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*Ted Peters*

As recent currents in theology flow through the contemporary delta they split into so many rivulets and tributaries that the central flow becomes difficult to identify. Subsequent to the watershed changes in both Roman Catholic and Protestant theology in the mid 1960s – the Second Vatican Council for the Roman Catholics and the “Death of God” theology for the Protestants – three larger streamlets began their flow toward the new century. The first was methodology, a renewed commitment by both Roman Catholics and Protestants to establish a firm epistemological foundation on which constructive theology could be built. The second was what began as the “theology of ... ” stream – that is, applying theology to secular sectors for both analysis and development. This led to a plurality of theologies: such as the theology of play, the theology of hope, and the theology of liberation. Soon the “of” was dropped and replaced with adjectives: liberation theology, ecumenical theology, feminist theology, black theology, queer theology, postcolonial theology, and such.

The third stream began as a mere trickle in 1966 with the publication of Ian Barbour’s book, *Issues in Science and Religion* (Barbour 1966). In the decades since it has gathered volume and velocity until it is now a raging intellectual river. This river is sometimes referred to as “Theology and science” or “Science and religion”. Although it was spawned by Christian systematic theologians, both scientists and theologians are now diving in from Jewish, Islamic, Hindu, and Buddhist traditions as well.

Astrotheology drinks from both the “Theology and science” stream as well as the “theology of ... ” stream. A creative-mutual-interaction (CMI) has developed between theologians and selected fields within science: physics, cosmology, evolutionary biology, genetics, and neuroscience (Russell 2008: 20–24). What interest the astrotheologian are the discoveries and discussions taking place among astronomers, cosmologists, exo-biologists, astro-biologists, astro-ethicists, and those scientists searching for extraterrestrial intelligence (ETI). Astrotheology is, at minimum, a *Theology of Space Science*. And it is a lot more.

It is time for a definition. *Astrotheology is that branch of theology which provides a critical analysis of the contemporary space sciences combined with an explication of classic doctrines such as creation and Christology for the purpose of constructing a comprehensive and meaningful understanding of our human situation within an astonishingly immense cosmos.* Astrotheology is not a field set off on its own. Rather, it is a branch on the

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larger systematic theology tree. Astrotheology provides one agenda among others on the sytematician's to-do list.

With regard to theological method, astrotheology relies upon the sources identified in the Wesleyan Quadrilateral: scripture, history, reason, and experience. Special attention is given to reason, in this case reason in the form of natural science accompanied by philosophical criticism of natural science. Astrotheology gives priority of place to credible science, especially astrobiology and related space sciences. These sciences require direct attention by the astrotheologian, but also indirect attention, as the astrotheologian looks at science through the eyes of culture. The Christian astrotheologian employs a hermeneutic of secular experience, interpreting secular and scientific assumptions in light of a scripturally based faith in the transcendent God of Israel.

Here are the doctrinal *loci* or areas of concern for the astrotheologian. (a) *Creation*. What is the scope of God's creation? Earth alone? Or, does it include the Big Bang, the Anthropic Principle, the genesis of life, and the evolution of species on our planet as well as other planets? (b) *Christology* (person of Christ) and *Soteriology* (work of Christ). Does the atoning work of Jesus Christ on Earth suffice for all beings throughout the universe? Or, might we expect God to become incarnate multiple times, once for each spiritually ready species? (c) *Sin*. Would extraterrestrials whom we encounter be fallen, like us? Or, might they be so evolutionarily advanced in science, technology, and morality as to bring goodness if not salvation to us on Earth? (d) *Eschatology*. With the prognostications of physical cosmologists regarding the demise of our sun and the eventual heat death of the universe, how should we handle the biblical symbols of "new creation" and "eternal life"? (e) *Ethics*. What are the quandary issues arising from space exploration and related matters? What direction should public policy take? How can astrotheologians and astroethicists contribute?

In what follows we will firstly briefly review pre-Copernican and post-Copernican versions of astrotheology. We will then, secondly, turn to the relevant space sciences, especially astrobiology and astrophysics. Thirdly, we will turn to an immediate to-do list for the Christian theologian, to four tasks that identify the portfolio of the astrotheologian.

### Centering in pre-Copernican astrotheology

According to historians Michael J. Crowe and Steven J. Dick, the first labeled treatment of astrotheology begins in 1714 with the publication of the book *Astro-Theology, or a Demonstration of the Being and Attributes of God from a Survey of the Heavens*. The author, William Derham (1657–1735), was an Anglican clergyman and chaplain to the future King George II. Derham's own version of the history of science is broken into three epochs, the Ptolemaic, the Copernican, and now his third, post-Copernican system-of-the-universe. Accordingly, says Derham, each star is itself a sun like ours with a family of orbiting planets, also like ours. These planets orbiting fixed stars he declares "to be habitable worlds; places ... accommodated for habitation, so stocked with proper inhabitants" (Crowe 2008: 125). Derham cannot prove this. So, he asks

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for either a direct divine revelation or better scientific instruments to confirm or disconfirm his speculation. The task of astrotheology in Derham's era was to glorify God by stressing the immensity and magnificence of God's creation. When we turn to the twenty-first century, astrotheology's task has become a bit more modest by asking: just how should theologians assess and interpret the findings of astrophysics and astrobiology; and how might theological *loci* be affected by these findings?

