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Editors' Note

The articles in this special issue have been developed from papers presented at the 2005 Highlands Institute for American Religious and Philosophical Thought Conference on Science and Religion, in Highlands, North Carolina. The conference, chaired by Robert Neville, featured three plenary speakers well-known to the science and religion dialogue—Nancy Howell, Wentzel van Huyssteen, and Wesley Wildman. Thirty other scholars presented original research on a wide variety of topics, including evolutionary theory, religion and science in naturalistic, panentheistic, and postmodern theologies, teaching religion and science, and the interplay of these two disciplines in the works of individual authors. We regret that it was not possible to publish more of these exceptional papers.

Comparative Natural Theology

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Introduction

This paper argues that there can be traction between an ontology of nature,[1] on the one hand, and a metaphysics of ultimacy,[2] on the other. This is contrary to traditional natural theology, which aims at direct entailment from an ontology of nature to a theory of ultimacy.[3] It

[1] For the purposes of this paper, "ontology of nature" could be called "philosophical cosmology"; in both cases the point is to establish basic categories for understanding all of nature and its operations. I use the former phrase here to avoid confusing "philosophical cosmology" with "scientific or physical cosmology." Moreover, "ontology" focuses on the character of what exists, which is hospitable to natural theology's inquiry into the ontological character of ultimacy.

[2] I use "ultimacy" rather than "ultimate reality" or "God" in deference to the results of the Comparative Religious Ideas Project. See Robert Cummings Neville, ed., *The Human Condition* (vol. 1), *Ultimate Realities* (vol. 2), and *Religious Truth* (vol. 3) (Albany, NY: SUNY, 2001). That project sought to identify through a rigorous process of comparison and analysis which categories work best to describe what is important about the ideas of world religious traditions, minimizing distortion and arbitrariness. One of the conclusions of the project, though for practical reasons not reflected in the title of the second volume, is that the term "ultimate realities," while more generous and more useful than the singular term "ultimate reality" and the much used term "God," is nevertheless biased against religious traditions that focus on the discovery and living out of ultimate ways or paths and on freeing people from an unhealthy obsession with ultimate realities. A vaguer category encompassing both "ultimate realities" and "ultimate paths" is preferable—thus "ultimacy." My interest here is in metaphysical theories of ultimacy, of course, and this leans heavily toward "ultimate realities," and yet I will persist in using the term "ultimacy" as a reminder of the complex diversity of religious thought in this area. The abstract retains "ultimate reality" for the sake of broader understanding. Elsewhere, I use "ultimate realities" rarely, and always as a specification of "ultimacy" that self-consciously subordinates "ultimate ways."

[3] Natural theology is the subject of many definitions. For the sake of this essay, I take it to be the rational attempt to derive information about ultimacy (God, in some traditions) from philosophical interpretations of nature. Several comments are in order here. First, treating philosophical interpretations of nature as the starting point for inference serves to frame natural theology as an act of interpretation and thereby rejects the possibility that inference can ever be simply "from nature." Even most scientific theorizing about nature is too constrained to be the basis for natural-theology inference; philosophical mediation is necessary for inquiry at the junction of nature and ultimacy metaphysics to be theologically significant. Second, some definitions of natural theology contrast it

is also contrary to detractors of natural theology who assert that no rational knowledge of ultimacy is possible based on any amount of analysis of the natural world. Traction between ontology of nature and ultimacy metaphysics is thus neither extremely strong nor entirely absent, but rather such as to have the limited effect of making some views of ultimacy less plausible and others more plausible.

There are four reasons for judging the argumentative force of natural theological arguments in this way. First, there are many uncertainties about any ontology of nature. They are complex intellectual creations in their own right, dependent on synthesizing a great deal of scientific theorizing about nature and discovering principles by which to make sense of such rational structures of nature as exist. This is made difficult by the sheer enormity of the task but also by the fact that the natural sciences constitute a kind of uneven and sometimes *ad hoc* patchwork of theories about nature rather than a seamless garment of rational comprehensiveness.

