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The Possibilities and Limitations of Theology of Nature as a Reconciliatory Strategy between Science and Religion

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The relationship between science and religion is largely conceptualized within two particular paradigms. One viewpoint holds that science and religion are mutually exclusive realms with no basis for meaningful interaction, as they are concerned with radically different facets of existence. This position is typified by the cliché that, "science asks 'how?' religion asks 'why?'" Others have seen science and religion as antithetical opposites, arguing that one must be privileged at the expense of the other. The tension between biblical literalists and scientific materialists is particularly illustrative of this position. Yet there are those who see the relationship between science and religion in more reconciliatory terms; they are dissatisfied with the idea that the two can be neatly compartmentalized and separated, or that only one can offer a means of knowing the truth.

It is with the latter group, those who seek a meaningful reconciliation between science and religion, that this paper is concerned. More specifically, I propose to detail what has been called a 'Theology of Nature' as a reconciliatory strategy concerning religion and the natural sciences. Ian Barbour, John Polkinghorne, Arthur Peacocke and Francis Collins elucidate the ideas associated with a 'Theology of Nature' and it is through their works I hope to articulate the areas in which science and religion can (and cannot) find common ground. The interpretation of scientific discoveries, particularly with regards to cosmology, biological evolution, quantum mechanics, and genetics, offers the theologian an opportunity to cast scientific insight into a theological framework. It is in the actual process of conducting scientific investigation that reconciliation with theological perspectives proves troublesome. Specifically, miracles, or special instances of God's interaction with the world that seem to defy natural laws, highlight a seemingly irreconcilable point between theology and the natural sciences.

These ‘Theologians of Nature’ present a distinguished perspective on the science-religion dialogue, as they are all eminent scientists as well as devoutly religious persons. With respect to scientific credentials, Barbour, Polkinghorne, and Peacocke have doctorates in physics, mathematical physics, and biochemistry, respectively, while Collins is an MD with a PhD in physical chemistry. Additionally, they all are members of the Christian religious tradition: Barbour has a degree from Yale Divinity School, Polkinghorne is a former Anglican Priest, Peacocke is a former priest in the Diocese of Oxford, and Collins is a self-described Evangelical Christian. It is important to
acknowledge that these scholars are operating from a specific religious tradition (what could broadly be described as ‘Christian’) and as such they are primarily focused on how Christian theology may be reconciled with modern science. They do not explicitly touch on questions concerning reconciliation under the pretexts of other religious traditions. Such ventures are by all means worthwhile, but for the purposes of the study at hand, the ‘Theology of Nature’ presented by these scholars is acknowledged as stemming from Christian perspectives.

Before going into the intricacies of ‘Theology of Nature’ it is necessary to detail more specifically the scientific and religious contexts that ground this concept. While exhaustive definitions do not exist for either ‘science’ or ‘religion’, I hope here to sketch a broad picture of what will be implied by each term throughout this paper. Two general parameters encapsulate the natural sciences. The first is that the scientist assumes ‘metaphysical naturalism’, or the view that science “can pursue, identify, and entertain only natural causes as plausible explanations of natural phenomena, with the universe as a whole regarded as if it were a closed system of natural causes” (Gregory 505). Secondly, the scientist practices ‘critical-realist empiricism’, the idea that he or she “can examine only what can be observed, investigated, verified, and (in principle) falsified through empirical methods as an extension of human sense perception” (Gregory 505). As such, we see science (in so far as it is a means of gaining knowledge) as an exercise whose participants (i.e. scientists) are concerned exclusively with natural processes and admit of only natural (as opposed to ‘supernatural’) explanations. Additionally, scientific theories are open to constant revision in the light of new data gathered.

Having acknowledged that the above mentioned scholars of ‘Theology of Nature’ operate from a specific religious tradition, I’ll attempt here to set forth a working definition of ‘religion’ that encapsulates the position from which these thinkers are articulating their ideas. Rodney Stark proves especially helpful on this point. He posits that ‘religion’ “consists of explanations of existence based on supernatural assumptions and [includes] statements about the nature of the supernatural and about ultimate meaning” (111). He goes on to further qualify this definition by noting that ‘supernatural’ “refers to forces or entities beyond or outside nature which can suspend, alter, or ignore physical forces” (108). Additionally, he notes that ‘Gods’ are “supernatural ‘beings’ having consciousness or desire” (108). This conceptualization of ‘religion’ touches on two important facets that the Theology of Nature scholars explicitly endorse. The first is the idea that there is a ‘supernatural’ realm that transcends the temporal and physical constraints associated with natural laws. Secondly, these scholars recognize a ‘God’ who is not only ‘supernatural’ but also an agent (‘having consciousness or desire’) who continually interacts with the world and is responsive to humans. In this sense, these scholars are decidedly theistic as opposed to deistic. That is, they do not see God as an entity that set the universe
in motion and then stood back to let the whole process unwind itself. Rather, they understand God as an agent who is creatively and actively engaged with the universe and those beings who inhabit it.