Although Derham may have given us our term, "astrotheology", the subject matter of the field antedated him. In Athens prior to the Christian era, philosophers asked whether there could be a plurality of worlds (*aperoi kosmoi*). Those offering speculative answers can be divided roughly into two schools, the Aristotelians, who argued that one world is enough, versus the pluralists (originally atomists) who argued for many worlds. Aristotle (384–322 BC) said that there can be only one center and one circumference; therefore there cannot be several worlds or several heavens (Aristotle "On the Heavens" I:8:276–77; "Metaphysics" XII:8:33). Democritus (ca. 400–370 BC) and the atomists, to the contrary, said that "there must now be, and always have been, an infinite number of other worlds in various stages of growth and decay." Epicurus (341–270 BC) followed Democritus, arguing that "there are infinite worlds both like and unlike this world of ours" (Epicurus: 5). Although the Aristotelians have enjoyed the greater influence during the pre-Copernican era, the pluralists have garnered both medieval and post-Copernican supporters.

In the first millennium and a half of the Christian Church, a few theologians entered the many worlds arena. The Aristotelian nay-sayers took the initial lead, arguing forcefully that unity and oneness and centeredness befit both God and the world. St. Thomas Aquinas (1224–74) weighed the issue of many worlds carefully, deciding to side with Aristotle. He considers an argument in favor of pluralism: "it is better that there be many worlds than there be one because many good things are better than a few" (Aquinas ST.I:Q47; A3). The Angelic Doctor, as Thomas has come to be known, to the contrary, determines that one world is the superior option. "It is necessary that all things should belong to one world," he says. Why? Because of what Plato and Aristotle had previously said. According to Plato, the oneness of God makes it appropriate for God to create but one world (Plato, *Timaeus* 31). According to Aristotle, perfection is associated with oneness (all things in the world tend to center around a single center) and this implies that one world would better testify to God's perfection. Two things are notable here. First, Thomas does not appeal to Scripture to trump reason. Second, Thomas registers no shock or revulsion at the question. Rather, he even-handedly debates the matter before drawing a negative conclusion.

Like Thomas Aquinas, John Buridan (1295–1358) subjects Aristotle to critical examination but comes up with the opposite conclusion. Aristotle, arguing from nature, had prohibited the creation of multiple worlds because nature obeys the centering principle. But, rather than appeal to nature, could we by faith assert that God could create other worlds of a different type or different species? Yes, says Buridan. "We hold from faith that just as God made this world, so he could make another or several worlds" (Dick 1982: 29). Nominalist William of Ockham (1280–1347) similarly affirmed that God could create other worlds, even worlds better than the one in which we live (Dick 1982: 33).

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In sum, during the first millennium and a half of the Christian era theologians raised the question of many worlds, but Aristotelian single-world centering prevailed. With the dawn of the Reformation and the Enlightenment, however, things changed. Extraterrestrial life became a “doctrine taught in college classrooms, championed by preachers, and celebrated by poets” (Dick 1982: 35). At least two factors contributed to the rise of interest in the possibility of ETI. The first was an external factor: the gradual acceptance of the heliocentric cosmology proffered by Copernicus, Kepler, and Galileo. The second was an internal factor: the persistence of the neo-Platonic principle of plenitude and the belief that every good potential should become actualized. Accordingly, if God were to create planets with the potential for supporting life, then planets devoid of life would be an inappropriate waste of God’s creative energies. This would be like setting the table with plates and silverware but not serving food. The potentiality for life seems to require the creation of actual life, so our predecessor theologians thought.

### **Copernicus and the Paine ‘n’ Twain decentering of Earth**

The revolutionary book by Roman Catholic Nicholas Copernicus, *De Revolutionibus Orbium Coelestium* (*On the Revolutions of the Celestial Orbs*) was published in Nuremberg by the German Lutherans in 1543. Copernican cosmology was advanced in Germany by Johannes Kepler (1571–1630) and in Italy by Galileo Galilei (1564–1642). The latter used a telescope, whereas Copernicus and Kepler did not. In a letter to Galileo, Kepler writes, “I must point out that there are inhabitants not only on the moon but on Jupiter too” (Dick 1982: 59). Even though Kepler and Galileo were avid Copernicans, the heliocentric model of the universe only gradually garnered general public acceptance. Theologians of the Reformation era found it difficult to assess the credibility of Copernicanism; but by the time of the Enlightenment many theologians were scanning the skies through telescopes to locate their space neighbors.