Second, there are always questions about the completeness of the set of ultimacy hypotheses that might have a claim in any natural theology argument. While we can run a natural theology argument through its paces and notice how some ultimacy theories fare better than others in the process, we are never certain that another ultimacy

with revealed theology. This works in theological traditions for which informative revelation is possible and the distinction of revelation from natural processes is plausible. Some theological traditions reject one of these conditions. I reject both. I think information of any kind is unintelligible apart from nature and also that all knowledge is revealed as well as natural. I cannot elaborate this "ground of being" understanding of revelation here but its very possibility calls into question the advisability of defining natural theology by means of a contrast with revealed theology. Third, some have included in the domain of natural theology rational arguments for the existence of God that make no explicit reference whatsoever to nature. The basis for this appears to be that such arguments leverage the power of "natural reason" unaided by revelation, a usage indebted to the understanding (just discussed) of natural theology contrasted to revealed theology. In this context I take "natural" in "natural theology" to refer to the natural world and "natural reason" to be synonymous with "reason." How does this definition of natural theology relate to, say, the ontological argument of Saint Anselm or Leibniz? It is mostly insignificant for natural theology, though not because it is impossible or because reason is in any sense not a part of nature but just because it lies outside the scope of reflection on the natural world. Of course, in a minor way it remains significant for natural theology as a phenomenon of nature that needs to be explained. But as a logical argument it belongs not to natural theology but to metaphysics.

theory not currently in the mix of competing hypotheses may fare better still.

Third, this kind of reasoning is relatively new as an explicit form of inquiry, which means that the comparative criteria by which we discriminate superior from inferior metaphysical proposals about ultimacy are under-explored. Thus, we must allow that a given argument in natural theology could become more (or less) persuasive with time as comparative metaphysics gradually stabilizes and comparative criteria are better understood. For example, exactly how important are the criteria that "an adequate ultimacy metaphysics should solve the problem of the one and the many" and "an adequate ultimacy metaphysics should uphold the co-primordiality of principles of law and operations of chance in nature"? Is one of them more important than the other? Are they even fully compatible?

Fourth, and perhaps most importantly, ultimacy may be such that there just is not one superior metaphysical theory of it. Rather, it may be replete with category-defying cognitive richness that forces perspectival scattering of metaphysical theories. Or it may surpass human rational capacities altogether.

These difficulties do not constitute a knock-down argument against the possibility of natural theology. They define the senses in which natural theology is difficult and indicate the sorts of considerations that must be taken into account along the way. The claim of its possibility has to be established or refuted through attempts to do it. The chances of success turn decisively on how effectively philosophical interpretations of nature constrain theories of ultimacy.

A Perennial Question

Can nature tell us anything about ultimacy? This is an ancient question, shared across cultures, and handled differently but in structurally similar ways in West Asian, South Asian, and East Asian philosophical traditions. More often than not, the answer has been a qualified yes: the world around us does tell us something about ultimacy, but not as much as we might want to know. For example, the cosmological arguments of medieval Judaism, Christianity, and Islam concurred that there must be an ultimate reality that gives rise to the proximate reality we know, but we cannot infer much about its character—certainly not as much as the sacred texts of these theistic

religions affirm. Similarly, many traditions of South Asian philosophy found it necessary to include authority as a valid form of inference (*pramana*) because observation and logic alone could not yield the Vedas' portrayal of ultimacy. Chinese traditions perhaps have been the most optimistic about reading the character of ultimacy off of the way reality shows up for us in natural processes, but the plural and vague visions of ultimacy that typically result confirm the difficulty of the task.

Within this mixed story about the inferential journey from nature to ultimacy there are specialized subplots, some highly skeptical and others extremely optimistic. On the skeptical side, Buddhist philosophy relies heavily on the possibility of inference from human experience to religious insight, but the fruit of this inference in the most rigorously philosophical forms of Buddhism (such as the Madhyamaka School of Mahayana Buddhist philosophy) is primarily a spiritually liberating path and only secondarily and vaguely a metaphysical portrayal of ultimacy. According to this way of thinking, reality as we conventionally experience it is deeply misleading. Careful inference from the suffering and contradictions of experience frees us from its delusions, including the twin delusions that there is an ultimate reality lying behind it all, and that we need to explain conventional reality with reference to some ontologically more basic theory of ultimate reality.

