Do radioisotope methods yield trustworthy relative ages for the earth's rocks?

John Baumgardner's article on radioisotope methods, in *J. Creation* **26**(3):68–75), seems to be (in part) a response to my article in the August issue, since some of the very arguments he uses in this paper regarding zircon crystals he also uses in his letter of response to my article in this same issue of the Journal. Although I agree with his main premise, I am struck by two major things in his article. The first is that, as every good creationist knows, evidence is always interpreted. Specifically, Baumgardner seems to take as axiomatic that the Great Unconformity *is* the beginning of the Flood, and interprets all of the data to fit with this assumption, even though not all of the data fit this assumption very well. However, the Great Unconformity could just as likely be the result of orogeny (mountain building) during the last major supercontinent cycle during the Flood.

The second is that in his figure 3, showing the distribution of apparent ages of zircon crystals taken from various places, the peaks correspond very well with the beginning of the various proposed supercontinents that seem to have formed and broken up during the Flood. Specifically, the peaks at 1.2 Ga, 1.9 Ga, and 2.7 Ga correspond with the formation of supercontinents Rodinia, Columbia, and Vaalbara (Ur) respectively. Thus, the data cited by Baumgardner seems to be explained readily in my proposed model as a result of Flood processes, but it cannot be well explained by Baumgardner, except as an odd relic of the creation process.

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» **John Baumgardner replies:**

Mr Stenberg seems not to grasp the staggering consequences of his proposal that the earth's granitic continental crust, with its large inventory of radioactive elements and an average thickness of some 35–40 km, formed during the Flood. Stenberg seems to imagine that the radioactive elements so abundant in today's granitic rocks were somehow introduced into pre-existing crystals via some unspecified magmatic process apart from a wholesale melting and recrystallization of the rock. To me, and I suspect to most earth scientists, such a thing is inconceivable. Potassium, after all, is a major element in alkali feldspars such as orthoclase ($KAlSi_3O_8$). A typical granite contains 35% or more alkali feldspar. The only imaginable way for such rocks, with their large inventories of U, Th, and K, to form is to crystallize from a melt. If that much molten rock were present at the earth's surface during the early portion of the Flood, how could any life-forms have survived to be fossilized later?

Stenberg is insisting that cooling be by naturalistic means, but what conceivable naturalistic process could cool so much rock in the span of a few weeks? If the granitic crust comprising the continents today did not appear until during the Flood, what then was the "dry land" mentioned in Genesis 1:9? What was it that distinguished the "dry land" from the "seas" on Day 3 in regard to topography? If there were not a fairly large topographical difference between the sea bottom and land surface, where did the water filling today's oceans reside? If the granitic crust comprising the continents today did not appear until during the Flood, where on the earth did all the pre-Flood plants and animals reside that were later buried and fossilized on the surface of the present-day continents?

To me problems of having the granitic rock comprising the bulk of today's continental crust cool and crystallize during the Flood are insurmountable. It seems much more reasonable to associate the "dry land" of Genesis 1:9 with the granitic continents and the onset of the Flood with the explosive appearance of fossils in the sediment record. Mr Stenberg's primary difficulty in being able to accept these conclusions seems to be his reluctance to allow for God's supernatural activity during creation and the Flood, despite the plain meaning of 2 Peter 3:3–6.

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Russell Humphreys' cosmology

Russell Humphreys' *new creationist* cosmology seems to suffer from four major problems. His model lacks elegance; his mechanics may be flawed; his liberties with general relativity are in question; and his claims are short on empirical evidence. Since, from a cosmology-building perspective, any single one of these indictments is serious enough to disqualify his efforts, it seems that he would have to rise above all four to satisfactorily deliver a credible and viable end-product to creationists.