As mentioned in the introduction, these scholars are seeking to go beyond the mindset that science and religion are two entirely distinct domains with no meaningful overlap, or that one must be excluded in favor of the other. The former position is a separate-but-equal type doctrine, commonly referred to as the ‘Independence’ view (Barbour 2000, 17) or the Non-Overlapping Magisteria view (‘NOMA’ ) (Gould 1999). This ‘Independence’ position is partially grounded (at least for the religious adherent) in what has been called the ‘Linguistic-biblical-narrative trend.’ This trend acts as

[A]n approach to theological discourse which insists that whatever Christianity has to say it says on grounds which are unique to itself...Science is 'spoken' in the laboratory: theology is 'spoken' in the church. There neither is, nor needs to be, any communication from one to the other...theological discourse is sui generis (Helfing 20).

That is, the language associated with God can be employed without recourse to any ‘scientific’ language, and further, language relating to God cannot be rendered intelligible through ‘scientific’ discourse. Another manner in which this compartmentalization of science and religion unfolds is via the ‘Existential-pastoral-spirituality trend’ in which “[c]onversion, prayer and liturgical participation...give theology all it needs by way of motivation and subject matter...emphasis thus falls...not on texts but on devotion, not on God as disclosed or meditated but on God as personally immediately present” (Helfing qtd. in Byrne 21). Whereas the first trend establishes theological language as entirely distinct (‘sui generis’) from the language of science, this second trend posits religious experience (independent of text or intellectual pursuit) as being the only necessary element for understanding God. Either way, under both of these ‘Independence’ trends, science is categorized not so much as being antithetical to religion, merely non-consequential.

The same cannot be said when it comes to trends that favor excluding one domain at the expense of the other. Ian Barbour calls this tendency the ‘Conflict’ view and cites the strife between scientific materialists and biblical literalists concerning evolution as particularly demonstrative of this trend. He states, “both [scientific materialists and biblical literalists] claim that science and religion make rival literal statements about the same domain (the history of nature), so a person must choose between them. They agree in saying that a person cannot believe in both evolution and God” (2000, 11). Perhaps this ‘Conflict’ trend, typified by ‘New Atheist’ scholars Richard Dawkins and Daniel Dennett on one side and the American Christian Right’s push to teach Intelligent Design in schools on the other, is the most popular contemporary confrontation concerning science and religion. Yet the ‘Conflict’ trend extends well beyond the realm of biological evolution. Dawkins and Dennett both assert that evolution is only one area in which religious people are fundamentally misguided. Conversely, for a growing
number of people there exists a profound distrust of science, whether it be in relation to evolution, global climate change, or genetic engineering. Whereas the ‘Independence’ trends highlighted above may render a sort of lukewarm truce between science and religion, this latter position actively foments clash and is a particularly salient feature of the contemporary ‘culture wars.’

Many people find these ‘separation’ and ‘conflict’ strategies quite inadequate, and it is on this point that the Theology of Nature scholars have attempted to construct a more harmonious relationship between their theological and scientific outlooks. From a scientific perspective, these scholars see science as an integral, yet limited human activity. From a theological perspective, they see science as a means of coming to know more about God. As such, they seek to meld their scientific and theological insights in order to give a more holistic account of the human experience, both in relation to the natural world and to God.

These scholars tend to reject the ‘Independence’ trends in favor of what they feel is a more holistic view of reality. John Polkinghorne contends that “if reality is generously and adequately construed, then knowledge will be seen to be one; if rationality is generously and adequately construed, then science and theology will be seen as partners in a common quest for understanding” (1998, xiv). Polkinghorne is positing that the ontological make-up of the universe is unitary as opposed to binary. That is, while we may have separate realms investigated by science and theology, these realms when ‘generously and adequately construed’ will be seen in terms of a harmonious whole. Additionally, Polkinghorne is recognizing both science and theology as valid epistemic instruments in our ‘quest for understanding.’ Ian Barbour mirrors this view, stating, “We cannot remain content with science and religion as unrelated languages if they are languages about the same world. If we seek a coherent interpretation of all experience, we cannot avoid the search for a more unified worldview” (2000, 22 emphasis added). This idea of a ‘more unified worldview’ runs contrary to the idea that science and religion are completely unrelated realms which cannot have any meaningful overlap. Indeed these scholars strongly contend that if we are to make full sense of our position as embodied beings within the natural world of God’s creation, we must utilize both scientific and theological perspectives.

The ‘Conflict’ position, in which either science or religion is seen as the exclusive means of knowledge and truth is rejected by these scholars because they feel both sides present a distorted picture of science and its relation to religion. Thinkers such as Dawkins and Dennett are seen as giving science too wide of a scope. In The God Delusion, Dawkins suggests that “the existence of God is a scientific hypothesis like any other...God’s existence or non-existence is a scientific fact about the universe, discoverable in principle if not in practice” (73). While the ‘Theology of Nature’ scholars may have a deep respect for science, ‘scientific’ claims such as these are seen as overstepping important boundaries. David S. Gregory contends,
Perhaps God is metaphysically transcendent [i.e. He doesn't exist in spatial/temporal dimensions or is inconceivable in spatial/temporal categories.]... It would then be a mistake born of dubious metaphysical assumptions to expect or demand that God be rendered conceptually, linguistically, or scientifically accessible (503, 505).

Given that the ‘Theology of Nature’ scholars see God as supernatural (‘metaphysically transcendent’) they don’t expect that the natural sciences could either prove or disprove his existence.