Theistic traditions have produced another form of skepticism in the form of exclusive reliance on God's self-revelation conjoined with the denial that we can infer anything about God from created reality. The utter transcendence of God motivates this skepticism (in twentieth-century Swiss Christian theologian Karl Barth's rejection of natural theology, for example), but the counterintuitive result is that there are no natural or scientific constraints whatsoever on revealed traditions' claims about God. Could the loving God Barth believed in really create a world that was utterly misleading as a source of knowledge of God's character?

The extremely optimistic side is rare by comparison. Some thinkers have claimed that the pattern of inference from apparent design in cosmology and biology to a designer can produce detailed knowledge of the character and purposes of ultimacy as well as knowledge of its existence and its basic relation to the world. These natural theology enthusiasts sometimes even reject revealed theology altogether as too burdened with myth to make a useful contribution to

knowledge of ultimacy. Twentieth-century American philosopher Charles Hartshorne is an example of one type; early nineteenth-century German philosopher Georg W. F. Hegel is an example of another; and Enlightenment Deism, a movement that continues down to the present in transformed ways and under different names, yet another.

In our time, the well populated middle ground is the domain of discussion among most who are interested in science-religion relations. Most accept that nature constrains what we can say about ultimacy. They do this while admitting that nature does not permit clear lines of entailment from science to detailed knowledge of ultimacy, while tolerating a persistent lack of clarity about what precisely are these constraints. Within these boundaries several debated questions mark out the interior territory, and I note two here.

First, are the constraints from science on hypotheses about ultimacy strict enough to allow direct entailment relations from science to God? Controversial intelligent design theorists such as American biochemist Michael Behe[4] and American mathematician-philosopher William Dembski[5] say yes, though they admit (consistently with the medieval design arguments) that the entailment does not yield much more than the sheer existence of a designer.[6] Atheists say yes, too, and it is the non-existence of a divine being that science entails, but this is a

[4] Michael J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Free Press, 1996). See also Behe, William A. Dembski, and Stephen C. Meyer, *Science and Evidence for Design in the Universe: Papers Presented as a Conference Sponsored by the Wethersfield Institute, New York City, September 25, 1999* (San Francisco: Ignatius Press, 2000).

[5] William A. Dembski, *The Design Inference: Eliminating Chance through Small Probabilities* (Cambridge and New York: Cambridge University Press, 1998), and *No Free Lunch: Why Specified Complexity Cannot be Purchased without Intelligence* (Lanham, MD: Rowman & Littlefield, 2002).

[6] Technically speaking, the designer may be clever aliens rather than any deity. This curious possibility even has a literary history. One of the premier examples is Douglas Adams's *Hitchhiker's Guide to the Galaxy,* a 1978 BBC radio comedy subsequently transformed into a series of novels (first published in 1988) and two movies (the last of which was released in 2005). The premise includes an Earth designed and created by the alien Slartibartfast and his Magrathean colleagues on a contract with a race of hyper-intelligent, pan-dimensional beings who want to use the Earth as a giant supercomputer to find the ultimate answer to the question of life, the universe, and everything. But this kind of scenario leads to a vicious regress: whence Slartibartfast? Intelligent design theorists know full well that the resulting regress requires the postulate of a supernatural designer, which makes their entertaining the possibility of aliens as designers even more curious.

relatively rare view. Numerous contemporary skeptical authors from American astronomer Carl Sagan[7] to Skeptics Society founder Michael Shermer[8] stop just short of evidence-based atheism when they say that science is steadily removing any need we once might have had to postulate God. Most in the science-religion dialogue suspect that science is too vague to determine a single view of ultimacy and that the best we can aim for is consonance relations between scientific and traditional religion-based theological understandings of the world.[9] Some, such as American metaphysician Robert Neville, deliberately aim for metaphysical formulations of ultimacy that are perfectly neutral to scientific theories. He reasons that if there were any inferential traction between the cosmological pictures of science and the metaphysical pictures of ultimacy, then the latter would be too coarsely formulated, too much in thrall to the actual cosmology of our universe and insufficiently attuned to the ontological conditions for any possible cosmological environment.

