

## Einstein says that cosmological expansion is not locally detectable

Dr D. Russell Humphreys writes that ‘(1) the anomalous sunward acceleration of deep space probes, and (2) the Milgrom empirical equation for the force keeping stars in orbit within galaxies’ are ‘strong scientific hints that [cosmological] expansion is going on right now.’<sup>1</sup> He gives no hint that general relativity predicts that such (Friedmann–Lemaître [FLRW]<sup>2</sup> universe) expansion will not affect local experiments<sup>3</sup> within regions that cannot be treated as FLRW spacetime. An example of such regions is a spherical vacuum region embedded in a FLRW universe, in which region a Schwarzschild star is centered. See section 5.5 (‘Swiss-Cheese models’) of this Cargèse lecture <[www.arxiv.org/PS\\_cache/gr-qc/pdf/9812/9812046.pdf](http://www.arxiv.org/PS_cache/gr-qc/pdf/9812/9812046.pdf)> for details. In general relativity and similar theories, only on the largest observable scale would any one particular FLRW model be valid for our real universe. On smaller scales, nearby matter-energy concentrations, e.g. in or just outside a cluster of galaxies, should appear to have exclusive influence on local, small-scale experiments, particularly in vacuum. To be sure, if the cosmological constant is significantly large and positive, then expansion should be detectable with some such experiments as well; but that should be attributed to the constant, not the FLRW nature of spacetime.

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### References

1. Humphreys, D.R., Humphreys clarifies cosmology again, *TJ* 17(1):60–62, 2003.
2. Also referred to as Friedmann, Friedmann–Robertson–Walker, FLRW, FRW, etc.
3. Long-range or large-scale experiments/observations, such as observations of the cosmic

microwave background radiation, are not local experiments, but observations of test-particle trajectories in the solar system are local.



Courtesy of NASA

### Humphreys’ reply: Only the big bang says that

I’m glad that Dr Campbell is thinking about these matters, and I encourage him to devote his thoughts to generating a young-world creationist cosmology of his own. For the benefit of most readers, the ‘Friedmann–Lemaître–Robertson–Walker’ (FLRW) universe (a.k.a. various subsets of those four names) is a technical name for the familiar theory that Fred Hoyle derisively dubbed the ‘big bang’. Sharing Hoyle’s derision (but not many of his other views), and desiring to eschew obfuscation, I’ll continue calling it the big bang, and other less complimentary names.

Campbell may not know that most readers of *TJ* think the big bang is incorrect. They would assume (correctly) that I was thinking of expansion in the ‘white-hole’ cosmology<sup>1</sup> I have mentioned frequently in this journal.<sup>2</sup> That cosmology has only a superficial resemblance to the big bang. One of the big differences is that gravitational potential (the energy it takes to lift a unit mass up to a height far beyond all the stars) plays a major role in my cosmology. The big bang has no large differences of gravitational potential from place to place, so it ignores that factor.

As expansion of space and matter takes place (a natural consequence in my theory), the gravitational potential would change with the expansion. It is

not hard to show that the rate of change of the potential is proportional to the rate of expansion. That relates it to the Hubble constant, which we estimate from galactic redshift/distance ratios.

It is quite possible that the rate of change of gravitational potential in my theory is related to the anomalous observations I mentioned. If so, then my theory, which is based on Einstein’s theory of general relativity, would provide a counter-example to Campbell’s title. It would not be *Einstein* who asserts local undetectability of expansion, but instead only one of Einstein’s theoretical illegitimate grandchildren, the big bang. It is a logical fallacy (committed by many people), and a bad mental habit, to equate the big bang theory with general relativity. The former is a subset of the latter.

However, let’s not lose sight of the main point: two different phenomena (anomalous spaceprobe deceleration and speeds of stars orbiting in galaxies) seem to depend on a particular value of acceleration that is very close to:

$$Hc \cong 7 \times 10^{-10} \text{ m/s}^2$$

where  $H$  is the Hubble constant and  $c$  is the speed of light. This clue screams out to us that those two phenomena are somehow related to the phenomenon that gives us the Hubble constant. That idea stems from *observations*, not theory. Any cosmology that cannot explain the connection between these data is inadequate. As Campbell points out, the big bang does not seem to be able to do so. Thus he has helped us develop a new line of evidence that the big bang is a big bust!