Questions concerning the existence or non-existence of God are not the only ones these scholars see as being beyond the scope of scientific enterprise. Polkinghorne states, “Science is unable itself to offer any reason why natural laws take the particular form that they do, or why we can discover them through mathematical insight” (1998, 11). Thus while Polkinghorne has full trust in the scientific process as a means of discovering truth about the natural world, he doesn’t see science as being able to account for the fact that such ‘truths’ happened to have taken the particular forms they did. He sees the natural sciences as a means of discovering the intelligibility of the natural world, but for Polkinghorne it’s not the intelligibility of mathematics or physics, but “intelligibility itself that, apart from God, is incomplete, an unexplained brute fact” (Helfing 26-27). As such, scientists can uncover intelligibility, but cannot use science to explain that the universe is intelligible in the first place. Just as Polkinghorne doesn’t think science can account for the existence of intelligibility, neither does Peacocke feel it can adequately inform the moral sphere. He quotes Mary Hesse as stating that scientific knowledge “does not yield truth about the essential nature of things, the significance of its own place in the universe, or how it should conduct its life” (2004, 19). Hence, with respect to the ‘Conflict’ trend, these ‘Theologians of Nature’ see scientific materialists as overstepping boundaries when trying to explain questions concerning the existence of God, intelligibility, or moral and ethical responsibility in entirely material/natural terms.

Conversely, they see biblical literalists as taking an unnecessarily closed-minded approach to scientific inquiry and discovery. Arthur Peacocke not only feels this position is a disservice to science, but to religious understanding as well. He states that the ‘deep’ questions of theology “cannot be asked at all without directing them to the world as we best know and understand it, that is, through the sciences” (2004, 47). He is essentially contending that if God created the world, and we ignore our most effective means of understanding the world (science), then we are closing off a door to a greater understanding of God. Perhaps Francis Collins sums up the situation most succinctly: “Science is the only legitimate way to investigate the natural world... [But] Science is not the only way of knowing. The spiritual worldview provides another way of finding truth” (208). As such, these thinkers seek to transcend any ideology that strictly separates scientific and religious inquiry, as well as any position that gives science
an overblown, or underappreciated, role in understanding the world.

A Theology of Nature is the general strategy adopted by these scholars in their attempt to overcome the ‘Independence’ and ‘Conflict’ trends and build a more fluid relation between religion and the natural sciences. In detailing more specifically what a ‘Theology of Nature’ entails, it is helpful to distinguish it from ‘Natural Theology.’ Natural Theology is a line of thought which contends “that the existence of God can be inferred from (or is supported by) the evidence of design in nature, of which science has made us more aware” (Barbour 2000, 17). Generally speaking, ‘Natural Theology’ is an umbrella term for ‘arguments from design.’ As John Polkinghorne explains, Natural Theology rests on the idea that “physical fabric is endowed with transparent, rational beauty” (1998, 1 emphasis added). The term ‘endowed’ implies that an agent created the universe in such a manner that it is orderly and rational. The Intelligent Design movement, which contends that organisms are so complex and perfect that they must have been created by a higher intelligence, highlights the thinking that underwrites Natural Theology. Ultimately, Natural Theology differs from ‘Revealed Theology’ in so far as it posits that the existence of God can be deduced from observations of the natural world, independent of any sort of divine revelation (Peacocke 2001, 33). While the Theology of Nature scholars do not deny that the apparent ordering and intelligibility of the universe suggests a divine creator, they espouse a much more nuanced understanding of God’s relation to the created order.

In contrast to the ‘Independence’ and ‘Conflict’ trends previously highlighted, Barbour posits an ‘Integration’ trend, and it is on this idea of integration and reconciliation that the Theology of Nature rests. Barbour explains that under Theology of Nature, the theologian starts “from a particular religious tradition and argue[s] that many of its beliefs are compatible with modern science but some beliefs should be reformulated in the light of specific scientific theories” (2002, 1). Whereas the Natural Theologian starts from a scientific investigation of the world and subsequently deduces God’s existence based on the ‘rational beauty’ of the observations, the Theologian of Nature embarks from a specific religious tradition (Christianity in the present case) and seeks to cast (or re-cast) his or her theological understandings in a manner consistent with what has been uncovered about the natural world via science. There is a degree of reflexivity and openness to this theology, and it is through this adaptive mindset that these scholars hope to narrow the gap between scientific discovery and theological insight. Arthur Peacocke explains that for religious persons,

[T]he terms which describe the reality to which they are committed are not, should not, in my view, be regarded as fixed and irreversible...Such believers should always be ready to expand their terms, to take in new meanings and to enrich their imaginative resources as their consciousness and experience changes and enlarges (not least with the growth of the natural sciences themselves) (2004, 22).
As such, these ‘Theologians of Nature’ recognize a reciprocal link between science and religion. Instead of being mutually exclusive or in opposition, they see one as informing the other. Not only do ‘Theologians of Nature’ view the natural sciences as a means of uncovering the nature of the world created by God, but also they see the evidence uncovered as offering insights into the character and mind of the divine.