For so many today, the very term “Copernican revolution” connotes a cultural shift away from geocentrism and anthropocentrism and toward a more humble appreciation for our tiny planet amidst an immense universe. It further connotes a shift away from religion and toward science, away from human hubris and toward an openness for sharing our cosmos with extraterrestrials. Is this an accurate picture?

This is the picture painted by Thomas Paine (1737–1809) and Mark Twain (1835–1910), who used Copernicus as a lever to dislodge the allegedly out-of-date Christian worldview. Paine, a Deist who claimed that he had a “natural bent” toward science, contended that Christian theology required belief in only one world, Earth. And he found this objectionable. “It is not a direct article of the Christian system that this world that we inhabit is the whole of the habitable creation,” he first acknowledges. Then, he proceeds to draw an embarrassing conclusion. “To believe that God created a plurality of worlds ... renders the Christian system of faith at once little and ridiculous, and scatters it in the mind like feathers in the air. The two beliefs [Christian faith and other worlds] cannot be held together in the same mind” (Crowe 2008: 221–29). A century later Mark Twain (1835–1910) repeated Paine’s attack on alleged Christian geocentrism. “How insignificant we are, with our pigmy

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little world!. ... Did Christ live 33 years in each of the millions and millions of worlds that hold their majestic courses above our heads? Or was our small globe the favored one of all?" (Crowe 2008: 463). In short, sophisticated Copernicans know that the Earth orbits the sun; but, allegedly, atavistic Christians are still pre-Copernican and committed to seeing Earth dwellers as the center of the universe.

Do Paine 'n' Twain paint an accurate picture? Not exactly. Arthur O. Lovejoy tries to correct the widespread mistaken assumption that pre-Copernican theologians were vulnerable to decentering. Did pre-Copernican geocentrism provide warrant for religious anthropocentrism? No, says Lovejoy. Why? Because for pre-Copernican Europe the center of the Earth was thought to be hell, not our planet's surface with its living creatures. "For the centre of the world was not a position of honor; it was rather the place farthest removed from the Empyrean, the bottom of the creation, to which its dregs and baser elements sank. The actual centre, indeed, was Hell" (Lovejoy 1936: 101–2). Fiery volcanoes provided evidence of a subterranean hell. Medievals were not geocentric; they were diabolocentric.

What provided the warrant for anthropocentrism was reason, not geocenteredness. We human beings sit atop the ladder of life because of our intellect, our intelligence. Any challenge coming from the Copernican revolution would come not from decentering the planet but from the prospect that extraterrestrials might have greater intellectual capacity than we. In his *De docta ignorantia* of 1440, pre-Copernican Nicholas of Cusa affirmed belief in ETI and – apparently overcoming his anthropocentrism – speculated that perhaps extraterrestrials are of higher nobility than we Earthlings, that "the earth is perhaps inhabited by lesser beings" (Lovejoy 1936: 115).

The Copernicus–Kepler–Galileo revolution in astronomy stimulated considerable interest among theologians in the many-worlds controversy. Theological speculations and affirmations of extraterrestrials as part of God's creation exploded in the works of renegade Dominican Giordano Bruno (1548–1600) and Enlightenment giant Immanuel Kant (1724–1804). Adopting extraterrestrials as fellow members of God's family was advocated by orthodox or mainline preachers and theologians such as Thomas Chalmers (1780–1847) of Glasgow; Cambridge University astronomer and Anglican clergyman William Whewell (1794–1866); Victorian poet Alfred Lord Tennyson (1809–92); John Henry Cardinal Newman (1801–90); and Liberal Protestant theologian Albrecht Ritschl (1822–89). Extraterrestrials captured the imaginations of movement founders such as Emmanuel Swedenborg (1688–1772); American transcendentalist Ralph Waldo Emerson (1803–82); Mormon founder Joseph Smith (1805–44); Seventh-Day Adventist apostle Ellen White (1827–1915); and founder of the Bahá'í religion in Iran, Bahá'u'lláh, who wrote in *Gleanings from the Writings of Bahá'u'lláh*, "Know thou that every fixed star hath its own planets, and every planet its own creatures, whose number no man can compute" (Troxel 2012).

### **Astrotheology today**

Relatively little has been heard from twentieth- and twenty-first-century theologians on questions about extraterrestrial neighbors or, for that matter, any astrotheological concerns. Although no loud voices have been raised, the peeps are worth listening to.

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Turning our ears first to Roman Catholics, we listen carefully to Karl Rahner (1904–84) while he whispers a single line about “the many histories of freedom which do not only take place on our earth” (Rahner 1978: 446). The colorful Hans Küng (1928–) says “we must allow for living beings, intelligent – although quite different – living beings, also on other stars of the immense universe” (Küng 1984: 224). American Roman Catholic theologian Thomas O’Meara speculates with a hint of glee: “There might be a number of modes of supernatural life with God, a variety of God’s more intimate life shared with intelligent creatures in a billion galaxies” (O’Meara 1999: 25).

