excel in it, but only if executed in grace. Let's make the Technical Journal excellent in both content and the 'tone' it is presented in!

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Humphreys' new vistas of space

In his recently published article,¹ D. Russell Humphreys makes some disparaging assertions about me and my associates, and I would like the opportunity to respond.

Long before [Humphreys' book] *Starlight and Time* went to the publisher, I reviewed the work and encouraged Humphreys to change his mind about publishing. I based my appeal on well established, well understood science, including the fact that the universe is filled with

'clocks' (time-dependent phenomena in stars and galaxies) that refute Humphreys' fundamental premise about time variations in the history and 'geography' of the cosmos. Humphreys dodged the issues I raised, diverted to side issues, and eventually resorted to attacking my expertise as a scientist, as well as my character and theology.

I am 'disturbed' (as he says) but not at all 'threatened' (scientifically, intellectually, or in any other way) by *Starlight and Time*. My motive is to save the Christian community, including Humphreys himself, from embarrassment and from unnecessary scorn. Since Humphreys had no respect for my views on his work, in early 1995 I asked four physicists (all of whom accept the five doctrinal statements which appear on the inside front cover of your journal) to appeal directly to Humphreys. They reviewed his material in detail and concluded that it should be withdrawn. While Sam Conner (MIT doctoral candidate in astrophysics) wrote the technical

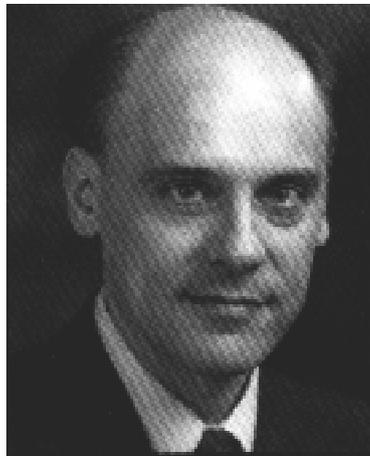
communications to Humphreys, Don Page (Ph.D., Caltech in physics on general relativity), Gerald Cleaver (Ph.D., Caltech in physics on string theory), Michael Strauss (Ph.D., UCLA in physics on fundamental particles), and I (Ph.D., Univ. of Toronto in astronomy on quasars and galaxies) reviewed the communications by Conner.

After only a few months of written exchange between Conner and Humphreys, Humphreys refused to continue any technical discussion (shortly after this point, Conner and Page began, at the invitation of young-earth ministries, including your own, to write for general Christian consumption). Humphreys' final communications to Conner were evasive and disrespectful, much as his communications with me have been. Apparently, anyone willing to question his views and able to identify his mathematical and physical errors is, in his view, incompetent. Thus, we appeal to your journal, for we hope that if creationists (and I am one, not a theistic evolutionist as Humphreys repeatedly asserts) acknowledge the implausibility of *Starlight and Time*, the damage it brings to the Christian community and to your and our evangelistic efforts can be minimized. Let's not give our mutual adversaries a boost.

Contrary to what Humphreys implies,² I have never conceded that my criticisms, published in *Facts & Faith*, were invalid or incorrect. I did acknowledge that they were too briefly stated to be widely understood. I might add that nothing I've seen in any of Humphreys' writings would cause me or my colleagues to alter or abandon our evaluation of his theory. I can only interpret Humphreys' ongoing dodges and insults as a subterfuge.

While I applaud *Creation Ex Nihilo Technical Journal* for publishing Conner and Page's critique of *Starlight and Time*³ I can only wish that the editorial team had

restrained Humphreys from characterizing Conner and Page as 'blind' and their thinking as 'incomplete', a 'mistake', and 'contradictory'. (Readers and Humphreys might be helped in such cases by the intervention of some outside referees.) [There were three — ed.] Humphreys' attacks on Conner and Page, his disregard for their knowledge and expertise, and his trading of one untenable model for an even less tenable one (his appeal to imaginary time will delight opponents of the Christian faith) only enlarges people's barriers to trusting in the reliability of the Bible and to believing in the God who inspired it.



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References

1. Humphreys, D.R., 1998. New vistas of space-time rebut the critics. *CEN Tech. J.*, 12(2):195-212.
2. Humphreys, Ref. 1, footnote 69, p. 212.
3. Conner, S.R. and Page, D.N., 1998. *Starlight and time is the big bang*. *CEN Tech. J.*, 12(2):174-194.

Russell Humphreys replies:

I am disappointed that Dr Ross has chosen to respond to my cosmology model on such a personal level, rather than forthrightly addressing the scientific issues I

raised. Instead, the main purpose of his letter appears to be to portray me as dishonest. He alleges that I am 'evasive and disrespectful' and use 'dodges and insults as a subterfuge.' Therefore, he implies, my cosmology must be wrong. I hope no reader of this journal thinks that is a valid logical argument! However, Ross has been saying such things to his audiences for many years without giving me an opportunity to reply, thus leaving them with a wrong impression of me and my work. I am glad to have this chance to respond to these allegations in public. Let's consider the main ones:

1. 'Long before *Starlight and Time* went to the publisher, I reviewed the work and encouraged Humphreys to change his mind about publishing' — Wrong. Ross never reviewed my cosmology, and never advised me not to publish it. In fact, in April 1993, before I had written my paper, Ross declined the opportunity to officially peer-review it for the editors of the scientific conference to which I planned to submit it.¹ Then he ceased corresponding with me for over five years, until December 1998. The scarcity of specific dates in Ross's letter suggests he is relying mainly on his memory, which could explain his confused account of events. If he has misplaced his files of the correspondence, I can provide him with copies.¹⁻³
2. 'I based my appeal on ... the fact that the universe is filled with "clocks" ... that refute Humphreys' fundamental premise about time' — Wrong. There was no appeal. Ross's April 1993 letter was his last communication to me before my book went to the publisher in October 1994. Neither that letter nor any of his previous communications to me said anything about clocks or my 'fundamental premise', gravitational time dilation. As for his claim about clocks here, it too is