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### References

1. Humphreys, D.R., *Starlight and Time*, Master Books, Green Forest, Arkansas, 1994.
2. Humphreys, D.R., Timothy tests theistic evolutionism, *TJ* 11(2):199–201, 1997; New vistas of space-time rebut the critics, *TJ* 12(2):195–212, 1998; Humphreys replies, *TJ*

13(1):50–55, 59–62, 1999; Starlight and Time: a response, *TJ* 14(2):73–78, 81, 2000; Russell Humphreys replies, *TJ* 15(2):47–48, 2001; Our galaxy is the centre of the universe, ‘quantized’ redshifts show, *TJ* 16(2):95–104, 2002; D. Russell Humphreys replies and clarifies cosmology, *TJ* 16(3):76–78, 2002; Humphreys clarifies cosmology again, *TJ* 17(1):60–62, 2003.

## Microevolution or microdevolution

Some creationists, thinking it to be fact, are conceding microevolution, while pointing out that there is no way to get from it to macroevolution. Just what changes in nature are they accepting as evolution? Outward changes in colour, shape and size that confer a survival benefit and may even signal the arrival of a new species, may certainly seem like ‘upward’ changes indicative of the term microevolution.

However, the effect of these very same changes, inward, at the genetic level must be recognized. Only the ongoing loss, (as natural selection culls more genes, shrinking gene pools), and corruption (as mutations occur and accumulate progressively over generations, increasing defective gene loads), of genetic information is observed. Since the outward is encoded by the inward, then this direction of change in genetic information is decisive in revealing, in reality, it is not microevolution, but microdevolution that is occurring throughout nature.

This downward trend, amplified by time, is marching all of nature inextricably towards extinction (macrodevolution), the very opposite of what evolutionists theorize, proving evolution to be a complete myth. So microdevolution shows anyone using the term microevolution is, in fact, saying that nature’s becoming genetically poorer and degeneration is evolutionary. Or, simply calling a downward trend, an upward one, which must be reason enough why the term microevolution needs to become extinct.

For creationists to use the term

microevolution is to compromise with a lie, because microevolution says evolution is observed fact. This deceives the public into logically believing that, with enough time, macroevolution would occur. The truth is not that it is impossible to get from microevolution to macroevolution, but that microevolution will never give rise to macroevolution.

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## Dinosaur eggs

I read with interest the discussion between Paul Garner, Michael Garton, Richard Johnson and David Tyler (Garner *et al.*)<sup>1</sup> on the one hand, and John Woodmorappe and Michael Oard<sup>2</sup> on the other, regarding the Flood evidence of dinosaur eggs and footprints. Garner *et al.* claim that mechanisms to account for this have not yet been presented, but Woodmorappe and Oard offer in response, ‘*who knows under what conditions dinosaurs could occasionally build nests ... ?*’ While I would broadly agree with Woodmorappe and Oard on the geologically late Flood/post-Flood boundary, and the complexity of the deluge, I believe that there is an opportunity to offer a solution to the highlighted problems in a respectful manner. However the immense problems found in accounting for the Mesozoic layers as being deposits from the post-Flood period, have already been addressed by McIntosh

*et al.*,<sup>3,4</sup> so they will not be addressed again here. It would appear though that dinosaur nests are rare below the Cretaceous.<sup>5</sup>

Amongst the marine-reptile fossils are crocodiles and other reptilian animals such as giant turtles etc. Evolutionary scientists today examine the life of the crocodile and other large reptiles to try to gain an understanding of how dinosaurs lived.<sup>6</sup> In order to understand how the dinosaurs might have left footprints and eggs in nests in the sand and mud during the Flood it is therefore appropriate to examine the behaviour of living reptiles.

Firstly we need to question just what reptiles made it onboard the Ark. Places were reserved for air-breathing land animals, (Gen. 6:20) with sea creatures expected to survive the deluge. Clearly there would have been a cut-off boundary, but it is not too hard to imagine that many land dinosaurs close to this cut-off would also have been excellent swimmers, and survived the Noachic deluge for many days. Many reptiles, such as some snakes, turtles, crocodiles and alligators live predominantly in the sea or rivers and lakes, but use the soft river banks or sea shore to lay their eggs in shallow dug holes. As they do so, they leave behind a trail of muddy or sandy footprints. Even the land-living Komodo dragon or monitor is able to swim between islands in its native Indonesia, but lays its eggs in holes in the soft ground.

The Komodo monitor today breeds from May to August, but lays its eggs in the cooler months of September. It would appear that these reptiles are able to hold their eggs inside the body until favourable climatic conditions arrive.<sup>7</sup> However if eggs are held for too long they develop a second shell and the embryo cannot breathe. Some dinosaur eggs have been found with double shells, and in this and other respects they are considered very similar to modern crocodile eggs.<sup>8</sup>

It is not too hard to imagine that during the Flood year many dinosaurs survived for many days adrift in the floodwaters. Some of these were pregnant females, and held their eggs