Under the umbrella term of ‘Theology of Nature’ these four scholars highlight methodological stances which inform their relating of scientific discovery to theology. John Polkinghorne endorses a ‘Critical Realist’ approach. Regarding Critical Realism, he explains:

The noun expresses the conviction that the scientists are indeed exploring a physical world whose nature ‘out there’ is independent of human social construction…while the adjective acknowledges that physical reality is often partly veiled and obliquely encountered (contra the expectation of simple objectivity that was entertained by the thinkers of the enlightenment)” (2009, 25).

The ‘realist’ assertion of this strategy is vital to Polkinghorne because he contends that the physical world is indeed created by God and not a figment of our imagination. As a scientist, however, he is acutely aware that our encounter with the physical world is understood through approximation and interpretation: “Our attainment of knowledge is verisimilitude, not absolute truth. Our method is creative interpretation of experience, not rigorous deduction from it” (1998, 104). Ian Barbour mirrors this understanding, stating that Critical Realism “preserves the scientists’ realistic intent while recognizing that models and theories are imaginative human constructs. [Yet these models] make tentative ontological claims that there are entities in the world something like those postulated in the models” (1990, 43). As such, these thinkers contend that God has given an objective truth to the natural world, even if our intellectual models only give us an approximate means of understanding such truth.

While neither Arthur Peacocke nor Francis Collins explicitly acknowledge Critical Realism, the same basic tenet underlies their understanding of the physical world. Additionally, Peacocke employs what he refers to as the ‘Inference to the Best Explanation’ (IBE) model. With respect to the IBE model, Peacocke inquires, “If X were true, then would it not cover appropriately the range of experiences or experiment I am trying to explain?” (2001, 27) Essentially, this model asks that we make a certain postulate (X) and then see if that hypothesis makes observed experience more intelligible and coherent. Unsurprisingly, Peacocke asserts: “The best explanation to be inferred from the very existence of the world …is that the whole process, with all its emerging entities, is grounded in some other reality which is the source of its actual existence” (2001, 39). Namely, he contends that the existence of God grounds the most intelligible interpretation of our experience. From this IBE model Peacocke constructs an equation that more or less encapsulates the enterprise of Theology of Nature:
IBE: S + CRE→ RT

Where:

S = the realities of the world and humanity discovered by the Sciences

CRE = the Jewish and Christian communal inheritance of claimed Classical Revelatory Experience

RT = Revised Theology


This equation proposes that an amalgamation of what has been discovered via the natural sciences and what has been understood through ‘classical revelatory experience’ should inform a ‘revised theology’ or a Theology of Nature. Francis Collins endorses this amalgamation with his ‘BioLogos’ concept, in which Bio refers to ‘bios’ (the Greek word for ‘life’) and Logos alludes to the Greek rendering of ‘Word’. He explains, “To many believers, the Word is synonymous with God... ‘BioLogos’ expresses the belief that God is the source of all life and that life expresses the will of God” (203). Collins too is proposing a synthesis of ‘S’ (what we know about life on earth, or ‘bios’) and ‘CRE’ (the revealed word of God, ‘logos’). As such, Critical Realism, the IBE model, and BioLogos underlie the basic tenet of Theology of Nature, namely that scientific reasoning and insight lend themselves to a fuller understanding of both the natural world and God.

As previously noted, Barbour posits that Theology of Nature hinges on the idea that ‘some beliefs should be reformulated in the light of specific scientific theories.’ By focusing on four specific scientific domains (cosmology, biological evolution, quantum physics, and genetics), we can begin to see how these scholars adapt their theological positions in light of scientific evidence and what they contend such scientific discoveries tell us about the nature of God.

With respect to cosmology, or the creation of the universe, these Theologians of Nature unanimously accept the Big Bang theory. That being said, Francis Collins contends, “The Big Bang cries out for a divine explanation. It forces the conclusion that nature had a defined beginning. I cannot see how nature could have created itself. Only a supernatural force that is outside of space and time could have done that” (67). Within this statement we can see several key theological underpinnings. The first is that the universe had a defined beginning. This implies that there was an epoch before the universe, presumably only inhabited by a supernatural force. Additionally, this statement posits that the creation of the universe was contingent, not necessary. As such, the universe is not sui generis and therefore must be dependent upon some type of creative agent. While these scholars argue that the Big Bang theory is consistent with a divine, creative agency, they accordingly acknowledge that the six-day creation story presented in Genesis cannot be read literally. To this end, Arthur Peacocke goes so far as to offer a reformulation of the first book of the Bible in what he calls Genesis for the third millennium:

There was God. And God was All-That-Was. God’s Love overflowed and God said, ‘Let Other be. And let it have the capacity to become what it might be, making it make itself—and let it explore its potentials.’
And there was Other in God, a field of energy, vibrating energy—but no matter, space, time or form. Obeying its given laws and with one intensely hot surge of energy—a hot big bang—this Other exploded as the Universe from a point twelve or so billion years ago in our time, thereby making space.

Vibrating fundamental particles appeared, expanded and expanded, and cooled into clouds of gas, bathed in radiant light. Still the universe went on expanding and condensing into swirling whirlpools of matter and light—a billion galaxies (2001, 1).

