

**Postmodern Astro-Theology, Cometary Panspermia, and the Polonnaruwa Meteorite:  
Derham, Wesley, Whitehead, Griffin and Cobb**

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**ABSTRACT**

Here is a postmodern astro-theological response to factual evidence supporting cometary panspermia, including evidence of cyanobacteria fossils in meteorites (Hoover 2011) and diatom frustules in the Polonnaruwa meteorite (Wickramasinghe and others 2013). Distinct from William Derham's modern astro-theology, and in accordance with John Wesley's avoidance of factual *demonstrations/proofs* and Wesley's appreciation of factual *exemplifications*, postmodern astro-theology appreciates cometary panspermia. Cometary panspermia is a specific-factually correct *example* of panspermia in general. Generic panspermia is essential to panentheism. Cometary panspermia enriches evolutionary biology.

**Key words:** astronomy, theology, modern astro-theology, postmodern astro-theology, panentheism, panspermia, comets, cometary panspermia, Polonnaruwa meteorite; William Derham, John Wesley, Alfred North Whitehead, Charles Hartshorne, David Ray Griffin, John B. Cobb Jr.

**I. Meteors & Microfossils: Evidence of ExtraTerrestrial Alien Life?**

Astronomers, biologists, and astrobiologists have offered many various responses to recent evidence favoring microbial life carried by comets (cometary panspermia) and cometary debris contributing to meteors, meteorites, and micrometeorites. For instance, consider the following evidence:

Hoover, Richard B. (February-March 2011). "Fossils of Cyanobacteria in C11 Carbonaceous Meteorites." *Journal of Cosmology*, vol. 13, no. 35: 3811-3848.

[with "Implications to Life on Comets, Europa, and Enceladus," July-August 2011, vol. 15, no. II.e: 6249-6287.]

Also online at <[journalofcosmology.com/Contents15\\_files/Hoover\\_JOC\\_MS.pdf](http://journalofcosmology.com/Contents15_files/Hoover_JOC_MS.pdf)>.

**Abstract:**

Environmental (ESEM) and Field Emission Scanning Electron Microscopy (FESEM) investigations of the internal surfaces of the C11 Carbonaceous Meteorites have yielded images of large complex filaments. The filaments have been observed to be embedded in a freshly fractured internal surfaces of the stones. They exhibit features (e.g., the size and size ranges of the internal cells and their location and arrangement within sheaths) that are diagnostic of known genera and species of trichomic cyanobacteria and other trichomic prokaryotes such as the filamentous sulfur bacteria. ... (Hoover February-March 2011)

And consider the many various “Commentaries”—concerning Hoover’s claim to have found fossils of cyanobacteria in meteorites—in the *Journal of Cosmology* linked to “Meteors & Microfossils: Evidence of ExtraTerrestrial Alien Life?” online at <[journalofcosmology.com](http://journalofcosmology.com)> and <[journalofcosmology.com/Contents.html](http://journalofcosmology.com/Contents.html)>.

### **The Polonnaruwa Meteorite**

The most recent evidence of microbial life traveling by comets comes from the identification of diatom frustules embedded in fragments from a carbonaceous meteorite —“the Polonnaruwa meteorite”—that landed in Sri Lanka on 29 December 2012. Articles about the Polonnaruwa meteorite in the *Journal of Cosmology* include the following:

Wickramasinghe, N.C., J. Wallis, D.H. Wallis and Anil Samaranayake. (10 January 2013).

“Fossil Diatoms in a New Carbonaceous Meteorite.”

*Journal of Cosmology*, vol. 21, no. 37.

**Abstract:**

We report the discovery for the first time of diatom frustules in a carbonaceous meteorite that fell in the North Central Province of Sri Lanka on 29 December 2012. Contamination is excluded by the circumstance that the elemental abundances within the structures match closely with those of the surrounding matrix. There is also evidence of structures morphologically similar to red rain cells that may have contributed to the episode of red rain that followed within days of the meteorite fall. The new data on “fossil” diatoms provide strong evidence to support the theory of cometary panspermia.

(Wickramasinghe and others, 10 January 2013)

Wickramasinghe, N.C., J. Wallis, D.H. Wallis, M.K. Wallis, S. Al-Mufti, J.T. Wickramasinghe, Anil Samaranayake, and K. Wickramaratne. (13 January 2013).

“On the Cometary Origin of the Polonnaruwa Meteorite.

*Journal of Cosmology*, vol. 21, no. 38.

**Abstract:**

The diatoms discovered in the Polonnaruwa meteorite are interpreted as originating in comets and the dust in interstellar space. The exceptionally porous structure of the Polonnaruwa meteorite points to it being a recently denuded cometary fragment. Microorganisms that were present in a freeze-dried state within pores and cavities may have survived entry to be added to the terrestrial biosphere.