Perhaps more significant than the systematic theologians for astrotheology has been the indefatigable scientific work of the Specola Vaticana, the Vatican Observatory. The ever-curious and diligent Jesuit astronomers pursue science, and more than science. William Stoeger reminds us that “religion and theology must maintain a radical openness to, and a critical acceptance of, the range, evolution and structure of the physical, biological, psychological and cultural reality which the sciences reveal to us” (Stoeger 1988: 242). Stoeger, along with his colleagues, scans the heavens looking for scientific jewels and listening for the music of the spheres. “The universe sings God’s praises because it is beautiful,” write George Coyne and Alessandro Omizzolo; “it is beautiful because God made it” (Coyne and Omizzolo 2002: 160).

Listening to the Protestant theologians, we hear how Paul Tillich (1886–1965) provides a rare example of a contemporary systematic theologian willing to grapple with the Christological problem posed by many worlds. How should we “understand the meaning of the symbol ‘Christ’ in the light of the immensity of the universe, the heliocentric system of planets, the infinitely small part of the universe which man and his history constitute, and the possibility of other worlds in which divine self-manifestations may appear and be received?” Tillich proceeds to argue that we should expect divine self-manifestations among intelligent species on other planets. He grants that it is necessary for the theologian to speculate here, and then he proceeds to do so. “Incarnation is unique for the special group in which it happens, but it is not unique in the sense that other singular incarnations for other unique worlds are excluded. ... Man cannot claim to occupy the only possible place for incarnation” (Tillich 1951–63}: 2.95–96).

Wolfhart Pannenberg (b. 1928) spins the opposite direction from Tillich on the Christological question. Whereas Tillich thinks that the universe needs multiple Christs, one is enough for Pannenberg. After acknowledging the “discovery of nonterrestrial intelligent beings” as a matter of theological concern, the Munich theologian argues that “the Logos who works throughout the universe became a man and thus gave to humanity and its history a key function in giving to all creation its unity and destiny” (Pannenberg 1991–90: 2.76). The history of salvation on Earth will eventually converge with the history of the entire universe, and the salvific work of Earth’s Christ will be efficacious for the entire cosmos.

Before turning our ears toward the Evangelical Protestants, let us introduce another factor in space speculation, the UFO (Unidentified Flying Object) phenomenon. Beginning in June 1947 with pilot Kenneth Arnold’s sighting of nine mysterious “flying saucers” near Mount Rainer in the United States state of Washington, the

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news waves for half a century were abuzz almost daily with UFOs. Might they be craft visiting Earth from outer space? Awareness of possible alien intelligence became enhanced with extravagant reports by alleged contactees, thriller movies, television sit-coms, conferences, controversies, and icons of little green men (Peters 1977). Revivalist preacher and purported leader of American evangelical Christianity Billy Graham (b. 1918) responded. In his book on angels the beloved evangelist writes: “Some ... have speculated that UFOs could very well be part of God’s angelic host who preside over the physical affairs of universal creation. While we cannot assert such a view with certainty ... nothing can hide the fact that these unexplained events are occurring with greater frequency around the entire world. ... UFOs are astonishingly angel-like in some of their reported appearances” (Graham 1975: 9–14 *passim*).

Some fundamentalists to Graham’s right, in contrast, identify flying saucers with Lucifer’s angels, with demons, and seek to discourage fascination with these mysteries in the sky (Allnutt 1978). To Graham’s left is Barry H. Downing (b. 1918), a Presbyterian minister with a doctorate in science, who seeks to bring harmony with his book, *The Bible and Flying Saucers*. Downing offers a hermeneutic of scripture based upon an extraterrestrial interpretation (Downing 1968). He endorses the “ancient astronaut” theory, according to which technology and even life itself has been seeded and cultivated on Earth by extraterrestrial gardeners. What ancient Christians thought were visits from supernatural beings were in fact visits from natural – though extraterrestrial – beings.

Are visiting UFOonauts divine or demonic? Orthodox interpreter of culture Seraphim Rose contends that the UFO phenomenon is demonic. The devil has placed what looks like spaceships in our skies to satisfy the hunger of modern, spiritually starved Earthlings with a meal of naturalistic and futuristic religious belief. The eschatological utopia offered by alleged aliens who are more evolutionarily advanced than we is a delusion, a temptation to take us away from the true revelation in Jesus Christ. “Dabbling with UFOs can be as dangerous as dabbling with black magic” (Rose 2004: 12).

For the most part, today’s astrotheologians dodge the extraterrestrial hypothesis associated with UFOlogy and side primarily with what they deem the more credible sciences of space exploration. Why? Because, as Albert Harrison reports, “Almost sixty years of energetic research has failed to convince scientists that UFOs transport visitors from our own future, carry beings from another dimension, or bring us aliens from outer space” (Harrison 2007: 79). Like Jacob and Esau, UFOlogists and astrobiologists are rival siblings, seldom seen together at the same family barbecue. The split between UFOlogists and establishment scientists signals to the theologian that he or she must apply a more comprehensive hermeneutic of culture just to understand what the deeper issues are that lie beneath this secular split.