- wrong (see reference 11).
3. 'Humphreys dodged the issues I raised ... and eventually resorted to attacking my expertise as a scientist, as well as my character and theology.' — Wrong. Before my book publication in October 1994, Ross never communicated with me about it. It's a bit hard to dodge a non-raised issue! As for my opinions about Ross's expertise and character, I have always striven to keep them out of the public arena. His public theological teachings are of course a proper subject for public discussion,⁴ but the main one I have concentrated on is whether or not he is correct in elevating 'science' above Scripture.
 4. 'My motive is to save the Christian community, including Humphreys himself, ... from unnecessary scorn.' — I am rather amused, because Dr Ross and a few of his like-minded friends are about the only people I know of who are trying to heap scorn upon my cosmology. If he is worried about scorn on the Christian community, all he has to do is stop scorning! As for saving me future criticism by the atheists, Ross can hereby cease his efforts; since I do not crave the approval of that crowd, their disapproval would not bother me. But if the true cause of Ross's worries is being scorned by the atheists himself, I would think a simple disavowal by him of my work would have been sufficient. Does he regard himself as being responsible for the scientific opinions of all Christians?
 5. 'I [Ross] am disturbed' — I agree. In this letter Dr Ross's usual calmness is absent, and it may be that strong emotions are what have clouded his recollection of events.
 6. 'In early 1995 I asked four physicists ... to appeal directly to Humphreys' — Misleading. Only one of the four, Mr Conner, ever communicated personally with me. He never hinted that he was acting as an agent for Ross, or that Page, Cleaver, and Strauss might be reviewing Conner's letters, so such interactions must have been carried out in secret. During this period I corrected several of Conner's early errors, which Conner acknowledged privately.⁵
 7. '[All four physicists] accept the five doctrinal statements [of this journal]' — Doubtful. Being supporters of Ross, they could not in honesty accept statement two, 'The final guide to the interpretation of Scripture is Scripture itself', since Ross's final guide — not in word but in practice — is 'science'.⁶ They might also have a problem with statement three, '... Genesis is a simple but factual presentation ...', since Ross's re-interpretations of Genesis are anything but simple.
 8. 'Humphreys refused to continue any technical discussion' — Wrong. I discontinued only private technical discussions with Conner, not public discussions with him in the journals. Furthermore, I did the discontinuing only after July 1995, when I discovered that Conner had not been straightforward with me about his intentions.⁷ I found I was being used to privately tutor an adversary of young-earth creationism! I responded to Conner with the intent of limiting any technical discussions with him to public ones, so everyone could see who was making the mistakes. However, I left the door open for private discussion with Conner of non-technical issues.⁸
 9. 'anyone willing to question [Humphreys'] views ... is, in his view, incompetent' — Wrong. Not everyone, and definitely not because of opposition to my views. For example, I think Dr Page is competent, but he was probably careless in checking Conner, as I mention in my reply to Conner in this issue. The reason I had wanted Ross to be an official reviewer of my paper for the 1994 International Conference on Creationism was that I wanted competent criticism from someone of the opposite point of view. Ross not only refused,⁹ but he also failed to recommend anyone else, such as Dr Page.
 10. 'I [Ross] am ... not a theistic evolutionist' — False. My article spells out exactly what I mean by theistic evolutionism: '... any view which combines theism with naturalistic evolutionism — including that theory's events ('big bang', molecules-to-man evolution), order of events (light before earth, death before Adam), and time-scale (billions of years).'¹⁰ This very reasonable definition describes Dr Ross's views perfectly. Ross's misappropriation of the name 'creationist' obscures the fact that his teachings are completely opposed to a straightforward reading of the biblical account of creation.
 11. 'I [Ross] have never conceded that my criticisms, published in Facts & Faith [in 1995],^{11, 12} were invalid or incorrect. I did acknowledge that they were too briefly stated to be widely understood.' — Well, then, let Dr Ross spell out his criticisms more clearly in a peer-reviewed scientific journal (such as this one) wherein I can reply, and we'll have a good clean scientific debate about it!
 12. 'me [Ross] and my colleagues' — Scientific issues should not be decided on the basis of who has the most colleagues! But for those who have no other way of judging, I point out that I, too, have colleagues in this matter. The peer reviewers who accepted my papers for the 1994 International Conference on Creationism and for last year's CEN Technical Journal were (as I now know) competent,

secularly-published theorists with PhDs in physics and mathematics, and graduate-level training in general relativity. In addition, I have received private advice and encouragement from over a half-dozen general relativity theorists in the academic world. Like Dr Ross's two more reticent colleagues, these haven't come forth with public pronouncements on this issue. Unlike Ross's shy colleagues, these would have a lot to lose by doing so, in view of the academic world's tendency to purge known creationist sympathizers from its ranks.

13. 'Humphreys' ongoing dodges and insults' — Wrong. It is Ross who has repeatedly dodged public debates with me.¹³ The alleged 'insults' may consist of my assertions that Ross is a theistic evolutionist, not a creationist. Is it insulting to insist on truth in labelling?
14. 'I can only wish that the editorial team had restrained Humphreys from characterizing Conner and Page as "blind" and their thinking as "incomplete", a "mistake", and "contradictory" .' — Wrong. I have tried to keep my counterpunches clean and above the belt, and the editors made sure of it. I said that Conner and Page had an intellectual blind spot,¹⁴ not that they are blind. Second, I said their metric was incomplete.¹⁵ That is a technical phrase relativists often use; it is no more insulting than saying that a map of California does not completely describe all of North America. Third, I don't know of any kinder word than 'mistake' to describe a serious, relevant error. As for 'contradictory', I can't find any place where I used that word about Conner and Page's thinking.¹⁶
15. 'Humphreys' ... disregard for [Conner and Page's] knowledge and expertise' — Wrong. I don't disregard such; I challenge their

conclusions on objective scientific grounds. Ross appears to endorse the ancient opinion of Galileo's opponents, that truth should be determined by human 'authorities' — not by reason, evidence, and Scripture.¹⁷

16. '[Humphreys'] trading of one untenable model for an even less tenable one' — Wrong. I made no trade. I did not give up on the earlier possibility in my book; I merely made explicit a new and interesting one which was implicit in my mathematics all along. Either model was defensible, but rather than go tediously over old ground, I used the opportunity to get a second one onto the table.
17. '[Humphreys'] appeal to imaginary time' — Wrong. I never used that term, except to quote Hawking.¹⁸ I think 'imaginary time' is a misnomer, and instead I spoke of 'stopped clocks'. As my references to well-known relativists show,¹⁹ in going from normal space-time into a Euclidean zone, the time dimension changes into a space dimension, and clocks and other normal physical processes stop. But the former time dimension is a perfectly real space dimension, just as real as the other three and having the same character.
18. '[so-called] imaginary time will delight opponents of the Christian faith' — Wrong. The opponents should be dismayed. While Hawking does try to use the concept of Euclidean zones to try to eliminate the beginning of time, I use it in a very different way to support the idea of a recent beginning. I think the opponents of Christianity would be quite upset to hear of creationists not only keeping up with the latest concepts in general relativity, but also using them to support the biblical account of creation.

In concluding, I exhort Dr Ross to put personal feelings behind

him and ascend to the cleaner, clearer realm of scientific discourse. I call upon him to quit depending on the opinions of other scientists, and instead submit scientific critiques of his own to peer-reviewed scientific journals such as this one. That kind of openness would improve all young-earth creation models and greatly glorify Jesus Christ our Creator.

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References

- Ross, H.N., 1993. Letter to Humphreys, April 15.
- Humphreys, D.R., 1992. Letters to Ross: January 13, August 13, November 12; Humphreys, D.R., 1993. Letter to Ross, March 19.
- Ross, H.N., 1998. Letter to Humphreys, December 1.
- Van Bebber, M. and Taylor, P.S., 1994. Creation and Time: A Report on the Progressive Creationist Book by Hugh Ross, 1st Ed., Eden Publications, Mesa, Arizona. This is an excellent and well-documented refutation of Ross's theology and teachings.
- Conner, S.R., 1995. Letter to Humphreys, April 23.
- Van Bebber and Taylor, Ref. 4, pp. 25–40. Ross claims nature is the 'sixty-seventh book of the Bible' and says that we should treat it as equal to the written revelation. However, in practice, he elevates human interpretations of nature above the straightforward, face-value, meaning of the written revelation, using the current fads of science to 're-interpret' Scripture until it 'agrees' with the fads.
- Ross, H.N., 1995. Fund-raising letter to supporters, July. This letter mentioned that Conner had been, for some time, a highly-committed financial supporter of Ross and was also supporting Ross with various 'research' and writing projects. This was contrary to the way Conner had presented himself to me in his correspondence.
- Humphreys, D.R., 1995. Letter to Conner, July 9.
- Ross, Ref. 1.
- Humphreys, D.R., 1998. New vistas of space-time rebut the critics. CEN Tech. J. 12(2):195–212. See p. 211, Ref. 2 of that

article.