Second, can science help us choose among competing views of ultimacy, even if it does not select out a uniquely adequate view? This question is under-explored because most people involved in science-religion discussions have not engaged religions beyond their own, or conflicting views within their own religion, well enough to make serious comparative analysis feasible. It is an emerging issue, however, and thinking about it carefully leads to a clarified understanding of what has really been going on in traditional natural theology all along, but hidden in unanalyzed premises.

The New Natural Theology

If science constrains hypotheses about ultimacy at all, it does so by means of mediating disciplines that help bridge the often noted gap

[7] Carl Sagan, *The Demon-Haunted World* (New York: Random House, 1996).

[8] Michael Shermer, *Why People Believe Weird Things: Pseudoscience, Superstition, and Other Confusions of Our Time,* 2nd ed. (New York: Henry Holt and Company, Owl Books, 2002).

[9] Nancey Murphy provides a compact survey of types of logical connection between science and religion in "Postmodern Apologetics, or Why Theologians Must Pay Attention to Science," in W. Mark Richardson and Wesley J. Wildman, eds., *Religion and Science: History, Method, Dialogue* (New York and London: Routledge, 1996), 105-20. The volume situates this essay as part of a larger debate on the topic of holistic justification versus stronger entailment relations between science and theology.

between the conceptuality of science and the conceptuality of religious thought. Ethics (rigorous discussion of moral values) and ontology (rigorous discussion of being and existence) are the most common mediating disciplines. The latter is the domain of natural theology, as well as other philosophical pastimes such as varieties of existential and phenomenological analysis. According to this parsing of the possibilities, natural theology presupposes the move from scientific theories of nature to philosophical interpretations of nature that disclose the ontological structures and processes that suffuse all of nature. It is at this point that natural theology proper takes over. Natural theology attempts to take the step from ontology of nature to a metaphysical theory of ultimacy.

Regarding the first move, from nature to ontology of nature, there is a great deal in contemporary science that has implications for ontology of nature. For example, the ontology resulting from scientific theories of the law-like and chance-like behavior of the natural world can become a suggestive starting point for the second step, natural theology proper. In this case, natural theology would seek to discover whether an ontology of nature stressing the entanglement of law-like and chance-like processes in nature can support traction with theories of ultimacy. There are many other examples of the first step from theories of science to ontologies of nature, some focusing on quantum entanglement, some on natural law, some on emergence and complexity.

Unsurprisingly, this first step has its detractors, but it is particularly important to admit openly that the second step, natural theology proper, is utterly indigestible to a fairly large group of impressive intellectuals who ought to be in a position to know what human inquiry can and cannot accomplish. For them, constructing an ultimacy metaphysics on the basis of an ontology of nature or in any other way is just a waste of time and finally deeply misleading. Perhaps it would be advisable here to take for granted the value of ultimacy metaphysics, just to avoid the complexities involved in entertaining alternative viewpoints. But whether and how to proceed beyond ontologies of nature of the basic sort I defend here is a pressing question in our time, and the competing approaches are accompanied by potent sensibilities about the morality of inquiry. This produces misunderstanding and confusion often enough that an argument on

behalf of one's own approach in relation to sympathetic portrayals of alternatives could be helpful, if it is not absolutely required.

I make out three fundamentally distinct approaches to the question of whether and how to move beyond ontologies of nature to metaphysics of ultimacy. Each has a kind of appeal, which explains the passion with which it is held, and also the prevalence of misunderstanding across the differences.

Approach 1: We should stop at ontology of nature, which is already extremely adventurous. Further speculation about ultimacy should remain personal and private, or perhaps shared among close friends, but not framed as material for meaningful public discussion. We might consider going so far as to demythologize the non-empirical content of speculative ontologies, reframing "laws of nature" as observable regularities in reality and "operations of chance" as ungrounded randomness, but we must stay silent about ultimate "why" questions. This is the sort of modesty demanded by our repeated experience of not being able to settle more aggressive metaphysical inquiries. It requires us to rein in our desires for comprehensive explanations of all reality but this can be a relief as much as a disappointment once we appreciate how politically and morally dangerous comprehensive meta-narratives have proved in all human civilizations.