Model not elegant

Humphreys' model is not elegant. Processes move along in starts and stops and even reversals. In the 2nd installment of Vardiman and Humphreys' three-part cosmology

series,[1] the reader is confronted with no less than seven instances of "Imagine", "Suppose", "If God", and "Let's say" as Humphreys forces through a series of in-flux parameters he continually adjusts in order to get Creation Week to turn out 'just right'. This awkward storybook approach serves to diminish the scientific thrust of his endeavour. His regime to transfer distant starlight to a young earth is ponderous, almost as if God is under compulsion to deliver a 6-day-old planet in an ancient universe no matter the cost. This is classic 'tail wagging the dog'. At least one *ad hoc* fix must be introduced into Humphreys' patchwork cosmology early on. He writes:

> "Imagine that events prior to Day Four have expanded space and moved the shell of 'waters above the heavens' out to a radius of, say, one billion light years. This would have left the earth and the nearly-flat fabric of space within the ring just above the critical potential."

However, according to Humphreys' own calculations, the actual potential at this early phase will be many times deeper than the critical level. Using his requirement of 8.8 x 10^{52} kg for *M,* the mass of the waters above, and 1 billion light-years for radius *R*, his eq. (3a), $\Phi = -GM/R$, says that at the close of Creation Day 3, the gravitational potential Φ will be approximately *13.8 times deeper than critical*.[2] A rescue would be to arbitrarily grant G, the gravitational constant, a value 13.8 times less than today's known value, an appeal he may have hinted at in an earlier installment.[3] However, with no prior instruction from our study of the early universe—whether observationally or hypothetically—as to why we should assume an increase in the strength of G over time, our concession to do so would simply be *ad hoc*. To be sure, lack of elegance in Humphreys' cosmology model-building is no small charge, because all it takes to 'bump' a clumsy model is just the next one in line which is simply 'less wrong' (note Occam's razor).

Model's mechanical failure

Humphreys' model may suffer a serious mechanical failure. He counts on the stretching of space to impose the predicted $1+z_{cos}$ cosmological redshift factor on incoming light rays trailing his shrinking sphere of timelessness,[1] never considering the very real possibility that the sphere of timelessness should itself act as a gravitating body—possibly a strong one—and thus countermand any hope of achieving the Hubble redshift. Though he may be correct about its surface not being of a material nature,[1] his sphere is nonetheless a mathematically defined geometry with potentially strong gravitational properties and so should possess a discernable event horizon, one which may exhibit pronounced effects on close-proximity light waves.

Gravitational redshift is given by

$$1 + z_{grav} = \frac{1}{\sqrt{1 - 2GM / rc^2}} \qquad (1)$$

where, for purposes of this study, *GM/r* is equivalent to the gravitational potential Φ of Humphreys' dynamical sphere of timelessness of radius *r(t).* Therefore,

$$z_{grav} = \frac{1}{\sqrt{1 + 2\Phi / c^2}} - 1 \qquad (2)$$

where the terms and sign convention used under the radicand are intentionally made identical to that of Humphreys.[4] Here we consider Humphreys' shrinking sphere of timelessness to be a gravitating body of gravitational potential Φ, *phi*, on which incoming light rays from galaxies are falling and gaining energy. We can neglect the radius of the shrinking sphere at any coordinate time, since Humphreys requires the sphere be always timeless, and thus the gravitational potential deep enough to make the radicand in (2) imaginary.[1,5] However, we don't need to go that deep (i.e. 'imaginary') to show that the gravitational strength of the sphere is powerful enough to cause real problems for the model. By obeying the Schwarzschild limit and keeping Φ just above the critical value of $-½c^2$ and making the radicand approach the limit of zero, it's easy to see that z_{grav} can grow to a very large value indeed! And this would cause a *blueshifted signal, not a red one*, since we, as observers in more or less the centre of the shrinking sphere, are standing 'downhill' from the incoming light rays and not 'uphill'. Clearly, if this scenario is accurate, any hope of a Hubble redshift in Humphreys' universe is dashed. Worse, the entire model collapses.