11. Ross, H.N., 1995. Progress towards resolution of the creation-date controversy. *Facts and Faith* 9(1):12–13. *Facts and Faith* is a quarterly non-peer-reviewed layman's newsletter issued by Ross's organization; it normally does not publish rebuttals. I first saw this issue (first quarter) in March, 1995.
12. Humphreys, D.R., 1995. An open letter to Hugh Ross. *Bible-Science News* 33(4):21–22. This open letter in the May issue was a copy of a technical reply to Ross's criticisms in Ref. 11; I faxed it to him on March 7, 1995 and mailed him a copy on March 26, 1995. When Ross did not respond, I sent the open letter to BSN. Ross finally replied publicly in the August issue of *Bible-Science News* 33(6):6, but he did not try to defend his technical points or refute mine, deferring instead to then-future publications he expected from Conner, et al. None of those later publications appeared to use or defend the specific points Ross had made in Ref. 11.
13. Humphreys, D.R., 1995. There you go again, Dr Ross! *Bible-Science News* 33(6):6–7. On page 7 is a reprint of an August 13, 1994 letter I sent Ross, politely asking him why he had backed out of a radio debate scheduled for the week before — only after he found out I was to be his opponent. He never answered that letter.
14. Humphreys, Ref. 10, p. 210.
15. Humphreys, Ref. 10, p. 201.
16. Humphreys, Ref. 10, p. 212. See that article's Ref. 36, where I did say of Prof. Stephen Weinberg: 'This shows that even Nobel Laureates are not immune from self-contradiction.' Since this appraisal includes the whole human race, nobody needs to feel singled out and particularly offended.
17. Galilei, G., 1632. *Dialogo ... Massimi Sistemi del Mondo*, G.B. Landini, Florence. English translation in: Drake, S., 1967. *Dialogue Concerning the Two Chief World Systems*, 2nd Revised Ed., University of California Press, Berkeley. Simplicio, the spokesman for Galileo's academic opponents, often falls back on appeals to Aristotle's authority. Salviati, the spokesman for Galileo's point of view, just as often argues against human authority, calling instead for careful reasoning and evidence to settle scientific issues. Unfortunately, Simplicio's intellectual descendants are still far too numerous today, and Salviati's are far too few.
18. Humphreys, Ref. 10, p. 211. See Ref. 33 of that article.
19. Ellis, G.F.R., Sumeruk, A., Coule, D. and Hellaby, C., 1992. Change of signature in classical relativity. *Classical and Quantum Gravity* 9:1535–1554.

More on vistas

I congratulate you on publication of the paper 'Starlight and time is the big bang' by Samuel R. Conner and Don N. Page.¹ I am not a cosmologist, but I am a professional theoretical physicist (now in retirement) so I am able to follow the algebra and test the reasoning presented. I applaud the authors for providing such a careful, thorough, perceptive, and exhaustive assessment of the book *Starlight and Time* by D. Russell Humphreys, and for listing the evidence which excludes the whole class of relativistic young – universe cosmologies. The reply 'New vistas of space-time rebut the critics' by D. Russell Humphreys² introduces a completely new argument, but contains a number of incorrect statements. I shall here comment on the central issue.

By his insistence on the use of the Klein metric, Humphreys appears to be expressing a belief in just one true metric for the universe. No! The metric is not a property of the universe, but is a property of the system of co-ordinates used to describe the universe. Since one can readily transform from one set of co-ordinates to another, the metric may change along with the transformation. Conner and Page have explicitly stated the connection between the Schwarzschild coordinate system (which implies the Klein metric) and co-moving coordinates (which implies the Robertson–Walker metric). Since the transformation between the two co-ordinate systems exists, the two metrics are exactly equivalent to each other — they stand or fall together. Indeed, Conner and Page have explicitly demonstrated that the two metrics predict exactly the same proper time elements for comoving observers.

Humphreys' apparent belief in just one true metric leads him to a misinterpretation of his own Figure 3 by switching clocks in mid-

argument. He first uses clocks reading Schwarzschild time to construct the figure with its 'timeless zone'. Then, instead of regarding such a zone as a pathology induced by the use of Schwarzschild clocks which have been travelling faster than light (clocks which may have some convenience for descriptive purposes, but certainly no physical reality), he mistakenly believes he has uncovered an intrinsic property of the universe thus enabling him to switch to 'expansion fraction' clocks — that is, clocks reading cosmic time — for his exposition of the figure. No! The figure does not indicate some constraint on the behaviour of ordinary physical clocks. If any clocks have been prevented from 'ticking' in the 'timeless zone', they would only be those associated with the Klein metric, i.e. (unphysical) Schwarzschild clocks and not any clocks which, at all stages of the universe expansion, have in their travels obeyed the cosmic speed limit (the speed of light). Actually, even Schwarzschild clocks do something in that zone, they are not completely non-functional, they are not completely stopped as is clearly shown in Conner and Page's Figure 4.

But, does it matter? Suppose a friend telephones you from a very great distance and tells you that sometime in the next two weeks he is going to visit you. Towards the end of that period you locate in your home a favourite watch that you had mislaid some months before. Of course it has stopped, so, joyful at finding it again, you wind it and set it to the correct time. Shortly thereafter your friend arrives and simultaneously you check your watch to see if it is still going — it is, and you note that just ten minutes have elapsed since you wound it. Do you then deduce that your friend's travel time was only ten minutes? No! Why not? Because the very great distance and the maximum possible speed of travel

available to humans forbids it. In like manner, the very great distance from here to the distant galaxies, and the limitation on the speed of light tells us that the light has been traveling for a very long time even if our clocks were stopped (or not even created until the light was about to arrive). So we must allocate a very great age to the universe, not simply an age our clocks have recorded supposing them to have started after changes in the universe when they were not 'ticking'.

The bottom line is this: in our reference frame the distant galaxies are billions of light years away, so in our reference frame the light has taken billions of years to get here, so in our reference frame the age of the universe is in the billions of years range. It is simply quite irrelevant what clocks elsewhere in the universe may be doing, but if D. Russell Humphreys' clocks at the edge of his universe happen to run faster than ours do, then they would indicate an even greater age than those billions of years!

The overwhelming evidence that the universe is very old does not distress me, because I regard the statement '... he made the stars also' (Gen 1:16) to be a parenthetic insertion into a narrative solely about the establishment of the earth's ecosystem. I believe the insertion is there to acknowledge that the Creator of the universe is the same Mighty One who created all living things, and is not there to imply any time relationship between those two creative events.

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References

1. Conner, S.R. and Page, D.N., 1998. Starlight and time is the big bang. *CEN Tech. J.*, 12(2):174-194.
2. Humphreys, D.R., 1998. New vistas of space-time rebut the critics. *CEN Tech. J.*, 12(2):195-212.