(Wickramasinghe and others, 13 January 2013)

Wickramasinghe, N.C., and J. Wallis, D.H. Wallis, M.K. Wallis, N. Miyake, S. G. Coulson, Carl H. Gibson, J. T. Wickramasinghe, A. Samaranayake, K. Wickramaratne, and Richard B. Hoover. (published 04 March 2013).

“Incidence of Low Density Meteoroids of the Polonnaruwa-Type.”

*Journal of Cosmology*, vol. 22, no. 1.

**Abstract:**

The ingress of micrometeorites of cometary origin with densities below  $\sim 1 \text{ g cm}^{-3}$  into the Earth could average at least 5 tonne per day. Although much of this is burnt upon entry through the atmosphere as meteors, a non-trivial fraction ( $\sim 10\%$ ) which have sizes of  $\sim 1 \text{ m}$  could end up in the form of Polonnaruwa-type meteorites that have mostly gone unnoticed. (Wickramasinghe and others, 04 March 2013)

Wallis, Jamie, Nori Miyake, Richard B. Hoover, Andrew Oldroyd, Daryl H. Wallis, Anil Samaranayake, K. Wickramarathne, M.K. Wallis, Carl H. Gibson, and N.C. Wickramasinghe. (05 March 2013).

“The Polonnaruwa Meteorite: Oxygen Isotope, Crystalline and Biological Composition.” *Journal of Cosmology*, vol. 22, no. 2.

**Abstract:**

Results of X-Ray Diffraction (XRD) analysis, Triple Oxygen Isotope analysis and Scanning Electron Microscopic (SEM) studies are presented for stone fragments recovered from the North Central Province of Sri Lanka following a witnessed fireball event on 29 December 2012. The existence of numerous nitrogen depleted highly carbonaceous fossilized biological structures fused into the rock matrix is inconsistent with recent terrestrial contamination. Oxygen isotope results compare well with those of CI and CI-like chondrites but are inconsistent with the fulgurite hypothesis.

(Wallis and others, 05 March 2013)

## II. Astro-Theology

*The Journal of Cosmology* is now inviting theologians, theological ethicists, philosophers, and other scholars to offer commentaries and articles concerning recent factual evidence of extraterrestrial microbial life. For the purpose of editorial shorthand, editor-in-chief astrophysicist Rudy Schild, guest editor theologian Joseph A. Bracken, and guest editor theological ethicist Theodore Walker Jr. refer to these interdisciplinary deliberations as “astro-theology.”

[See “Introduction to Astro-Theology” (Schild 2012) and “Astro-theology in the Journal of Cosmology” (Walker 2012).]

### Modern Astro-Theology

The term “astro-theology” was used in *Astro-Theology: or, A Demonstration of the Being and Attributes of God, from a Survey of the Heavens* (1715) by William Derham (born 1657, died 1735). Derham was an observational astronomer and an Anglican clergyman. He described his math-and-telescope-assisted astronomy as “modern” (p. 8-9). In Derham’s person and work, modern astronomy plus theology produced modern astro-theology.

## Postmodern Astro-Theology

A revision of modern astro-theology can be signaled by replacing “Demonstration” with “Exemplification” in Derham’s subtitle. Accordingly, <*demonstration* of theological truths via astronomical survey> becomes <*exemplification* of theological truths via astronomical survey>.

Demonstration connotes proof. According to postmodern science instructed by Alfred North Whitehead’s *Science and the Modern World* (1925), John B. Cobb’s originating use of the term “post-modern” to refer to Whiteheadian thought (1964), and David Ray Griffin’s *Whitehead’s Radically Different Postmodern Philosophy* (2007), factual evidence can only *exemplify* (never prove) logically necessary existential truths [logically necessary truths about existence/reality].

## Wesleyan Precedent

The postmodern reluctance to embrace factual proof/demonstration was authorized by another Anglican clergyman: John Wesley (born 1703, died 1791). Wesley fully appreciated modern science. He was an amateur scientist. He discovered a marine “glow worm” (Otto and Lodahl 2009: 103). He collected and studied scientific writings. He studied astronomy and cosmology (Collins 2011). He visited with scientists. He wrote about science and medicine. He did experiments. And he required that his clergy study natural philosophy (Otto and Lodahl 2009). He was seriously interested in relating natural science to theology. However, Wesley avoided the factual demonstrations and the arguments from design (Intelligent Design arguments) that often characterized English natural theology, including Derham’s astro-theology.

According to Wesley scholars, Wesley’s avoidance of factually demonstrated theology is apparent in his selective plagiarism of writings by Derham. While lamenting Wesley’s plagiarism, they appreciate a Wesleyan precedent for theological responses to natural science.