This rendering of Genesis, with its smattering of scientific terms, is meant to re-construct the Biblical creation narrative in a manner consistent with current cosmological understandings. It is explicit in acknowledging that the universe gradually took its shape over an evolutionary period of ‘twelve or so billion years.’ This idea that the universe evolved to take its present form, and wasn’t created in a fixed, static manner, will present itself later as a direct analogue with respect to the biological evolution of life on earth.

Specific facets of Peacocke’s new narrative such as ‘matter, space, time or form’, ‘given laws’ and ‘expanding and condensing’ are all referenced in the ‘Anthropic Principle.’ In its ‘weak’ form, the Anthropic Principle states, “Our location in the universe is necessarily privileged to the extent of being compatible with our existence as observers” (Barrow 2). This position rests on the idea that our ability to even observe the universe is exceedingly rare, and thus to some extent ‘privileged.’ In its ‘strong’ form, the Anthropic Principle suggests, “The Universe must have those properties which allow life to develop within it at some stages in its history” (Barrow 21). The teleological implications of the ‘strong’ Anthropic Principle are explicit, as it contends that the universe must permit the emergence of life. Whether in its ‘weak’ or ‘strong’ form, the Anthropic Principle rests on discoveries made by modern scientists concerning the apparent ‘fine-tuning’ of the universe. Recent insights suggest that if the physical constants of the universe had been even slightly different, the universe as a whole would be radically different. ‘Matter, space, time or form’ as well as the ‘given laws’ could have been completely unrecognizable or even non-existent. Referencing John Polkinghorne, Alvin Plantiga explains,

We know that there has to have been a very close balance between the competing effect of explosive expansion and gravitational contraction which, at the very earliest epoch about which we can even pretend to speak (called the Planck time, 10⁻⁴³ sec. after the big bang), would have corresponded to the incredible degree of accuracy represented by a deviation in their ratio from unity by only one part in 10 to the sixtieth (1).

Because the degree of accuracy had to be so exact in the initial stages of the Big Bang in order for the universe to take its present form, the Theologians of Nature contend that this strongly suggests the presence of an intelligent creative agency. Accordingly, had the initial conditions of the universe been ever so slightly different, life as we currently know it would most likely not have emerged. And it is to the emergence and development of life that we now turn.

Just as the universe came into being over a long, evolutionary process, the Theologians of Nature recognize that
life on earth followed a similar evolutionary path. Through biological evolution, Peacocke identifies “God as ‘exploring’ and ‘composing’ through a continuous, open-ended process of emergence” (2004, 209). The process is ‘open-ended’ in so far as it reflects Peacocke’s revised Genesis notion of God saying, ‘Let Other be. And let it have the capacity to become what it might be, making it make itself—and let it explore its potentialities’ in which the ‘Other’ is creation, and as an expression of its free-will, it is allowed to ‘make itself.’ Via biological evolution, God is seen as ‘exploring’ or “unfolding fugally all the variations and combinations inherently possible for and derivable from the tune he originally called” (2004, 210). Francis Collins mirrors this understanding, and puts forth a six-part formula coined ‘Theistic Evolution.’ This formula starts from the basic premise that God is the impetus for everything, but states at step:

4. Once evolution got under way, no special supernatural intervention was required. 5. Humans are part of this process, sharing a common ancestor with great apes. 6. But humans are also unique in ways that defy evolutionary explanation and point to our spiritual nature. This includes the existence of the Moral Law (the knowledge of right and wrong) and the search for God that characterizes all human cultures throughout history (200).

Collins conceptualizes the evolutionary process in deistic terms. He sees God as setting the process in motion, but in such a manner that He wouldn’t have to intervene substantially to alter it. While God may interact with the products of the process, the process in and of itself is allowed to direct its own course within a set of God-given parameters. Collins’ idea that humans are ‘unique’ reflects what Peacocke earlier characterizes as ‘emergence.’ Emergence is the idea that at higher levels of complexity, entities take on novel forms that prevent them from being exhaustively described through concepts pertaining to lower levels of complexity. Thus a book can’t be meaningfully understood just in terms of its atoms, nor can a society be understood solely in terms of the individual. The idea of ‘emergence’ is adopted by the Theology of Nature scholars as a stance against materialist reductionism. They argue that humans have ‘emergent’ capacities (namely spiritual qualities) that have evolved over time and defy explanation in exclusively material terms. Aside from the idea of spiritual ‘emergence’, the theistic and materialistic concepts of evolution differ with respect to agency. Daniel Dennett explains,

Blind, directionless evolutionary processes ‘discover’ designs that work. They work because they have various features, and these features can be described and evaluated in retrospect as if they were the intended brainchildren of intelligent designers who had worked out the rationale for the design in advance (59).

A theistic interpretation of evolution doesn’t recognize it as ‘blind’ and ‘directionless’ but contends that evolution is the tool of an agent (God) who means to actualize a certain desire and purpose. Not only do Theologians of Nature look to the natural sciences a means of understanding the world, but they also acknowledge that scientific discoveries can tell us something about the nature of God. What does it say
about God that He chose to produce the universe and life through an evolutionary process as opposed to creating them in an already-made, static form? John Polkinghorne contends that we must understand God in 'kenotic' terms. Kenosis refers to the idea of self-limitation; God is kenotic is so far as "that by bringing the world into existence God has self-limited divine power by allowing the other to truly be itself" (Polkinghorne 1998, 13). In order for the other to 'truly be itself' God self-limited his omniscience (specifically his knowledge of the future) so as to allow creaturely free-will. He also limited his omnipotence to the extent that He gives his creation a certain degree of autonomous power to create itself and exercise its free-will. In this sense, God is decidedly non-interventionist with respect to the evolutionary process. Biological evolution is the means by which creatures are allowed to 'make themselves' and in order to allow this process to be fruitful, God chose to stand back, or embrace a kenotic ethic.