Russell Humphreys replies:

I'm glad to have Dr Duff's comments on my cosmology, especially since, being of the old-cosmos point of view, he is motivated to search for errors in my reasoning. Even though his specialty is solid-state physics, not relativity, I welcome scrutiny by more theoreticians. However, Duff seems to have overlooked several things which undermine his main technical points. In that regard, let's examine five of his statements:

1. 'Humphreys appears to be expressing a belief in just one true metric for the universe.' Incorrect. I do not claim uniqueness for the Klein metric, merely that it is more useful here than the metric Conner and Page were using:¹ 'Thus the Robertson-Walker metric is a less complete description of this physical situation than the Klein metric is.'
2. 'Since the transformation between the two coordinate systems exists, the two metrics are exactly equivalent to each other [my emphasis]' Duff put the whole statement in bold font, implying it was his main point. But my paper cites a counter-example to that very point:² '... this is not the first time a change of coordinates has [revealed new physics]. In 1960, Kruskal and Szekeres introduced a new set of coordinates which revealed startling new regions of space-time in the vacuum around and within a black hole, regions which had lain concealed and unsuspected in the Schwarzschild vacuum metric. The new coordinates shed a great deal of light on the nature of the event horizon, opened up the possibility of white holes and worm-holes, and stimulated a great outpouring of research on black holes for the next three decades. Thus it should not be too surprising that a shift of coordinates has again revealed new black-hole physics,

this time within the matter region.'

As experts in general relativity know very well, there exists a transformation between Schwarzschild coordinates and Kruskal coordinates. But no expert would try to claim the Schwarzschild and Kruskal metrics are 'exactly equivalent to each other', because the latter describes more regions of space-time than the former.³ Thus my example directly contradicts the argument Duff is trying to make.

3. '[The timeless zone is] a pathology induced by the use of Schwarzschild clocks' Duff gives no mathematical proof for this assertion. It is merely an opinion. It is a rather common sentiment, since many textbooks are fond of heaping unmerited verbal abuse upon Schwarzschild coordinates. For example, one text accuses Schwarzschild coordinates of delinquent behaviour:⁴ 'spurious ... inappropriate ... misbehave ... go bad'. But then the same text goes on to say:⁵

'We will of course adopt the view that the coordinates that go bad at [the event horizon] are the Schwarzschild coordinates' [emphasis mine].

The word 'adopt' shows that the textbook writers' preference in coordinates is merely an arbitrary and personal value judgment.

4. 'If any clocks have been prevented from "ticking" in the "timeless zone", they would be only ... Schwarzschild clocks.' Here Duff appears to have missed the caution in my paper:⁶

'Schwarzschild coordinates are conceptual. You can think of them as the times and distances which would be read out from clocks and rulers unaffected by gravity, velocity, acceleration, or any other feature of the space-time continuum.'

Conceptual clocks don't

have to stop, not even in Euclidean zones. Duff did not discuss my statement above at all, apparently overlooking it. He also seems to have overlooked that other theoreticians besides myself have concluded there may be Euclidean (timeless) zones in the black-hole/white-hole topology my cosmology uses. The paper in the *International Journal of Modern Physics* by Hellaby, Sumeruk, and Ellis,⁷ which I referred to frequently in my paper, requires that Duff take the concept of timelessness seriously. The use of conceptual Schwarzschild clocks could help him find his way through this new, nearly uncharted wilderness in relativity, the fascinating idea of Euclidean zones.

5. 'But, does [timelessness] matter?' Duff gives an illustration of a watch stopping in your home and uses it to claim that one should measure the friend's travel time only with unstopped watches. He seems to have overlooked the following sentence in my article:⁸

'In particular, their metric gives no hint at all of a large region of space-time in which physical processes, including clocks, are completely stopped.'

I've emphasized 'physical processes' here because Duff's illustration would more accurately fit my theory if all physical processes in your home, including processes in your own brain and body, had stopped. Then the stopped watch would reflect your own experience. From your point of view, the friend would arrive very suddenly. Ignoring this distinction, Duff claims in his second-to-last paragraph that even if my theory were true, the cosmos would still be billions of years old. But he is simply expressing a personal preference in clocks, regarding the distant clocks as more important than the ones on earth. How unrelativistic

of him!

Now let's move on to Dr Duff's final, less technical, point. In his last paragraph he gives us a 'biblical' reason for his scientific worldview, the last part of Genesis 1:16, which he interprets as meaning the stars were made much earlier than the two great lights.

However, if Dr Duff is going to stake so much on just a few words in an English translation (and the vast majority don't support his interpretation), it would be good to examine the original language underlying the translation. In this case, it turns out that the original Hebrew does not support his interpretation (as most Bible translators realise). Just before the word for 'stars', there is a small untranslatable word, the accusative particle 'et. It indicates that 'stars' is the direct object of the verb 'made' at the beginning of the verse. Tacked onto 'et is the Hebrew consonant waw, which is usually translated 'and'. There is an identical construction of waw plus 'et just before 'the earth' at the end of Genesis 1:1. There it is translated 'and the earth', indicating that God created the earth as well as the heavens. Leaving out the middle phrase of Genesis 1:16 (describing the function of the great lights), a very literal translation is: 'And God made the two great lights ... and the stars.'

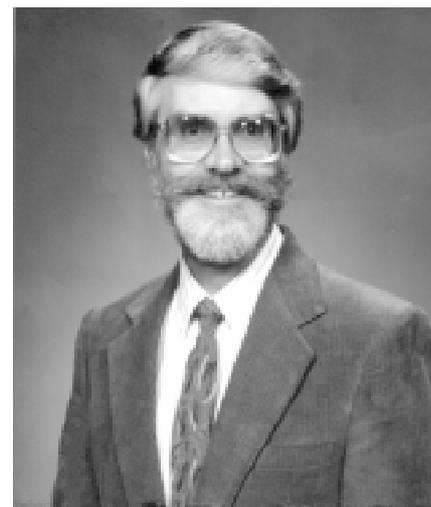
Thus I suggest that the most straightforward meaning of the Hebrew verse is that God made the stars essentially simultaneously with the Sun and Moon, not beforehand.

This illustrates the danger of basing too much on just a few words. We should build our own worldview on an exegesis of all relevant Bible passages. Thus in this matter, we should also take into account such verses as Exodus 20:11,

'For in six days, the LORD made the heavens and the earth ...'

which, combined with the context, clearly and explicitly declares that Jehovah made not only the earth, but also the heavens in six ordinary weekdays. There are many other

Scriptures which support that statement, and there are none which clearly and explicitly say the world is billions of years old. Therefore, in view of Dr Duff's respect for Scripture, I invite him to join me and other believing theorists in searching for young-world cosmologies.



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5. Ohanian and Ruffini, Ref. 4, p.441, last paragraph.
6. Humphreys, Ref. 1, p. 197, Section 3, first paragraph.
7. Hellaby, C., Sumeruk, A. and Ellis, G.F.R., 1997. Classical signature change in the black hole topology. *International Journal of Modern Physics*, D6(2):211-238. See my quote of this paper in my answer to Conner in this issue, p. 59.

8. Humphreys, Ref. 1, p. 196, Section 2, sixth paragraph.

Vistas — one more

As in his original cosmology proposal^{1,2} and in subsequent writings in its defence,^{3,4} so also in New vistas of space-time rebut the critics,⁵ Dr Humphreys makes sweeping physical claims without backing them up with the simple mathematical calculations which would demonstrate their truth or falsity.