### **Astrotheology, astrobiology, and the anthropic principle**

During the 1970s the term “exotheology” began to appear (Peters 2008:101–3). It was based on the then extant scientific term, “exobiology,” coined by scientist Joshua

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Lederberg in 1960. Activities at NASA in the mid 1990s led to modifications of the research agenda and the emergence of the field of “astrobiology,” “which redefined the boundaries and the concept of exobiology” (Dick and Strick 2005: 202). Astrobiology continues the search for extraterrestrial life, to be sure; but it does so by relying upon a broader range of sciences (Arizona 2012). Astrobiology now encompasses genomics, ecology, planetary formation, and all sciences dealing with the origin, history, and distribution of life in the universe. Among its tasks, astrotheology analyzes the assumptions and implications of astrobiology toward the end of enhancing and enriching a worldview centered on God as creator and redeemer.

NASA’s version of astrobiology focuses its research program on three fundamental questions: (1) How does life begin and evolve? (2) Does life exist elsewhere in the universe? (3) What is the future of life on Earth and beyond (NASA 2012)? Steven Dick and James Strick observe that “these are fundamental questions that humanity has asked in increasingly subtle and refined forms over millennia” (Dick and Strick 2005: 10). Our Earth-centered worldview is at stake. “As Darwinism placed humanity in its terrestrial context, so exobiology will place humanity in a cosmic context. That context – a universe full of microbial life, full of intelligent life, or devoid of life except for us – may to a large extent determine both humanity’s present worldview and its future” (Dick and Strick 2005: 9).

NASA’s Mars researcher Christopher McKay would agree. “Astrobiology has within it three broad questions that have deep philosophical as well as scientific import. These are the origin of life, the search for a second genesis of life, and the expansion of life beyond Earth” (McKay 2000: 45). McKay sees within these three questions an inherent “deep philosophical” import. This deep philosophical import should concern the astrotheologian.

The first question – how does life begin and evolve? – seems to require two separate understandings of evolution, one cosmic and the other Darwinian. Cosmic evolution describes non-living or pre-living physical phenomena, such as the evolution of a star – our sun – as a main sequence star evolving into a red giant before ending up as a white dwarf. Charles Darwin’s model of evolution applies to something quite different, because it deals solely with living organisms, solely with speciation. Cosmic evolution – including pre-biotic chemistry – is not governed by natural selection acting on inherited traits, whereas biological evolution is. Therefore, the Darwinian model does not include the origin of life. Astrobiologists are looking for the origin of life, whether on Earth or anywhere else. They are currently looking for pre-biotic chemistries that could – allegedly – evolve into life.

Theologians need to remain alert to these different definitions of “evolution” and avoid confusing one with the other, even though the distinction gets blurred at the cultural level. “The idea of cosmic evolution implies a continuous evolution of the constituent parts of the cosmos from its origins to the present ... the entire universe is evolving ... all of its parts are connected and interact, and ... this evolution applies not only to inert matter but also to life, intelligence, and even culture” (Dick and Strick 2005: 9). Note the inclusion of culture. The astrotheologian needs to keep in mind that this comprehensive understanding of evolution does not in itself constitute a single theory that explains both pre-biotic and biotic phenomena with the same explanation.



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The answer to the second question – does life exist anywhere else in this universe? – is being pursued by astrobiologists on two levels. Within the solar system, the search is on for microbial life. The second level is the search for intelligent life, most likely to be found outside our solar system, yet still within the Milky Way. For example, astrobiologists plan to study the chemistry of extra-solar planets by looking at the absorption spectra of a known background star, whose light passes through the planetary atmosphere. Free oxygen or methane could indicate a habitable location.

The Search for Extraterrestrial Intelligence Institute (SETI), among others, listens for radio signals sent from extraterrestrial civilizations that have advanced evolutionarily and technologically so that they can produce radio signals. Radio astronomy – listening for electronic signals – is the main method employed by SETI researchers. So far, silence.

Astrobiology's third question is this: what is the future of life on Earth and beyond? This includes forecasts of exporting life from Earth to other locations in space; and it includes the interaction between life on Earth and life elsewhere. Terrestrial scientists and their respective funders have found manned space flight excruciatingly expensive. America's Apollo program, which put a human being on the moon, is now history. And it may remain history for some time. Unmanned space exploration with sophisticated robots is now the preferred method for pursuing extraterrestrial research.

Scientists are not the only ones with eyes turned toward the heavens, however. Investors and explorers are looking toward space for profit and adventure. Investors are considering mining operations on asteroids and taking tourists to the moon. The Mars Society is beginning a long-range plan to colonize the red planet. Even if there's nobody out there, we'll be out there soon.

All three of NASA's scientific questions occupy today's astrobiologists. Should they occupy the theologians as well? It is healthy for the astrotheologian to formulate questions that arise from within theology proper, of course. Yet, astrotheology will be still healthier if it eats frequently off the dinner plate of the space sciences.