Concerning theodicy, Ian Barbour rejects the idea of kenosis, and it is on this point that we can see a theological variance between him and other Theologians of Nature. He claims, “If behind God’s kenotic actions there was an omnipotent God who refrained from rescuing the victims of pain and suffering, the problem of theodicy would still be acute” (2002, 107). Thus he rejects the idea of a God who chooses to stand back, as this choice opens the door for suffering. Instead, Barbour embraces process theology, derived from Alfred North Whitehead’s process thought. The idea of “process thought suggests that the limitations of divine power are the product of metaphysical necessity rather than voluntary self-limitation” (2002, 107). Process thought holds that events, not objects, are the fundamental constituents of reality. This temporal focus on events suggests that God didn’t choose to stand back and not know the future, but rather that the future is intrinsically yet to be known. Accordingly, “In process thought, god provides initial aims relevant to particular occasions, so very specific divine initiatives are possible though always in cooperation with finite beings in the world” (2002, 118). Thus how events will actually unfold is unknown by God, but there is a cooperative relationship between God and his creation in how those events will be actualized. While there is a nuanced variance concerning the role of kenosis, the Theologians of Nature all contend that the evolutionary process represents some limiting of God’s omnipotence, as it is through evolution that creation (whether the universe, or life more specifically) was able to ‘make itself.’ That being said, they do not see the evolutionary process as entirely ‘blind.’ The Theologians of Nature maintain that creatures with some sort of ‘God-consciousness’ would eventually arise via the evolutionary process. As such, God isn’t entirely hands-off in the evolutionary process, as He set the parameters and conditions by which creation would ‘make itself.’

With respect to humanity, this notion of ‘making oneself’ correlates heavily with the idea of free will. For the Theologians of Nature, insights into quantum mechanics provide glimpses of
the relation between human free will and God’s providential action within the world. The rise of quantum mechanics ushered in a paradigm shift in which the mechanistic notions espoused in Newtonian mechanics underwent substantial revision. At the sub-atomic level, quantum events cannot be ‘predicted’, but can only be thought of in terms of probability. The Heisenberg uncertainty principle states that an electron’s position and momentum cannot be known simultaneously, whereas on the macro-scale (the realm of Newtonian mechanics) both an object’s position and momentum can be calculated accurately. The Heisenberg uncertainty principle posits that our inability to know both position and momentum isn’t due to limited observational capacity, but is rather reflective of the intrinsic uncertainty associated with quantum events.

Regarding the intrinsic uncertainty at the quantum level, Polkinghorne states that “epistemological uncertainties become an ontological openness, permitting us to suppose that a new causal principle may play a role in bringing about future developments” (1998, 60). Polkinghorne thus sees the quantum level as a possible causal nexus between God and the world, or the region through which God injects influence. He goes on to explain that “as embodied beings, humans may be expected to act both energetically and informationally. As pure Spirit, God might be expected to act solely through information input.” He further identifies ‘information’ as “influence that brings about the formation of a structured pattern of future dynamical behavior... [Or] influence by directional preferences but not by the transfer of energy” (1998, 63). The ontological openness (i.e. unpredictability) at the quantum level correlates with free will because it defies any sense of determinism. Concerning God’s providential interaction with the world, Polkinghorne implies that God inputs ‘active information’ (that is, His ‘influence’) at the quantum level, but doesn’t dictate the quantum event, just creates a ‘Portfolio of Possibility’, or a narrowed-down range of possible events (1998, 72). This way, God can input information at the quantum level, but does so in a way that doesn’t determine the quantum event, just influences it in a certain way. Barbour explains that, “most quantum events occur by chance, but God influences some of them without violating the statistical laws of quantum physics” (2002, 27). It is then suggested that God’s influence at the quantum level can somehow manifest itself as action on the macro-level, although the causal relation between the micro and macro level remains quite unclear.

The idea that God interacts with the world via the input of ‘active information’ at the quantum level is highly controversial and only vaguely understood at best. Regardless of its actual validity as a causal nexus, quantum indeterminacy nonetheless highlights two prominent facets of Theology of Nature. The first is that it lays out a manner by which God could interact with the world without abrogating the natural laws He supposedly ordained in the first place. Arthur Peacocke rejects the notion that God acts at the quantum level, favoring the idea that God effects the entirety of
world systems, or the ‘System-of-systems’:

If God interacts with the world-system as a totality, then God, by affecting its overall state, could be envisaged as being able to exercise influence upon events in the myriad sublevels of existence of which it is made without abrogating the laws and regularities that specifically apply to them” (2001, 109).