Unorthodox general relativity

Humphreys takes an unorthodox 'left-hand turn' with general relativity. In his Pioneer paper,[2] just before he introduces eqs. (A16, 17), he first offers a brief line of reasoning which—at least to him—yields convincing evidence that "In an empty expanding shell, the metric must change with time." He then offers eq. (A17): $g_{rr} = g_{rr}(t)$, an equation he later terms "unassailable". Feeling secure in this new but potentially self-made position, he then proceeds to hurl challenges at long-held GR dogma. It's easy to see where he is headed when he says this:

> "The textbooks *assume* that all components of the energy-momentum tensor T_{μ}^{ν} must be zero inside the cavity, even if the shell is expanding. Their basis for that assumption is the lack of obvious sources of gravitational field in the cavity."

Confident that he has seen what others have missed, Humphreys continues to barrel forward by saying that the general relativist conclusion that the coefficient *L* cannot be time-dependent must be wrong because it conflicts with his eq. (A17)! In turn, he propels himself to this: "That leads me to question the assumption that all parts

of the energy-momentum tensor should be zero, in particular, the assumption that T_t^r and T_r^t should be zero." From there, he feels emboldened to work out his new spacetime derivation, one from which creationists may want to stand aloof—that is, until a qualified and unbiased seconder can be retained to lend his validation. *But what a confirmation of Humphreys' derivation will emphatically not do is prove or in any way uphold his claim that space is like a fabric and inherently 'stretchy' in a bonus dimension*[3]—a claim that depicts God as a grand cosmic manipulator—increasing, then relaxing, then increasing again the tension of space in order to start, stop, and reverse processes to guarantee that creation is delivered in a 'six-Earth-days-package-deal' with today's observed parameters.[1] This is purely an interpretation on Humphreys' part and is likely borne of his ongoing, even tenacious, desire to construct a heavily time-dilated universe. A more elegant approach may be to impose his derivation—where Φ is just above the critical potential—on every point of space equally. There may be benefits. For instance, what if the tension generated on space early on Creation Day 1 was sufficient to yield today's low-energy photons of the ubiquitous background radiation? That would make the CMB completely matter independent. No big bang 'surface of last scattering' necessary. And no more chasing CMB 'shadows'.

Ideas lack an empirical underpinning

Finally, Humphreys' ideas lack an empirical underpinning. We have received no instruction from any recent astrophysical manifestation or long-term observation that prompts us to adopt Humphreys' stretchy space interpretation as a general rule of spacetime dynamics. Indeed, it seems that the one slight hope he had of underscoring his proposal of a near-earth 'gravitational well'—the anomalous Sunward acceleration of the Pioneer spacecraft[2]—has vanished. Researchers at the Jet Propulsion Laboratory in California have now attributed the anomaly to the thermal recoil force acting on the spacecraft.[6] That leaves Humphreys with nothing physical in the universe to tie his stretchy space idea to. And while the controversial observed phenomenon of concentric shells of galaxies centred on our home galaxy[7] could hypothetically point to a true centre in an inhomogeneous universe, it is incapable of producing the requisite matter density to manifest Humphreys' local gravitational well, a feature he must have in order for his cosmology to work (hence, his appeal to stretchy space). In sum, Humphreys' contribution falls short of compelling science. Without an astrophysical tie—and in view of the other problems detailed in this article—he leaves the serious investigator little motivation to dig deeper into his new cosmology.

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References

1. Vardiman, L. and Humphreys, D.R., A new creationist cosmology: in no time at all—part 2, *Acts & Facts* **40**(1):12–14, 2011.
2. Humphreys, D.R., Creationist cosmologies explain the anomalous acceleration of Pioneer spacecraft, *J. Creation* **21**(2):61–70, 2007.
3. Vardiman, L. and Humphreys, D.R., A new creationist cosmology: in no time at all—part 1, *Acts & Facts* **39**(11):12–15, 2010.
4. Humphreys, ref. 2, Appendix.
5. Humphreys, D.R., New time dilation helps creation cosmology, *J. Creation* **22**(3):84–92, 2008; eq. (8), p. 86.
6. Turyshev *et al.*, Support for the thermal origin of the Pioneer anomaly, *Physical Review Letters* **108**:241101, 2012.
7. Vardiman, L. and Humphreys, D.R., A new creationist cosmology: in no time at all—part 3, *Acts & Facts* **40**(2):12–14, 2011.