Evaluation: The difficulty here is the arbitrariness of not asking a good question, even if the question is an extremely difficult one to answer in fully satisfying ways. This has a subtle relation to the problem of oppressive meta-narratives: one of the most effective ways of attacking oppressive metaphysical stories is to take a systematic approach, which helps us notice what they leave out or distort. This is an option that this first approach forgoes. In other words, the appealing modesty of refusing systematic metaphysics can also leave us vulnerable to unscrupulous story tellers and their subtly or overtly oppressive meta-narratives.

Approach 2: Some (philosophical theologians of a sort) inquire into ultimacy using ontology of nature as the key to refining theological hypotheses. This is natural theology but carried out in a potentially cross-traditional way (e.g., Philip Clayton, Niels Gregersen, Alfred North Whitehead, in various ways, to various degrees).

Evaluation: The challenge here is the size of the task when we make our ontological speculations vulnerable to criticism from so many

scholarly disciplines, and multiple philosophical traditions and religious perspectives. It is arguably an absurdly impractical project.

Approach 3: Some (confessional theologians of a sort) use an ontology of nature as a framework for articulating one tradition's existing beliefs about ultimacy in a plausible and faith-nurturing way (e.g., Nancey Murphy, Arthur Peacocke, John Polkinghorne, Robert John Russell). This approach involves reducing the complexity of metaphysical inquiry by shifting the goal from inferring a theory of ultimacy as the best explanation for the world around us to merely showing the credibility of existing beliefs using a plausible ontology.

Evaluation: Focusing on one tradition is appealingly modest, practical in its recognition of our inability to know everything, and easy to motivate because of the practical relevance of this sort of inquiry to particular religious communities. But it seems arbitrary and self-serving to neglect parallel and possibly contradictory wisdom in other religious traditions. This is tolerable when working within a particular religion, perhaps, but even there questions about the ever-present "other" are always close at hand, more so in our time than ever.

I think that each of these three approaches is feasible for particular purposes and groups. Even the first, highly cautious approach can be the basis for a rich spiritual appreciation of nature and ultimacy, albeit expressed indirectly through cultivating reverence for nature or through poetic and artistic media (e.g., Sufi stories or Zen haiku or Romantic nature poetry). Certainly the third approach has much to commend it in particular communities, where the aspirations of rationality are not comprehensive but rather limited by that community's immediate needs. I appreciate the first and third approaches and yet want to insist that the second approach is also valuable, against criticisms of immodesty and impracticality from the other two approaches. It is possible in principle to use comparative philosophical theology to force contact between competing metaphysical theories of ultimacy, even if the task in practice is complicated by the difficulty of working across languages, eras, and cultures, and by the familiar specter of metaphysical arbitrariness. We can only secure this possibility by successful attacks on the arguments against it, such as those of Kant and Logical Positivism, but I must take

this success for granted in this context.[10] On the practicality issue, I contend that comparative metaphysics is gradually becoming a more feasible form of inquiry as the field of religious studies expands and our understanding of world philosophies becomes richer and more detailed.

I am certainly not alone in my affection for the second approach. Many theists and religious naturalists have been strongly attracted to the move from ontologies of nature to an adjudication of theories of ultimacy. Unfortunately, historic attempts to establish direct entailment from ontology of nature to ultimacy metaphysics—I am calling this *traditional* natural theology—have been very weak on the comparative front. This has a serious consequence. If natural theology is about entailment relations from nature to God, then the broadly accepted foundering of design or other cosmological arguments for God's existence can provoke abandonment of natural theology altogether. I consider this abandonment, which is fairly widespread in our time, premature. What is required is not the abandonment of, or obstinate clinging to, discredited arguments in natural theology but a correction to the understanding of natural theology itself.