Thus while Peacocke and Polkinghorne disagree about the actual system God uses to insert influence, they nonetheless hold to the central idea that his interaction with the world is conducted via the natural processes that are already in place and isn't dependent on a 'supernatural' usurpation of natural laws.

The second facet of Theology of Nature highlighted by quantum indeterminacy is that the scientific mode of thinking, while useful, doesn't give an exhaustive account of reality. Polkinghorne states that:

If quantum physics requires its idiosyncratic quantum logic, Trinitarian theology may very well require its own kind of logic also. If the quantum world cannot be known with a Newtonian clarity that assumes precise knowledge of both position and momentum, then maybe the assertions of apophatic theology—that there is an element of irreducible mystery involved in encounter with the infinite reality of God, beyond any finite human ability to articulate—should also be accorded appropriate respect (2009, 26).

Thus Polkinghorne sets up quantum indeterminacy as a challenge to ‘logical’ reductionist science and thus leaves the door open for a wide range of interpretation, especially concerning encounters with the divine. The ‘mystery’ associated with quantum indeterminacy speaks to the overall ineffable facets of God.

While theological discussions about quantum physics may seem rather divorced from everyday life, the same cannot as easily be said when those discussions turn to DNA and genetics. With President Obama's appointment of Francis Collins (an evangelical Christian who gained worldwide notoriety as the leader of the international Human Genome Project) as director of the National Institutes of Health, the relation between science and religion, especially concerning genetics, has been put in the forefront. At the White House ceremony in 2000 in which President Clinton announced that the human genome had been mapped in its entirety, Collins remarked, “It's a happy day for the world. It is humbling for me, and awe-inspiring, to realize that we have caught the first glimpse of our own instruction book, previously known only to God” (Collins 3). Collins's statement typifies a trend termed ‘God Talk’ in which biologists “are using spiritual constructs and religious rhetoric to describe their work and to convey its significance” (Nelkin 139). As biological science expands our knowledge about cloning and genetic engineering, growing ethical dilemmas are poised to cause tension, especially from people concerned that biologists are manipulating fundamental aspects of humanity. More specifically, many religious peoples feel that scientists are in a sense ‘playing God’ and entering territory humans were not meant to traverse.

‘God Talk’ is employed as a means of allaying these fears, and hinges on one of the central tenets of Theology.
of Nature, namely that through science we can come to know more about ourselves and God. Accordingly, under the ‘God Talk’ trend, “DNA is not just a biological entity in the rhetoric of science; it is a so-called sacred text, the core of essential humanity, or the master code...DNA, as it appears in God talk, has also become a sacred entity that holds the key to the essence of personhood” (Nelkin 140). To what extent the mixing of religious rhetoric with genetic science will ease concerns remains unclear. Yet it nonetheless represents an effort to cast scientific findings in a way that leaves room for a creator-God. Just as evolution came to be understood as the means God chose to develop life, so too is DNA portrayed as the mechanism through which God enables life to replicate and persist.

Cosmology, biological evolution, quantum mechanics, and genetics, offer insights into a reconciliatory strategy that seeks to ‘bridge the gap’, so to speak, between science and religion by melding scientific discoveries into a theological superstructure. That is, under the Theology of Nature, what is discovered via the scientific process is creatively interpreted so as to maintain coherency with respect to a supernatural agency. The notion of interpreting scientific discoveries and theories within a theological framework underwrites much of this reconciliatory process, and as Michael Buckley explains, “Concepts such as field of energy, vector, organism, evolution or (even) the second law of thermodynamics can and do pass analogous and heuristic structures into theology” (Byrne 12). However, scientific discoveries, theories, and concepts only constitute a portion of what falls under the umbrella term ‘science.’ While not easily definable, the ‘scientific method’, or the process of conducting science, presents new reconciliatory challenges and appears to offer less room for compromise with theological insights and presuppositions. Thus, in separating scientific discoveries from scientific method we can more clearly see the non-reconcilable facets between science and religion.

At this point, perhaps it would be helpful to re-examine the tentative definition of ‘science’ offered earlier. The first parameter of this definition posits that, for the sake of hypothesizing, researching, and conducting experiments, the scientist assumes ‘metaphysical naturalism’, of the view that the entirety of the universe is a closed system of only natural processes. This view, which admits exclusively of natural phenomena, is decidedly atheistic because it brackets out the ‘supernatural’ agency explicitly acknowledged under Theology of Nature. However, David Gregory posits that one must not be an atheist to be a scientist: “In contrast to atheists, scientists qua scientists do not believe in metaphysical naturalism—they accept it as a necessary prerequisite for doing science, whether or not they believe it is true” (506). This differentiation between accepting metaphysical naturalism as a ‘necessary prerequisite’ and believing it to be true still allows one to a posteriori cast scientific discoveries in a theological context, but it nonetheless demonstrates that the process of coming to those discoveries (via hypothesizing, researching, and experimenting) is
necessarily done without reference to any supernatural presuppositions.