» Russell Humphreys replies:

I could profit by Mr Speir's criticisms, except that all four of them fall so far short of his target as to be ineffectual. Here are my replies to each of them:

"His model lacks elegance"—when did 'elegance', a subjective matter of personal taste, become a standard for determining objective truth? However, my 2008 model[1] is far from being *complete*, as I said:

> "In this section I outline a speculative light transit-time scenario during Day 4. Other scenarios are possible, so you should take this as only an *example* of the possibilities that achronicity opens up."

As an example of what Speir terms my 'lack of elegance', he then ironically provides an inelegant calculation. He takes a mass for the 'waters above', 8.8×10^{52} kg, from my 2007 paper,[2] seemingly forgetting that it was based on getting the critical potential for the waters being out at a radius of 13.8 billion light-years. Then he uses that same mass for my 2008 example's radius of 1 billion light-years, of course getting a potential 13.8 times too deep. Had he properly processed what I said, he could have calculated what mass would give the critical potential my example was intending. It would have been 13.8 times smaller than the mass he used. So the problem he imagined did not exist.

"His mechanics may be flawed"—and then he introduces a flawed equation. His eq. (1) tries to show that my 2008 model's redshifts are really blueshifts. He introduces it abruptly without any derivation. It ignores the effect of time dilation and length contraction on the very clocks and rulers one would use to measure the redshift. He should have used my equation (21) for the ratio of received to emitted wavelengths:

$$\frac{\lambda_2}{\lambda_1} = \sqrt{\frac{1+2\frac{\Phi_1}{c^2}}{1+2\frac{\Phi_2}{c^2}}}\,\frac{R_2}{R_1}$$

See my 2008 article for the derivation and explanation of this equation.[3] Though I put a box around this equation to try to call attention to it, Speir