It is straightforward, using only undergraduate-level differential calculus, to show that Humphreys' claim of a 'timeless zone' in the Klein metric is false. In order for a 'timeless zone' to exist, there must be a region of spacetime within which there are no spacetime trajectories which have the property $ds^2 > 0$. However, it is easy to verify that every comoving

clock in Humphreys' bounded matter sphere cosmology traverses a timelike trajectory ($ds^2 > 0$), even in the region of (α, χ) space which Humphreys alleges is 'timeless.' Consider, for example, the trajectory of the Earth, which Humphreys hypothesizes is at the center of the matter sphere. The Earth's spatial trajectory in Schwarzschild coordinates is given by $d\rho_{Earth} = d\theta_{Earth} = d\phi_{Earth} = 0$. The Schwarzschild time component of the trajectory, $dt_{Schwarz, Earth}$, must be derived from the definition of the Schwarzschild time coordinate $t_{Schwarz}$

See equation (1) [below]

Humphreys claims that $dt_{Schwarz}$ is a 'conceptual' time interval which can be assumed to be real, so that $dt_{Schwarz}^2$ is positive⁶, but this is manifestly false. The value of $t_{Schwarz}$ for a particular spacetime event is manifestly a function (given in equation 1) of the comoving coordinate location (a, η) of the

spacetime event in question, and therefore the Schwarzschild time interval $dt_{Schwarz}$ along a particular spacetime trajectory is determined by that trajectory (i.e., by the succession of spacetime events which constitutes the trajectory).

To obtain the differential Schwarzschild time interval $dt_{Schwarz, comoving clock}$ which elapses along the spacetime trajectory of a comoving clock, one must differentiate equation (1), subject to the constraint imposed by the spacetime trajectory under consideration (namely that η is fixed for a comoving clock). The result is

See equation (2)

(where the leading '-' sign in equation (1) is used, as is appropriate for an expanding bounded matter sphere)⁷. Earth is located at $\eta_{Earth} = 0$, so

See equation (3)

$$t_{Schwarz} = \pm \frac{t_0}{1+b^2} \left[\frac{b^3}{1+b^2} \ln \left(\frac{\zeta+b}{\zeta-b} \right) + \frac{\zeta}{1+\zeta^2} + \frac{1+3b^2}{1+b^2} \left(\frac{\pi}{2} - \arctan \zeta \right) \right] \dots\dots\dots (1)$$

where

$$t_0 \equiv \frac{a_{max}}{c\sqrt{1-\eta_{edge}^2}}, \quad \zeta \equiv \sqrt{\frac{a_{max}}{a_{max}-a} \sqrt{\frac{1-\eta_{edge}^2}{1-\eta^2}} - 1}, \quad b \equiv \frac{\eta_{edge}}{\sqrt{1-\eta_{edge}^2}}$$

$$dt_{Schwarz, comoving clock} = da \frac{\partial t(a, \eta)}{\partial a} \Big|_{\eta \text{ fixed}} = -t_0 \frac{\zeta^3}{(1+\zeta^2)^2 (\zeta^2 - b^2)} \left(\frac{1+\eta_{edge}^2}{1-\eta^2} \right)^{1/2} \frac{a_{max}}{(a_{max}-a)^2} da \dots\dots\dots (2)$$

$$dt_{Schwarz, Earth} = -t_0 \frac{\zeta_{Earth}^3}{(1+\zeta_{Earth}^2)^2 (\zeta_{Earth}^2 - b^2)} (1-\eta_{edge}^2)^{1/2} \frac{a_{max}}{(a_{max}-a)^2} da \dots\dots\dots (3)$$

$$\zeta_{Earth} = \zeta(a, \eta_{Earth}) = \sqrt{\frac{a_{max}}{a_{max}-a} \sqrt{1-\eta_{edge}^2} - 1} \dots\dots\dots (4)$$

where

See equation (4)

Plugging the values of Earth's coordinate trajectory differentials into the metric gives,

$$ds^2_{Earth} = c^2 d\tau^2_{Earth} = \beta(a, \eta=0) c^2 dt^2_{Schwarz, Earth}$$

See equation (5)

To determine whether there is a timeless region along Earth's space-time trajectory, we need only locate those regions for which ds^2_{Earth} is negative.

It is easy to see that ζ_{Earth} is real when $a/a_{max} > 1 - (1 - \eta^2_{edge})^{1/2}$ and imaginary (that is, proportional to $(-1)^{1/2}$), when $a/a_{max} < 1 - (1 - \eta^2_{edge})^{1/2}$. Therefore, $dt_{Schwarz, Earth}$ is real and $dt^2_{Schwarz, Earth}$ is positive for $a/a_{max} > 1 - (1 - \eta^2_{edge})^{1/2}$. Likewise, $dt_{Schwarz, Earth}$

is imaginary and $dt^2_{Schwarz, Earth}$ is negative for $a/a_{max} < 1 - (1 - \eta^2_{edge})^{1/2}$. ζ_{Earth} and $dt_{Schwarz, Earth}$ vanish at $a/a_{max} = 1 - (1 - \eta^2_{edge})^{1/2}$.

The metric component $b(a, h)$, which we need to compute the Earth proper time using equation 5, is given by

See equation (6)

At the position of Earth, $\beta(a, \eta=0)$ is

See equation (7)

Or, equivalently,

See equation (8)

The numerator of $\beta(a, \eta=0)$ is the square of a real number, and so is necessarily non-negative. The sign of the denominator and thus of $\beta(a, \eta=0)$ depends on the value of a/a_{max} . Considering the same three cases as above, a/a_{max} greater than,

less than or equal to $1 - (1 - \eta^2_{edge})^{1/2}$, it is obvious that

I) if $a/a_{max} > 1 - (1 - \eta^2_{edge})^{1/2}$, then $b(a, h=0) > 0$ and $dt^2_{Schwarz, Earth} > 0$, so that $ds^2_{Earth} > 0$, a timelike trajectory.

II) if $a/a_{max} < 1 - (1 - \eta^2_{edge})^{1/2}$, then $b(a, h=0) < 0$ and $dt^2_{Schwarz, Earth} < 0$, so that $ds^2_{Earth} > 0$, a timelike trajectory.

It should be noted that case II), with $b < 0$, is precisely Humphreys' so-called 'timeless' region of the Klein metric. Earth clocks are not stopped in the region, however, since $ds^2_{Earth} > 0$. The reason for this is that whenever b is negative, dt_{Earth} is imaginary, so that $dt^2_{Schwarz, Earth}$ is also negative, yielding $ds^2_{Earth} > 0$.

III) if $a/a_{max} = 1 - (1 - \eta^2_{edge})^{1/2}$, then $b(a, h=0)$ diverges and $dt^2_{Schwarz, Earth} = 0$. It is not obvious from this analysis what is the value of the product $b(a, h) dt^2_{Schwarz, Earth}$, but in our recent CEN Tech. J. article⁸ and the Supplement to it⁹ we show that even in this case, $ds^2_{Earth} > 0$, a timelike trajectory.