Two related morsels on the astrophysicist's plate are too delectable for the theologian to pass up: the anthropic principle and the multiverse debate within Big Bang cosmogony. According to the anthropic principle (AP), the initial conditions obtaining as the universe began to expand from the Planck era were such that intelligent life would eventually evolve. It appears that our early universe was fine-tuned so as to prepare physics for evolving biology and biology for evolving intelligence. A strong version of AP (SAP) posits that life would be inevitable. A weak version of AP (WAP) simply says that life would be possible. This is a tad oversimplified, but satisfactory for our purposes here. What is important here is that within the field of astrophysics itself the question of purpose – teleology – arises. How might we answer it? In one of four ways. First, *chance*: the fine-tuning of the universe is due to sheer chance, to happenstance. Second, *providence*: the universe was designed by God in the beginning so that the divine will for the creation of conscious creatures could be fulfilled. Third, *retroactive ontology*: scientifically speaking, the entire universe is understood quantum mechanically as a single entity complete with backward causation or, theologically speaking, God's eschatological plan retroactively

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conditions the redeemed past. That is, future actuality retroactively redefines previous contingencies in terms of their actualized potentials. Fourth, the *multiverse*: our universe is only one of many, each with different initial conditions.

Because our universe is so startlingly finely tuned for life, almost no one finds chance to suffice as an explanation. Theologians drift primarily toward providence and occasionally toward retroactive ontology, while unsympathetic scientists embrace the multiverse explanation.

Renowned physical cosmologist George Ellis sides with the theologians on providence. “The symmetries and delicate balances we observe require an extraordinary coherence of conditions and cooperation of laws and effects, suggesting that in some sense they have been purposefully designed, i.e., they give evidence of intention, realized both in the setting of the laws of physics and the choice of boundary conditions for the universe. This is the basic theological view,” even if it is held by a scientist (Ellis 1993: 374). Ellis continues by showing how God’s physics readies the universe for God’s loving plan. “The key idea is that *the fundamental aim of [God’s] loving action ... shapes the nature of creation, in particular setting its meaning and limitations*” (Ellis 1993: 386; italics in original). Radio astronomer Jennifer Wiseman also sides with the theologians. “Radio telescopes, and indeed all telescopes, reveal a universe of complexity and beauty that speaks of great care and creativity in design ... we can even see that God is very good for even choosing to make a universe of beauty that leads to life” (Wiseman 2005: 177).

Robert John Russell believes that divine design underlies nature’s chance. “God chose these values to be precisely what they are, in order that life would arise eventually and by ‘blind chance’ on a planet such as ours” (Russell 2008: 287). Russell’s position could fit either the providential model or the retroactive model of divine action.

Such theological interpretations of the Big Bang’s initial conditions so mortify the hard-nosed physicist that he or she wants to say: there must be another explanation! Enter: the multiverse theory, or theory of multiple universes. Royal Society physicist Martin Rees rejects the providence answer and turns to the multiverse option. “If one doesn’t believe in providential design, but still thinks the fine tuning needs some explanation, there is another perspective. ... There may be many universes of which ours is just one” (Rees 2002: 68). If our cosmos is accelerating and the distant galaxies will forever be beyond our visual horizon, this suggests that there may have been many big bangs in the past. In fact, there might have been a big bang for each possible set of initial conditions.

Now, something interesting happens within the multiverse argument. What above we were calling the principle of plenitude in theology becomes in physics the principle of universality, “All that is possible, happens” (Ellis 1993: 373). In other words, every potential universe becomes an actual universe. We simply cannot see the others from within our universe. The number of universes is virtually infinite. Our particular universe actualized its potential for evolving life; but many others did not. We happen to live in one universe that produced life, therefore the theologically minded over-interpret the meaning of the physical substrate when they see providential design. The idea of the multiverse provides a secular explanation for the anthropic principle.

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What is fascinating here is that a theological argument – actually an anti-theological argument – appeals to some physicists when selecting a preferred scientific theory. The very fact that physical cosmology and even astrobiology from time to time find themselves appealing to theology (or anti-theology) in theory selection should provide sufficient reason for theologians to register interest.

### Four tasks for astrotheologians

Now, let us turn to the agenda of astrotheology. How should the discipline of astrotheology proceed in the near future? Four tasks on the astrotheologian's to-do list come immediately to mind. Let us look briefly at each in turn.

First, *Christian theologians along with intellectual leaders in each religious tradition need to reflect on the scope of creation and settle the pesky issue of geocentrism*. Allegedly, pre-Copernican Europeans had relied upon a belief that the planet Earth was in the center of the universe. This geocentrism allegedly supported religious hubris. Pride of place as Earthlings and as human beings ranked the human race highest among the living creatures. Today, many non-theologians and some theologians worry that our geocentric or anthropocentric religion will suffer drastically if a new relationship with extraterrestrials challenges this persistent belief system. However, these assumptions are misleading, as Michael Crowe demonstrates. "It is sometimes suggested that the discovery of extraterrestrial life would cause great consternation in religious denominations. The reality is that some denominations would view such a discovery not as a disruption of their beliefs, but rather as a confirmation" (Crowe 2008: 328–29; Peters 2009). Among the tasks for the astrotheologian, then, is the need to clarify if not correct the regnant opinion on the matter of geocentrism. This correction can take the form of enlarging the scope of the concept of creation.