The second parameter in our definition of ‘science’ contends that the scientist “can examine only what can be observed, investigated, verified, and (in principle) falsified through empirical methods as an extension of human sense perception.” The Theologians of Nature specifically recognize a facet of ‘human sense perception’ that is vital to their lives as religious persons, namely that of human experience with the divine. Polkinghorne argues that a “university that does not have a faculty of theology is incomplete since it fails to engage with the widely attested human experience of encounters with the sacred dimensions of reality” (2009, 30). However, this ‘human sense perception’ of the divine does not find a direct analogue in the scientific realm because it does not lend itself to empirical testing nor is it falsifiable. A scientist would be hard pressed to devise an experiment in which a control subject was made to have a divine encounter. Additionally, there is no way to account for or control a supernatural agency within scientific experimentation. Cosmologist Lawrence M. Krauss quips, “One cannot proceed with the process of scientific discovery if one assumes a ‘god, angel, or devil’ will interfere with one’s experiments” (WSJ 2). Thus two central tenets for the Theologians of Nature, namely the importance divine experience, and that this ‘divine’ possesses supernatural agency, appear irreconcilable with a scientific process that presupposes metaphysical naturalism.

Under Theology of Nature, it is supposed that God can intervene ‘miraculously’ within the created order to precipitate a specific event. It is with respect to miracles that we find a particularly poignant non-alignment between naturalistic and theistic perspectives. Francis Collins states, “If, like me, you admit that there might exist something or someone outside of nature, then there is no logical reason why that force could not on rare occasions stage an invasion. On the other hand, in order for the world to avoid descending into chaos, miracles must be very uncommon” (53). Collins recognizes that the regularity of natural laws is essential, for if they were continually abrogated the life-giving patterns which allowed for biological development would have been irreparably disrupted. Furthermore, a key reason why the world can be rendered intelligible via the natural sciences is precisely because of regularities within nature. That being said, miracles are given a sort of protection against the prying jaws of natural science: “It simply does not and cannot follow from the overwhelming regular course of natural processes that exceptions cannot occur. It cannot be said more plainly: science does not and cannot demonstrate that miracles are impossible” (Gregory 511). Because the scientific method cannot be used to prove or disprove God, the same logic is applied to miracles. However, under the auspices of a scientific method that presupposes metaphysical naturalism, anomalous events within nature cannot be attributed supernatural status just because they defy a full explanation in solely natural terms. It does not appear possible for the natural sciences to admit of a supernatural
agency that can arbitrarily usurp the system of natural regularities.

Philosopher Alvin Plantiga takes issue with the notion that a scientist must assume ‘metaphysical naturalism’, and argues that adopting metaphysical naturalism will from the outset “produce theories incompatible with theistic religion” (1). If one adopts the idea that the universe is a closed system of natural causes, the data rendered will be interpreted with the same naturalistic assumptions. Arguing from a theistic perspective, Plantiga asks us to

Consider the truth that human beings have been created in the image of God, but have also fallen into sin. This dual truth might be very useful in giving psychological explanations of various phenomena. If it is, why should a Christian psychologist not employ it? Why would the result not be science? (van der Meer 200).

Essentially, Plantiga is asking why metaphysical naturalism must be the default scientific mode of operation. Robert Klee offers a retort, stating:

The earliest form of inquiry that crudely resembles science began when serious inquirers ceased being satisfied with culturally approved supernatural explanations of events in the natural world. Those inquirers sought naturalistic explanations of things in terms of processes and entities unrelated to the workings of arbitrary deities or mystical forces (1).

As such, the scientific method focuses exclusively on non-agential, natural processes (as opposed to supernatural agencies) which lend themselves to controlled observation, prediction, verification and falsification. These four facets do not find direct analogues with respect to theological thought, because this endeavor a priori posits a non-falsifiable hypothesis (God exists) that cannot be empirically observed or tested. Furthermore, this hypothesis admits of an agency which transcends and can disrupt natural laws, and thus defies the parameters of natural observation. While the Theologians of Nature seek to understand how scientific discoveries relate to the presence of a supernatural agent, it nonetheless appears that such a supernatural agent must be excluded from the actual process of conducting scientific investigation.

Concerning the scientific method, the ‘Independence’ trend, or the idea that ‘scientific’ and ‘religious’ perspectives must be bracketed, has a strong bearing. It is when the individual moves beyond the process of science, into the more holistic sphere of making sense of the entirety of his or her experience as a human, that the freedom to incorporate or further separate scientific discoveries and theistic perspectives truly lies. I use the term ‘freedom’ intentionally because it speaks to the fact there is a degree of human choice that lies in constructing and/or adopting a certain metaphysic, whether is theistic, naturalistic, or something completely different. As John Brooke explains, “When the cultural and metaphysical implications—whether sacred or secular—of a scientific achievement are assessed, there will be a plurality of competing views of greater or lesser plausibility, but never reducible to one alone” (282). Humanity has exponentially increased its understanding of the world in the relatively short time modern science has been employed. Yet what is discovered via the scientific process is never self-evident. That is, discoveries do not come
with metaphysical implications etched into them. It is up to the individual to decide the over-arching meaning of a scientific discovery. Regarding the biological development of life, “[t]he claim that evolution demonstrates that human beings and other living creatures have not, contrary to appearances, been designed, is not part of or a consequence of the scientific theory, but a metaphysical or theological add-on” (Plantiga 1). It is in this process of ‘adding-on’, of creating and applying metaphysical significance to insights of the natural world that the scientist and the theologian are most free to establish common ground.

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