In “John Wesley’s Precedent for Theological Engagement with the Natural Sciences” (2009) Randy Maddox notes that John Wesley’s two-volume compendium—*A Survey of the Wisdom of G\*d in Creation: A Compendium of Natural Philosophy* (1763)—included substantial blocks of material copied from other books, including material from Derham’s *Astro-Theology: or, A Demonstration of the Being and Attributes of G\*d, from a Survey of the Heavens* (1715). [bold added]

Even though Wesley’s 1763 “*Survey*” included a section from Derham’s 1715 “*Survey*,” Wesley excluded portions indicating the existence of deity had been proven or demonstrated. Randy Maddox notes that “Wesley deletes Derham’s rhetorical flourish about the stupidity of those who cannot see evidence of deity in the regularity of the motion in the heavens” (2009: 22). Rather than offering a *demonstration* [“a demonstration of the being and attributes of G\*d” (Derham 1715; and Derham 1713)], Wesley was offering *examples*.

Therefore, Wesley declined to classify his work as a demonstration-proof-oriented *natural theology*. In contrast to the natural theology classification of Derham’s “*Survey*” (1715), Wesley classified his Derham-enriched “*Survey*” as “*Natural Philosophy*” (1763). (Maddox 2009: 18-23)

Similarly, W. Christopher Stewart says:

Wesley's rhetorical strategy contrasts sharply with that of Intelligent Design theorists. Wesley was careful not to overestimate the epistemic force of theistic arguments drawn from our experience of the natural world. Indeed, the whole tone of his *Survey* was to illuminate *who* G\*d is rather than to establish *that* G\*d is. By contrast, Intelligent Design theory inverts these priorities. (Stewart 2009: 189)

Wesley's approach to the relevance of the natural science for theology is closer to what John Polkinghorne calls "the new natural theology," which is modest about both its relationship to science (abandoning all attempts to give theological answers to scientific questions) ... and also ... The new natural theology forswears all attempts to "prove" G\*d's existence on pain of irrationality. ... (Stewart 2009: 190)

In "Degrees of Certainty in John Wesley's Natural Philosophy" (2009) Laura Bartels Felleman compares Wesley's natural philosophy with his sources. Felleman's comparison reveals "an obvious and intentional removal of condemnatory language directed at atheists" (2009: 59, also 78). In contrast with much 18th century English natural theology, Wesley's natural philosophy included no attack on atheists, and no claim to "demonstrative certainty" (Felleman 2009: 74).

Wesley's rejection of factual *demonstrations* and his enthusiastic appreciation of factual *examples* (minus his plagiarism) provide a "precedent for theological engagement with the natural sciences" (Maddox 2009). Accordingly, this Wesleyan precedent authorizes a postmodern revision of Derham's modern astro-theology, and a postmodern astro-theological response to cometary panspermia.

### III. A Postmodern Astro-Theological Response

The recent discovery of diatom frustules in a carbonaceous meteorite is strong evidence in support of cometary panspermia. More decisive evidence is forthcoming. For instance, the ESA Rosetta spacecraft (launched 02 March 2004) is scheduled to catch comet 67P/Churyumov-Gerasimenko in May 2014, and to deploy a robot to harpoon, anchor to, soft-land on, and study that comet in November 2014 (NASA Project Manager and Scientist— Claudia Alexander). No doubt, the final demonstrative proof that comets carry microbial life will be the recovery of living microbes from a comet.

Cometary panspermia is an *example* of generic panspermia.

[Concerning generic panspermia: Panspermia is generic (general-panoramic). And there are many specific examples of panspermia. In addition to cometary panspermia, other examples include: light-pressure panspermia, planetary panspermia, litho panspermia, spaceship panspermia, directed panspermia, and perhaps other ways of distributing seeds and microbes. For the sake of distinguishing panspermia from specific examples of panspermia, we may refer to panspermia with the somewhat redundant and rightly emphatic phrase—"generic panspermia."]

Generic panspermia is not contingent upon exemplification by comets and cometary debris. If we discovered that comets and cometary debris have never reached Earth, this would falsify cometary panspermia, not generic panspermia.

Generic panspermia holds that the entire universe [pan] is seeded [sperm-ia] with possibilities for newly emerging experiences and lives. Such panoramic provisioning is logically essential to the postmodern conception of an all-inclusive, providential, omnipresent, and eternally creative Creator. Whitehead argues that creativity is universal (1978 [1927-28]: 21), and that all “actual entities” are in the “process” of making creative contributions to “‘creative advance’ into novelty” (Ibid: 21, 128, 222). Charles Hartshorne says, “*To be is to create*” (1970: 01 [also Hartshorne 2011]). This Whiteheadian-Hartshornean conception of an ongoing universal creative-procreative and evolutionary *process* is consistent with Wesleyan thinking (Ogden 1984; Stone and Oord 2001; Campbell 2010).