The scope of creation for the Abrahamic traditions is inclusive of everything, known and unknown, visible and invisible. When biblical Christians speak of creation, it includes all of physical reality. The immensity of God surpasses the immensity of the universe. After all, since Anselm we have thought of God as that than which nothing greater can be conceived.

This in itself should settle the problem of alleged geocentrism. God is the center, figuratively speaking, not Earth. This has always been the case. Yet, some theologians continue to dub physical centeredness a matter of religious concern. Theologian Cynthia Crysdale, for example, worries about the impact on our self-understanding of contact with ETI. "We have faced this dilemma before: Copernicus and Galileo dethroned the human. Darwin made us mere coincidences of evolution. Slowly the human race is discovering that we're not the center of the universe, but that both space and time are so fast that we are mere blips on the screen. This ... won't go down lightly" (Crysdale 2007: 201). To the contrary, it will go down lightly. It already has. New Testament historian N. T. Wright, to cite a contrary example, states as emphatically as euphemistically that "*We are not the center of the universe*. God is not circling around us. We are circling around him" (Wright 2009: 23; italics in original). He adds, "The earth, and we with it, go round the sun of God and his cosmic purpose" (Wright 2009: 24).

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An astrotheologian need not necessarily focus on the ETI question. What is first and foremost is the question of scope: does God's creation deal solely with Planet Earth or does it encompass the entire universe with its 13.7 billion-year history and perhaps 100 billion-year future? With this as a criterion, we might want to dub three contemporary thinkers "astrotheologians" – John Polkinghorne, David Wilkinson, and Robert John Russell. They begin their work with the entire universe, replete with its history and future, as the horizon within which to pursue theological questions (Wilkinson 2010: 52). Each tries to discern the fingerprints of God in the heavens as well as on Earth. Russell argues strenuously for God's providential action at the sub-atomic quantum level and – even though atoms are small, they are everywhere! – divine action applies to Andromeda as it does here. "When we shift to an indeterministic world, a new possibility opens up: One can now speak of objective acts of God that do not require God's miraculous intervention but offer, instead, an account of objective divine action that is completely consistent with science" (Russell 2008: 128). An astrotheologian is a cosmic theologian.

Second, *the astrotheologian should set the parameters within which the ongoing debates over Christology (Person of Christ) and soteriology (Work of Christ) are carried on.* It should be dubbed a mistake to connect the incarnation with geocentrism. The question of multiple incarnations is a reasonable one, but not if the negative answer justifies geocentrism.

Here is a case in point. Despite the fact that the Lutherans at Wittenberg and Nuremberg had been responsible for the publication of Copernicus' *De Revolutionibus*, Reformer Philip Melancthon (1497–1560) argued against the plurality of worlds on Christological grounds. "The Son of God is One; our master Jesus Christ was born, died, and resurrected in this world. Nor does He manifest Himself elsewhere, nor elsewhere has He died or resurrected. Therefore it must not be imagined that there are many worlds, because it must not be imagined that Christ died and was resurrected more often, nor must it be thought that in any other world without the knowledge of the Son of God that men would be restored to eternal life" (Dick 1982: 89). Despite what the first Protestant systematic theologian says here, the existence or non-existence of other inhabited worlds with intelligent creatures is not a Christological question. It is a scientific question. Or, within theology, it is a question about the scope of creation.

The question of multiple incarnations depends in part on whether one thinks of soteriology in terms of revelation or in terms of atonement. If the work of Christ is primarily that of a teacher who reveals the truth about God, then one would tend to embrace multiple incarnations, one for each intelligent species whom God wishes to invite into the divine fellowship. If, on the other hand, one thinks of the work of Christ in terms of atonement – as a work of redemption accomplished on behalf of the entire fallen creation – then a single incarnation would suffice.

John Polkinghorne seems to embrace the first option, Christ as revelatory. Therefore, he needs to affirm species-specific appearances on various planets. "God's creative purposes may well include 'little green men' as well as humans, and if they need redemption we may well think that the Word would take little green flesh just as we believe the Word took our flesh" (Polkinghorne 2004: 176). In contrast, George Coyne opts for the second, for a single work of atonement efficacious for all.

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“How could he be God and leave extraterrestrials in their sin? After all he was good to us. Why should he not be good to them? God chose a very specific way to redeem human beings. He sent his only Son, Jesus ... and Jesus gave up his life so that human beings would be saved from their sin. Did God do this for extraterrestrials? ... There is deeply embedded in Christian theology ... the notion of the universality of God’s redemption and even the notion that all creation, even the inanimate, participates in some way in his redemption” (Coyne 2000: 187). Whether an astrotheologian sides with multiple incarnations or a single one, the key is that God’s redemption is cosmic in scope. Citing the patristic tradition, Keith Ward rightly foresees God’s eschatological future as “the uniting of all things – all galaxies and whatever beings there are in them – in Christ, the creative Word of God” (Ward 2002: 244).