This simple analysis for the spacetime trajectory of Earth through the Euclidean signature region of the Klein metric can be easily repeated for any other comoving trajectory (that is, any non-zero value of η). The outcome is the same: $\beta(a, \eta)$ and $dt^2_{Schwarz, comoving clock}$ always have the same sign, so that their product is always positive. One additionally must take into account the radial motion $dr_{comoving clock}$, but the additional contribution still leaves $ds^2_{comoving clock}$ positive, as we show in the Supplement. Further, whenever $\beta(a, \eta)$ diverges, $dt^2_{Schwarz, comoving clock}$ vanishes and whenever $\beta(a, \eta)$ vanishes, $dt^2_{Schwarz, comoving clock}$ diverges in such a way that the product βdt^2 remains finite and positive¹⁰. As Dr Page and I discuss in our paper and Supplement, explicit derivation of the proper time interval using the Klein metric shows that the proper time interval along every comoving clock trajectory in the interior of the

$$ds^2_{Earth} = c^2 d\tau^2_{Earth} = \beta(a, \eta = 0) c^2 dt^2_{Schwarz, Earth} \dots\dots\dots (5)$$

$$\beta_{(a, \eta)} = \frac{\left[1 - \frac{a_{max}}{a} \left(1 - \frac{(1 - \eta^2_{edge})^{3/2}}{\sqrt{1 - \eta^2}} \right) \right]^2}{\left(1 - \frac{a_{max}}{a} \eta^2 \right) \left[1 - \frac{a_{max}}{a} \left(1 - \frac{\sqrt{1 - \eta^2_{edge}}}{\sqrt{1 - \eta^2}} \right) \right]^3} \dots\dots\dots (6)$$

$$\beta(a, \eta = 0) = \frac{\left[1 - \frac{a_{max}}{a} \left(1 - (1 - \eta^2_{edge})^{3/2} \right) \right]^2}{\left[1 - \frac{a_{max}}{a} \left(1 - \sqrt{1 - \eta^2_{edge}} \right) \right]^3} \dots\dots\dots (7)$$

matter sphere is

See equation (9)

In other words, there are no timeless regions in the Klein metric. Humphreys comes close to noticing this ‘compensating’ behavior of $t_{Schwarz}$ ($dt_{Schwarz, comoving\ clock}$ is imaginary when β is negative) when he writes: ‘I now know that the location in question [i.e. at which the Schwarzschild time coordinate acquires an imaginary component] is not the event horizon, but rather the change surface, and that the imaginary component [of the Schwarzschild time coordinate] comes from a signature change in the Klein metric.’¹¹

This behaviour, wherein the time coordinate suddenly acquires an imaginary component as one crosses the signature change surface, is a clear indication that the signature change is an artefact of the coordinate system. Humphreys seems to recognize that this is the case. However, he fails to recognize that such a coordinate artifact cannot convert the timelike trajectories of comoving clocks ($ds^2_{comoving\ clock} > 0$) into spacelike trajectories ($ds^2_{comoving\ clock} < 0$). Such a conversion is mathematically impossible, since $ds^2_{comoving\ clock}$ is a scalar invariant quantity, completely independent of the coordinates used to describe the

clock trajectory, as we discuss in our paper and Supplement, and as Humphreys affirms in New vistas of space-time.¹²

Humphreys’ problem is that he never makes the effort to actually calculate the spacetime interval on comoving trajectories in his so-called ‘timeless region’.¹³ If his new proposal were valid, such a calculation would explicitly result in $ds^2_{comoving\ clock} < 0$. Instead of performing this simple calculation, he simply assumes that the Euclidean signature of the Klein metric in this region requires that ds^2 be negative for all trajectories. Explicit calculation of $ds^2_{comoving\ clock}$ in the Euclidean region, as I have shown above (and as Dr Page and I discuss in our CEN Tech. J. paper and explicitly work out in the Supplement), shows that this is not so.

This brief analysis shows that Humphreys’ claimed discovery of a ‘timeless zone’ in the center of bounded locally homogeneous cosmology is a fantasy. Unfortunately, it is not possible to go further into the problems of New vistas of space-time in this brief letter.

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6. Humphreys, Ref. 5, p. 203
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8. Conner, S.R. and Page, D.N., 1998. Starlight and time is the big bang. CEN Tech. J. 12(2):174–194.
9. Conner and Page, Ref. 7.
10. The former occurs on the Klein metric signature change surface and the latter on the surface which Humphreys incorrectly identifies with the event horizon. The divergence and vanishing of b are artefacts of the Klein coordinate system and have no physical consequences for physical observers inside the matter sphere.
11. Humphreys, Ref. 5, p. 209.
12. Humphreys, Ref. 5, p. 197.
13. This is analogous to his failure in earlier versions of the Starlight and Time hypothesis to explicitly calculate the proper time elapsed on comoving clocks, a calculation which shows, as we demonstrate in our paper and Supplement, that there is no differential time dilation in the bounded matter sphere cosmology.

$$\beta(a, \eta = 0) = \frac{\left[1 - \frac{a_{max}}{a} (1 - 1 - \eta_{edge}^2)^{3/2}\right]^2}{\left[1 - \left(\frac{1 - \sqrt{1 - \eta_{edge}^2}}{a_{max}}\right)\right]^3} \dots\dots\dots (8)$$

$$d\tau_{comoving\ clock} = \frac{da}{c} \sqrt{\frac{a}{a_{max} - a}} \dots\dots\dots (9)$$



Russell Humpreys replies:

In the above reply to my article,¹ Mr Conner again fails to inform the mostly creationist readers of this journal that he is an ardent supporter of a well-known opponent of creationism, Dr Hugh Ross. You might suspect from this omission that Conner's letter could be neglecting to mention other important matters as well. If you thought so, your suspicion is well-founded — Conner fails to respond to many important scientific issues I raised. Three of his most significant omissions are the following:

No acknowledgement of his big blunder

Conner's letter completely ignores the issue of centres, which I emphasized throughout my article. That compels me to repeat a charge more bluntly than before: in his first critique,² on the topic of centres, Conner made a tremendous faux pas³ which invalidates his conclusion. Even undergraduate physics students should be able to see the error, at least after reading section 8.2 of my paper, which points it out.

The mistake was that, using Newton's 'hollow-sphere' theorem, Conner⁴ inadvertently carved the unbounded cosmos he was considering into a spherical shape, giving it a centre which it should not have had. My section 8.3 shows that Conner should have known something was wrong with his result, because unbounded-matter universes (like the 'big bang') cannot have a centre. Undergraduate college teachers and popularizers of the 'big bang' have failed to communicate that fact to the public. But graduate-level cosmologists should know it, as my quote of Nobel Laureate Steven Weinberg showed.

Conner said he was trying to prove that gravitational forces are the same in bounded-matter and unbounded-matter universes. The failure of his proof supports my contention that there is a very significant difference between the two. That would completely invalidate

Conner's main criticism, that 'Starlight and Time is the "big bang"'. It appears to me that by remaining silent on this issue Conner is hoping no one will notice his mistake.

Before Conner submitted the final version of his critique, I sent word through the editor to Conner's co-author, Dr Don N. Page, alerting him that I had found a sophomore-level blunder in their paper. I did not specify the error. Despite my warning, Page failed to correct Conner's mistake. I notice Page's by-line is absent from this reply by Conner. Is that because, after my article had pinpointed the mistake, Page was embarrassed?

No notice of my comment on his key equation

Conner bases all the reasoning in his letter on its equation (1), which was equation (12) in his article and equation (20) in my book. But he missed or ignored what I wrote about that very equation in the last paragraph of my section 10, on page 208:¹

'Consequently the integration⁶³ which Klein performed to get his equation for t (equation [20] in my book, Conner–Page equation [12]) should only be evaluated for values of the variable which are real, not imaginary.'

The above-mentioned reference 63 of my article says:

'Klein, Ref. 6, p. 71, equation (87). Page 12 in my translation. The integration variable which must remain real is z , defined in Klein's equation (86).'

If my assertion in these quotes is correct, then the starting point of Conner's argument would not be valid in the region of space-time where Conner needs it to be valid, the Euclidean (timeless) zone. Thus all the reasoning in Conner's letter would be incorrect, and all his subsequent equations would be useless. You, the reader, do not need to make a technical judgment about the correctness of my assertion. All you need to do is notice that Conner

never dealt with my comment.