Contrasting Traditional and Comparative Natural Theology

Comparative natural theology, properly understood, is not about entailment relations from nature to a preferred metaphysics of ultimacy. Rather it seeks to compare numerous compelling accounts of ultimacy in as many different respects as are relevant. In this comparison-based way, we assemble the raw materials for inference-to-best-explanation arguments on behalf of particular theories of ultimacy, and we make completely clear the criteria for preferring one view of ultimacy to another. Schematizing this in a basic way can help to clarify the difference between traditional natural theology and the new natural theology.

An ontology of nature, O, is enormously complex, logically. At the simplest and most idealized level, O is a finite conjunction of (say, n) propositions, $O_1 \wedge O_2 \wedge O_3 \wedge \ldots \wedge O_n$. But the complexity arises when we allow for the facts that (1) these propositions collectively may not be mutually consistent, (2) the conjunction in any given formulation does

[10] There are many sound refutations of skeptical arguments against metaphysics. One of the most compelling is Robert Cummings Neville, *The Highroad around Modernism* (Albany: State University of New York Press, 1992).

not exhaust everything relevant to an ontology of nature, (3) the collection of propositions is a snapshot of a dynamic process whereby the ontology constantly adjusts to the growing insight of those who articulate it and to changes in scientific theories, (4) some of the propositions are more robust than others because they are most closely tied to well attested scientific theories, and (5) scientific theories themselves are snapshots of dynamic research programs with complex internal structures and relations to data. This realistic picture of the internal structure of an ontology of nature is utterly neglected in traditional natural theology.

Working from the most superficial characterization of an ontology of nature as a finite conjunction of consistent propositions, traditional natural theology tries to establish entailment from propositions in O to propositions about ultimacy, say,

> U_1="A First Cause exists and we call it God," and
> U_2="An Intelligent Designer exists and we call it God."

That is, traditional natural theology seeks arguments that, say, $O_3 \rightarrow U_1$ or $O_{14} \rightarrow U_2$. Because of the hidden but false assumption of the static perfection and internal consistency of O, this amounts to $O \rightarrow U_1$ and $O \rightarrow U_2$. Moreover, despite the fact that the history of theology displays real problems establishing the consistency of all propositions about ultimacy that are pronounced therein, traditional natural theology stipulates the desired consistency, which results in the appealing but manifestly over-simplified conclusion that $O \rightarrow U$. Voila! God exists and we even know something about the divine nature, all on the basis of analyzing implications of our observations about nature. No wonder there has been so much hostility to traditional natural theology.

Comparative natural theology is painfully sensitive to all of the fallacies in the argumentative procedure of traditional natural theology. I think that satisfactorily correcting these fallacies requires what I call the hypothetico-corrective theory of inquiry, but there is no space for a full account of that theory of inquiry here.[11] The following

[11] A serviceable summary is Wesley J. Wildman, "The Resilience of Religion in Secular Social Environments: A Pragmatic Analysis," in Michael G. Parker and Thomas M. Schmidt, eds., *Scientific Explanation and Religious Belief: Science and Religion in Philosophical and Public Discourse* (Tübingen: Mohr-Siebeck, 2005): 58-80.

schematization, however, does give an indication of some of the logical steps involved. Suppose we have three hypotheses about ultimacy, UH_1, UH_2, and UH_3 (these might be, for example, "Ultimacy is a personal supernatural being with intentions, plans, and powers to act"; "Reality is self-caused and ontologically ungrounded"; and "Ultimacy is Being Itself"). The examples illustrate how complex an ultimacy hypothesis can be but, for the sake of exposition, let us neglect such details and concentrate on the relation of these ultimacy hypotheses to the ontological theory of nature, O, which is supposed to help us decide among these ultimacy hypotheses. Specifically, and remembering the complexity and possible internal inconsistency of O, suppose that

$UH_1 \rightarrow \{O_1, O_6, O_8, O_{11}\}$,
$UH_2 \rightarrow \{O_1, O_5, O_6\}$, and
$UH_3 \rightarrow \{O_1, O_2, O_4, O_8\}$.

It follows from this that the ontological proposition O_1 is of little use in detecting superiority of one ultimacy hypothesis over the other two, because all three entail it. Other ontological propositions would be more useful but comparative criteria (CC) are required to realize this potential. Consider the following examples:

CC_1: "O_6 is especially important," and
CC_2: "O_8 is especially important."