In contradiction to the prevailing modern materialism that required viewing the universe as mostly uncreative-insentient-inanimate-uninspired-mechanical-dead matter, Wesley saw a divinely inspired creation.

While the discoveries of the seventeenth and eighteenth fueled the growth of mechanical conceptions of nature, in Wesley’s view, G\*d’s freely interactive presence filled the very fabric of creation. Matter was not merely matter, for it contained this mysterious presence of G\*d. In *Survey*, Wesley describes this most frequently as the principle of life—a spirit-fire-fluid—in a G\*d infused universe. ... a more-than-mechanical world—a world full of the mysterious Divine.  
(Otto and Lodahl 2009: 97-98)

The Creator freely interacts with the divinely inspired creation. Wesley saw no uninspired/dead matter. Wesley saw a living universe.

Regardless of whether claims for diatom frustules in the Polonnaruwa meteorite are factually true, or factually false; according to postmodern science, it is necessarily true that the Polonnaruwa meteorite brought no wholly insentient, entirely lifeless, absolutely uncreative, and totally dead matter. According to Whitehead, field theories, quantum theories, and vibratory theories exclude the existence of totally dead “stuff” (1967 [1925], p. 36; also 1927-28). Similarly, Hartshorne says, “the vibratory theory of matter banished merely inert units from science” (1976, p. 67), and “even atoms have bits of freedom” (1997, p. 162). Furthermore, speaking of quantum *indeterminacy* is the reluctant-backwards-materialist way of acknowledging quantum *freedom*.

**Postmodern scientists** recognize that any event exemplifies logically necessary existential truths (logically necessary truths about existence/reality). For instance, consider the necessarily true existential statement: Something is happening. Obviously, this statement must be true. Even stating that <nothing is happening> exemplifies something happening. Making any factual statement implicitly confirms—by exemplifying—that something is happening.

Similarly, making any factual statement implicitly confirms that we are partly inclusive parts of reality among other variously inclusive parts of reality. Even when explicitly denied, the reality of parts among parts is always implicitly confirmed. The mereological idea that all parts of reality are parts of the whole of reality plus the theological idea that “the one all-inclusive whole of reality” (Ogden 1984: 21) is a living-responsive-loving-creative individual (Whitehead; Hartshorne) yields “panentheism” (*pan* [all] -in- *theos* -ism).

[The all-inclusive divine whole of reality is greater than the sum of all parts of reality. The divine whole is “that than which nothing greater can be conceived” (St. Anselm). It is not possible to conceive of a reality that is greater than (or equal to) the all-inclusive whole of reality. See *Anselm’s Discovery* (Hartshorne 1965); and see *Charles Hartshorne and the Existence of G\*d* (Viney 1985). Also, Hartshorne conceives of a hierarchical ordering analogous to a living human individual’s relations to her living cellular individuals. A human individual is greater than the sum of her cellular individuals. For humans and deity, the whole is greater than the sum of its parts.]

Implicitly, making any factual statement (true or false!) confirms by exemplifying that we are parts among parts of the whole of reality, which yields panentheism. Therefore, **postmodern scientific theologians** (especially *process* and *neoclassical* theologians) are seldom enthusiastic about factual arguments favoring theology.

Unlike postmodern scientific theologians, modern astro-theologians are often very enthusiastic about factual demonstrations such as Intelligent Design and big bang cosmology. For example, in *G\*d and the Astronomers* (1992) modern astronomer Robert Jastrow presents big bang cosmology as evidence for biblical theism.

Postmodern scientific theologians typically display no enthusiasm for factually demonstrated theology. According to postmodern scientific theology, including postmodern astro-theology, astronomical facts are exemplifications, not demonstrations/proofs.

## Conclusion

Generic panspermia is logically essential to panentheism. Cometary panspermia is not. Cometary panspermia merely exemplifies generic panspermia. Nevertheless, cometary panspermia makes a very important contribution to postmodern science.

Postmodern biology prescribes “a richer account of evolution” (Cobb and others 2008). We need an account of evolution that is richer than natural selection without creativity, and richer than exclusively-Earth-centered modern biology. By calling attention to extraterrestrial contributions to evolutionary processes, cometary panspermia theory enriches an otherwise fatally impoverished modern theory of evolutionary biology.

After acknowledging the Wesleyan precedent for theological engagement with empirical science, and after distinguishing the theological necessity of generic panspermia from the specific factual contingency of cometary panspermia, a postmodern astro-theologian might judge that factual evidence favoring cometary panspermia is factually compelling and enriching. I do.

And, like me, other postmodern astro-theologians might rejoice upon receiving word of a new factual *exemplification* of an old metaphysically founded truth: Life is not, has never been, and never will be restricted to planet Earth.

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