No acknowledgment of confirming research

Throughout my article, I referred to a 1997 article in the International Journal of Modern Physics by general relativity theorists Charles Hellaby, Ariel Sumeruk, and George Ellis,⁵ from which I quoted:

'We have succeeded in demonstrating the possibility that a change in the signature of space-time may occur in the late stages of black hole collapse, resulting in a Euclidean region which bounces and re-expands, passing through a second signature change to a new expanding Lorentzian space.'

Since Hellaby et al. arrived at this conclusion by a different route from mine, their work is independent confirmation of the possibility of an Euclidean region in the black-hole/white-hole topology of my cosmology. This means that, regardless of my analysis, the Robertson-Walker metric Conner and Page depended on is too restrictive, because it automatically excludes that possibility. Conner and Page must re-derive all their equations with a more general metric which allows for the possibility of an Euclidean zone. If present, an Euclidean zone would invalidate the Conner–Page criticisms, so the Hellaby-Sumeruk-Ellis result requires Conner to prove that such a zone does not occur in this situation.

I mentioned the Hellaby article four times in my article: (1) in the third paragraph of the abstract, (2) in the second-to-last paragraph of section 1, (3) in paragraphs three through five of section 6, paragraph four being the quote above, and (4) in the second paragraph of section 12.1.

In all those places I pointed out the implications of that research for the validity of the Conner–Page criticisms. These references were in key parts of my paper, including the

abstract, introduction, and conclusion. If Conner saw none of them, then he did not read enough of my paper to intelligently criticize it. If he did see any of them, then he is trying to ignore a crucial issue.

Conclusion

In my paper, I answered all the original Conner–Page arguments, subsection by subsection. Point 2 above directly answers the argument Conner makes in his letter. However, Mr Conner has not reciprocated. He has not tried to answer me point-by-point, particularly avoiding the first and third issues above. Issue 1, Conner’s faux pas about centres, does serious damage to his first critique. Issue 3, the independent research supporting my paper, undermines both his first critique and his letter above. It would introduce some refreshing candour into Conner’s side of the debate if he would acknowledge those two flaws in his argument.

I welcome well-thought-out critiques and discussions of my cosmology, and I acknowledge the private and public contributions of several well-qualified fellow creationists toward that end. Even more, I would encourage more young-earth creationists to pursue cosmological research of their own, to the greater glory of God.

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1. Humphreys, D.R., 1998. New vistas of space-time rebut the critics. *CEN Tech. J.*, 12(2):195–212.
2. Conner, S.R. and Page, D.N., 1998. Starlight and time is the big bang. *CEN Tech. J.*, 12(2):174–194.
3. ‘Tremendous faux pas’ is a phrase used in verbal critiques of my cosmology by one of Mr Conner’s fellow-travellers, who after four years has yet to venture into print with his own criticisms.

4. Conner and Page, Ref. 2, section 2.2. I am giving Dr Page the benefit of the doubt concerning the generation of the error, since the section (in fact the whole paper) has the style and tenor of Mr Conner’s private letters to me in 1995. Those letters appeared to be from Conner alone, and Conner made no mention that any co-authors might have contributed to his letters. I mention this specifically because Dr Hugh Ross has been implying to his audiences that Conner, Ross, Page, and two professors personally corresponded with me at that time. They were begging me, Ross alleges, to withdraw my book. See an article in the *Reasons to Believe* newsletter: Ross, H., 1998. Avoiding a dangerous trap, *Facts and Faith*, 12(4):10–11. But for over five years (from May, 1993 through November, 1998) I never received any personal correspondence from anyone in that group except Conner. In a personal letter to me dated December 1, 1998, Ross finally acknowledged that he had not previously sent me any personal correspondence since 1993, long before I wrote my book.
5. Hellaby, C., Sumeruk, A. and Ellis, G. F. R., 1997. Classical signature change in the black hole topology. *International Journal of Modern Physics*, D6(2):211–238.

Starlight and time

I write regarding Humphreys’ cosmology as presented in his book *Starlight and Time: Solving the Puzzle of Distant Starlight in a Young Universe*,¹ and Conner and Page’s discussion of this hypothesis in *CEN Tech. J.*, 12(2),² and in particular regarding the role of gravity as discussed in both works.

Conner and Page state that Humphreys agrees, ‘explicitly or implicitly’ with the assumptions, stated by Conner and Page:

‘(3) the fundamental parameters of nature, such as the gravitational constant G ... are invariant over the observable history of the Universe.’

While I do not understand what Conner and Page mean by ‘the observable history of the Universe’, I suggest that they may have overlooked what I perceive to be a basic flaw in Humphreys’ hypothesis, which I believe actually advocates variable G .

Humphreys describes his concept of the creation of the ‘deep’ on Day 1 as follows:

‘Fig. 6 shows the deep at the instant God creates it ...’

‘Because the enormous mass of the whole universe is contained in a ball of (relatively) small size, the gravitational force on the deep is very strong, more than a million trillion “ g ”’s. This force compresses the deep very rapidly toward the centre...’

‘As the compression continues, gravity becomes so strong that light can no longer reach the surface...’ (Emphasis added.)

And Humphreys says: on Day 2, ‘Gravity at the surface (of the earth) drops to normal or present values.’ (Emphasis added.)

Humphreys’ wording seems to me to be very ambiguous, and, if I am interpreting it correctly, he is transposing cause and effect. Humphreys seems to be saying, perhaps unintentionally, that, at the instant of creation, the gravitational force is ‘very strong’ because ‘the enormous mass of the universe is contained in a ball of (relatively) small size,’ and that ‘gravity becomes so strong’ because compression occurs.

What is causing what? Is ‘strong gravity’ causing compression, or is compression causing ‘strong gravity’? Humphreys seems to be implying the latter.

And what does Humphreys mean by ‘strong gravity’? — high g (i.e. acceleration due to gravity, due to concentrated mass — how did it get so concentrated?) or high G (‘universal gravitational constant’ — created by God.)

My understanding of physics relating to gravity tells me that the scenario advocated by Humphreys, of initial containment of the ‘enormous mass of the whole universe ... in a ball of (relatively) small size’ and that the continued compression which Humphreys advocates occurred subsequent to creation (to the point where ‘light can

no longer reach the surface'), could only be possible if the magnitude of the 'universal gravitational constant' (G) was larger at creation than it is now, (more than a million trillion times larger!!) and subsequently increased in magnitude after creation, and then decreased to its present value, and if the gravitational attraction between objects in the created 'deep' was operating according to Newton's Inverse Square Law. ($F = Gm_1m_2/r^2$).³

If this is the case, then Humphreys is, in my opinion, perhaps unwittingly, advocating a varying G hypothesis.

Also, regarding the 'canopy', Humphreys states:

'... my suggestion doesn't do away with a canopy of water; it simply raises it a bit higher — a cosmic canopy!'

How would Humphreys explain Gen. 7:11–12:

7:11 'In the six hundredth year of Noah's life, ... on that day ... the floodgates of the heavens were opened.

7:12 'And rain fell on the earth forty days and forty nights.' (Emphasis added.)

These verses seem to clearly indicate that the water which fell as rain for forty days and nights at the beginning of the Flood, had been previously held above the earth, and was allowed to fall through 'the floodgates of heaven'.

In the Humphreys scenario, with the 'canopy' relegated to the outer edge of the universe, the water which fell as rain during the first forty days and nights of the Flood would have been an infinitesimal proportion of the total water there, and would have had to have come all the way from the edge of the universe for the Flood. Humphreys fails to describe a mechanism for this to occur.