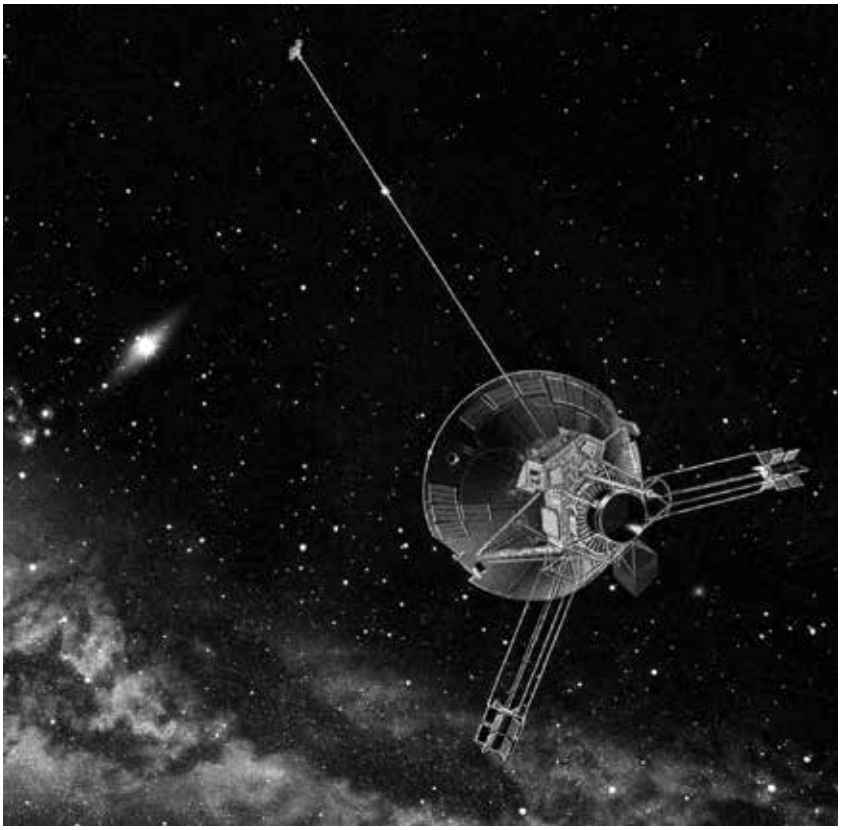

Photo: NASA

Figure 1. Anomalous slowdown of Pioneer spacecraft may have a cosmological explanation.

for some reason ignored it. I suspect that is because he ignored, or didn't understand, the whole section in which I derived it from basic principles. At any rate, what he should have done is try to find some specific flaw in my derivation, and then derived his own equation to replace it. Without that groundwork, his paragraphs on redshift are merely shooting at a straw man version of my model.

"His liberties with general relativity are in question"—only by Speir. In a superficial way, he goes through the derivation of my new metric in the Appendix of my 2007 paper.[4] He applies irrelevant adjectives to it, but nowhere does he point out a specific mathematical flaw. I get the impression that he does not really understand the mathematics or the basic concepts of general relativity I used. The only specific thing he cites is the fact that I point out a flawed assumption in conventional relativistic thinking on the topic and then advance beyond that to new ground. He is right in saying that on new ground one could be mistaken, but he appears to ignore the fact that (as is standard practice for *Journal of Creation*) my mathematics were checked by an anonymous but clearly expert reviewer who showed no hesitation to point out flaws. That should at least partially satisfy Speir's call for "a qualified and unbiased seconder".

After that, Speir takes quick aim at my interpretation (based on physics and Scriptural clues) elsewhere of spacetime as a real but unperceived material, like a fabric. It's a bit puzzling to me why he does that at this point, because that interpretation is not in the Appendix and the mathematics therein depend in no way on the interpretation.

"His claims are short on empirical evidence"—no more so than most cosmologies. My partial model explains the principal piece of evidence, the redshift-versus-distance observations. It does not try to explain the cosmic microwave background, but we have several possible explanations for that. (My problem has been in trying to figure out which possibility is correct.) As Speir acknowledges, various observations confirm that the cosmos has a centre and that our galaxy is near it—the fundamental tenet of not only my cosmologies, but all creationist relativistic cosmologies I know of. He seems to think my models depend on a "local gravitational well", whereas I was using a *cosmic*-scale gravitational well. As for my explanation of the Pioneer anomaly (figure 1), Speir is rushing to acceptance of the latest secular attempt to explain the anomaly with the Pioneers' heat being radiated predominantly forward, without waiting for the authors of that paper to document the all-important heat analysis underlying their conclusion.[5]

To sum up, I sincerely appreciate informed criticisms of my work, because they help me and the readers know whether I've made a mistake or not. But, regretfully, Mr Speir has not been able to put forth a valid criticism due, it would seem, to his apparent very limited understanding of what he is criticizing.

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References

1. Humphreys, D.R., New time dilation helps creation cosmology, *J. Creation* **22**(3):84–92, 2008. See esp. pp. 88–90. Archived online at creation.com/images/pdfs/tj/j22_3/j22_3_84-92.pdf .
2. Humphreys, D.R., Creationist cosmologies explain the anomalous acceleration of Pioneer spacecraft, *J. Creation* **21**(2):61–70, 2007. Mass estimate on p. 25 after eq. (25). Archived online at creation.com/images/pdfs/tj/j21_2/j21_2_61-70.pdf .
3. Ref. 1, pp. 88–89.
4. Ref. 2, pp. 65–69.
5. Humphreys, D.R., Flaw in creationist solution to the Pioneer anomaly? creation.com/pioneer-anomaly-heat, 11 May 2013.