Third, *theologians should analyze and critique astrobiology and related space sciences from within, exposing extra-scientific assumptions and interpreting the larger value of the scientific enterprise*. Although scientists should be respected and honored for what they know and for what they promise, scientific claims should not be given a free pass. Scientific claims should be subjected to critical review by religious thinkers.

The theological critique of science targets two domains: first, mistaken images held within the scientific community of theological matters and, second, assumptions and trajectories that frame the scientific picture itself. Regarding the first, Heidelberg theologian Michael Welker speaks forcefully: “Theology can and must challenge the natural sciences to correct their false perceptions of theological themes and contents” (Welker 2012: 14). Correcting mistaken views of what religious believers actually believe – mistaken by both scientists and theologians in some cases – warrants the theologian’s attention.

In addition, the theologian may on occasion need to enter the internal domain of science with analytical and critical tools. Quite frequently extra-scientific or even ideological commitments slip into scientific frameworks at the level of assumption. Materialism and ontological reductionism, among other isms, are common. Even atheism in many cases. In the field of astrobiology and its sister, SETI, an over-interpreted variant of Darwinian evolution frames and guides the research program. Despite the fact that many of our leading evolutionary biologists decry the presence of a progressive entelechy or directional purpose in evolution, space researchers frequently work on the assumption that life’s genesis is almost inevitable where pre-biotic chemistry is present and, even more suspiciously, that once life gets going it will progress toward increased complexity, toward intelligence, and toward science and technology as we know it. In short, the presumed purpose of the entire history of our natural cosmos is to produce the very persons studying the cosmos, our scientists. This is a disguised form of geocentrism, now transformed into scientist-centrism. Religious intellectuals may wish to point this out from time to time.

A constellation of ideas has converged to produce what we might call the “ETI myth” (Peters 2009). Evangelical James Herrick contends that science fiction influences science proper; and this has led to a myth in the heart of science. He uses the term “Myth of the Extraterrestrials” to refer to “the idea that intelligent extraterrestrials exist and that interaction with them will inaugurate a new era in human existence” (Herrick 2008: 51). Spiritually deprived modern culture is thirsting for superior entities in space who can save our planet, and, according to Herrick, this is

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a poor substitute for the classic God of theism and its genuine promise of redemption. Herrick fears that the ETI myth – replete with the alleged evolutionary promise that we can employ science and technology to achieve our own redemption, and that our more highly evolved ETI neighbors are already where we are going – will replace the Christian faith, not augment it. “This is the Christian church’s challenge today – to reclaim its story and tell it in such a way that it stands out among all the others as authentic, as the Great Story that other stories have often sought to imitate” (Herrick 2008: 252). Or, “The biblical message is that transforming grace rather than an evolving human race is the means of discovering our spiritual destiny. Salvation is the liberating gift, not of benevolent aliens, but of a preexistent, creating and redeeming God” (Herrick 2008: 261).

In sum, astrobiology and sister fields should be celebrated for the fertile science that continues to produce new knowledge about our immense and complex universe. However, this celebration is limited to science that remains science. The theologian should offer a critique when the science drifts toward disguised ideology or substitute religion.

Fourth, *theologians and religious intellectuals should cooperate with leaders of multiple religious traditions and scientists to prepare the public for the eventuality of extraterrestrial contact*. No one can predict with precision exactly what is coming. If the day of extraterrestrial contact arrives, rethinking our terrestrial worldviews should follow. This is likely to be complex, not simple. Albert Harrison observes, “we cannot simply incorporate extraterrestrial ideas without thinking them through, because our systems (supranational, societal, and organismic) have highly interrelated parts, so changes in one arena yield changes in another” (Harrison 1997: 298). Religion is one of those parts, perhaps even foundational for revised worldview construction. Boston University systematic theologian John Hart foresees that “the collaboration of scientists, ethicists, and theologians will enhance both reflection on Contact, and terrestrial–extraterrestrial interaction when Contact occurs” (Hart 2010: 390). Cooperation and collaboration are the watchwords.

Planetary readiness informed by wisdom drawn from Earth’s historic religious traditions is being called for here. Secular or scientific anticipations are not enough. Religious readiness will be helpful to both religious and non-religious sectors alike. For public policy theorists anticipating the impact of contact, it would behoove them to engage theologians. We might “gain insights from theology in the possible nature of extraterrestrials that we might not consider if we focused only on human nature as studied by science,” says SETI’s Douglas Vakoch (Vakoch 2000). It appears clear that today’s astrotheologian earns an honest living.

*See also* Charles Darwin (Chapter 6), Scientific Revolution (Chapter 24), Theology and science (Chapter 59).

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