The alternatives would appear to include:

1. The 'floodgates of heaven' is allegorical language and does not really refer to rain which had been

stored as water above the earth, and subsequently fell as 'rain'.

2. The 'rain' resulted, as proposed by several creationists, from the projection of the 'fountains of the great deep' into the atmosphere, to fall back to earth as 'rain'.

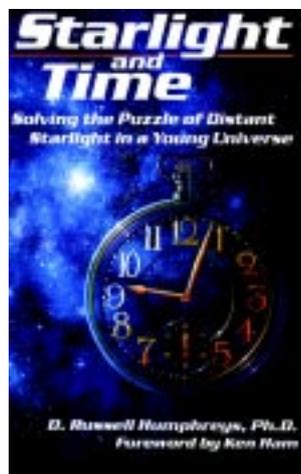
Both of these explanations seem to contradict the clear teaching of the Scriptures, which seem to indicate that the water had been previously held above the atmosphere and was allowed to fall as rain for forty days and nights, at the beginning of the Flood.

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2. Connor, S.R. and Page, D.N., 1998. Starlight and time is the big bang. *CEN Tech. J.*, 12(2):174–194.
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Russell Humphreys replies:

Mr Hunter bases the technical part of his comments on his interpretations of a few words in the

non-technical part of my book.¹ The answers to his questions are in other parts of the book. In answer to his belief that '[Humphreys] actually advocates variable G ', please note the only comment in my book about G is in the technical appendix:²

' G is the Newtonian gravitational constant.'

I've emphasized the last word to make this point: a constant is not a variable. What I meant by 'gravity' in the section Mr. Hunter refers to was not G , but just the ordinary meaning — the gravitational force on a unit mass, i.e., the acceleration of gravity, which I will call a here. If you plug into Newton's equation (the one cited by Hunter) my estimated mass m for the cosmos,³ the corresponding one light-year initial radius r of the 'deep', and the usual value of G , you will find that the initial value of a at the surface of the deep would be more than a million trillion times the value of a at the earth's surface today, which is about 9.8 m/s^2 and often called 'one gee'.

Next we come to Hunter's questions, '... is "strong gravity" causing the compression, or is compression causing "strong gravity"?' — The answer is 'yes' to both questions. That is, gravity causes the compression, and the compression causes the gravity to get stronger. As the monstrous, irresistible force of a million trillion 'gees' compresses the water, the radius r of the surface gets smaller. Using (in the same Newton's equation) the same mass m , the same value of G , and a smaller value of r , we see that a at the surface increases. Thus the ball of water is collapsing under its own weight, and the collapse accelerates as the ball gets smaller. This description of the collapse is straightforward freshman physics. No change of G is required, and I implied none.

After the collapse 'bounces' into an expansion,⁴ the reverse process happens. As the section of matter destined to become the earth

expands, the radius of its surface increases. Newton's equation then says that the value of a at the surface would decrease, as my book said. Again, no change of G is required.

Moving on to Mr Hunter's 'canopy' comments, I certainly did not mean to imply that the 'waters above the heavens' fell 20 billion light-years to earth to provide water for the Genesis Flood! The exegesis in my book⁵ suggests that the 'waters above the heavens' are not necessarily the same as the 'windows [or floodgates] of the heavens'. As for the latter, note that the order in Genesis 7:11 hints 'the windows of the heavens' may have been secondary to the 'fountains of the great deep'. That would leave room for Hunter's alternative 2, that water bursting forth from the 'fountains of the great deep' went into the atmosphere and enshrouded the earth with clouds, thus providing a continuous source of water for the rain falling from the clouds.

If other creationist theorists wish to find other models for the 'windows of the heavens', that is fine with me. But in all our theorizing, let us keep clear in our minds the possible distinctions between different biblical phrases, not allowing them to be inextricably bonded to human theories, such as the 'canopy' model or my cosmology.

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References

1. Humphreys, D.R., 1994. *Starlight and Time*, Master Books, Green Forest, Arkansas, U.S.A. See pp. 33–36. That section is in simplified layman's language; for scientific details one should consult the scientific part, Appendix C.
2. Humphreys, Ref. 1, p. 91 (Appendix C).
3. Humphreys, Ref. 1, p. 105, eq. (12).
4. Humphreys, D.R., 1998. New vistas of space-time rebut the critics. *CEN Tech. J.* 12(2):195–211. See p. 210, section 12.2 and Fig.12.

5. Humphreys, Ref. 1, p. 62 (Appendix B).

Gospel in the stars

I hope that Danny Faulkner's recent article, 'Is There a Gospel in the Stars?' (*CEN Tech. J.*, 12(2):169–172) will stimulate further research in this area. His article was mainly a critique of books by Joseph Seiss¹ and E.W. Bullinger² on this topic. Among other things, Faulkner cites discrepancies between the star names and meanings given by Seiss and Bullinger and those given by standard secular sources.

A major thesis of Seiss's book is that the original constellations depicted an outline of the work of Christ, the nature of His Church, and the consummation of all things when He returns; and that this outline was known to Noah. Seiss cites as evidence the similarity of the zodiacal constellations across all the major ancient civilizations. He claims, very plausibly, that with time the original meanings became somewhat obscured. In this way, the mythologies of later civilizations, notably the Greeks, would contain both glimpses and also distortions of the constellations' original meanings.

To check Seiss's claims, it would be important to research the most ancient names and given meanings of the stars. It would also be essential to publish the detailed references for the results, which unfortunately were omitted by Seiss. He did cite general references such as writings by the Arab Albumazer over 1000 years ago, a commentary on Albumazer written by the Jewish Aben Ezra, and later writings by French and other sceptics who claimed that the gospel was simply adapted from myths and astronomical lore known to ancient cultures. I would hope that some individuals qualified in Arabic, Hebrew, and ancient Middle Eastern languages could start from these and

then follow the leads back in time as thoroughly as possible.

Meanwhile, as one way to stimulate discussion, consider the major two stars in the constellation Libra: 'Zuben al Shemali' and 'Zuben al Genubi'. In Modern Arabic, as Faulkner points out, these names are understood as the 'northern claw' and the 'southern claw', respectively. They are considered as the claws of Scorpio, the neighboring constellation, and Libra does not even exist as a separate constellation in modern Arab cultures.³ On the other hand, Seiss claims that these names mean, respectively, 'the price which covers', and 'the price deficient', representing the work of Christ as opposed to the efforts of men in redemption. Libra means a scale, or balance, and these two stars appear on the two opposing sides of the scale.

To see if there might be other meanings for these stars in classical Arabic, I consulted the voluminous Arabic-English Lexicon by Lane.³ I am not an Arabic scholar, but it appears that in classical Arabic the consonants are most important, since (as in classical Hebrew) most vowels were not usually explicitly written. Evidently *zabuun* is a major word, meaning 'push'. The derivative word *zubaanaa* is applied to the claws of the scorpion, because the scorpion 'pushes' with them.³

However, *zabuun* has other meanings related to purchasing, such as a 'simpleton' or 'fool' who is 'pushed around' and is duped in a sale.³ The most ancient meaning of *zabuun* is apparently related to a Chaldean verb meaning 'to sell'.³ This meaning survives in Hebrew as *zeeben*, and is written similarly to *zaven*, meaning 'to buy'. So, 'price' is not a far-fetched meaning for this root.

Further, *shamaaliy* does mean 'northern' or 'left'. However, some words with the same consonants, such as *shamila*, refer to clothing with which one 'wraps' or 'covers'