In practice, comparative criteria are often much more complex than this, involving several features of an ontology simultaneously, with intricate interpretative dimensions. But even in these simplified cases, we can conclude that:

CC_1 ("O_6 is important") $\rightarrow$ UH_1 and UH_2 are superior to UH_3;
CC_2 ("O_8 is important") $\rightarrow$ UH_1 and UH_3 are superior to UH_2.

Subsequent debates over the relative weighting of comparative criteria CC_1 and CC_2 determine which of UH_1, UH_2, and UH_3 is finally the best explanation of the ontology of nature, O. In this instance, UH_3 is not faring well, while a decision between UH_1 and UH_2 would depend on which comparative criterion, CC_1 or CC_2, gets heavier weighting.

The confidence with which we draw a final conclusion from an inference-to-best-explanation style of argument of this sort depends upon how sure we are that (1) we have all of the relevant ultimacy hypotheses in play, (2) we have recognized all of the relevant comparative criteria, (3) we have properly accommodated our reasoning to the complexity of the ontology of nature and of the scientific theories on which it depends, and (4) we are realistic about the distinctiveness of any arguments concerning ultimacy. Traditional natural theology flagrantly violates all of these criteria for soundness of reasoning: (1) it usually ignores alternative ultimacy hypotheses, (2) it neglects explicit comparative criteria, (3) it oversimplifies both ontological premises and the scientific theories that inform them, and (4) it often treats ultimacy arguments as strictly analogous to arguments in other domains.

The transparency of criteria for metaphysical superiority (corresponding to comparative criteria) in the new natural theology is a huge advance on the covert operation of such criteria in traditional but wrong-headed forms of natural theology. It also stimulates superior conversation across different views because transparent criteria are vulnerable to criticism in a way that covert criteria are not. It is an open question whether an extended period of comparative metaphysics of this sort would induce greater agreement among those who initially value criteria for metaphysical adequacy differently. But there is no question that it would promote greater mutual understanding as well as more meaningful and satisfying debate.

Inference to Best Explanation Revisited

This logical analysis of inference-to-best-explanation argumentation stands in tension with existing analyses within so-called confirmation theory, which rely on Bayesian probability. The standard Bayesian account of inference to best explanation depends on evaluating the probability of propositions given certain conditioning factors. The relevant formalism is as follows: let P(A|BC) stand for the probability of proposition A given propositions B and C. Suppose that H is an hypothesis intended to explain evidence E in the context of background facts F. How "good" is H as an hypothesis? To begin with, neglecting the evidence E, H might be absurd relative to background facts F, so we need to keep an eye on the *prior probability of H*, which is P(H|F). Prior probability is high when H is simple or elegant or

possesses other desirable intrinsic features, and also when H fits closely with F. Next, we also need a way to measure the *explanatory power of H*, which is P(H|EF). Explanatory power is high when H has high predictive power; that is, P(E|HF) is high, meaning that E is likely on the assumption of the hypothesis H and given background facts F. Explanatory power is high also when E has low prior probability; that is, P(E|F) is low, meaning that evidence E is unlikely to occur just given background facts F and disregarding the hypothesis H. Finally, in cases where two hypotheses, H_1 and H_2, have equal explanatory power, i.e., $P(H_1|EF)=P(H_2|EF)$, the hypothesis with the higher prior probability wins; that is, H_1 wins when $P(H_1|F)>P(H_2|F)$.

Bayesian accounts typically neglect the role of comparative adjudication or rest content with simple pair-wise comparison of competing hypotheses. They also assume the meaningfulness of the "prior probability" of any hypothesis, which is its likelihood of being true given background information but disregarding the specific evidence pertaining to the situation in which the question about the hypothesis actually arises. This involves using unanalyzed concepts of simplicity, elegance, and fit with existing knowledge—the factors involved in judging prior probability. In the case of metaphysical hypotheses, and indeed hypotheses of most kinds, prior probability is a grossly abstracted concept. Even in the classic examples of hypothetical explanations of a crime scene, the idea of prior probability of an hypothesis seems no more than a hand-waving gesture toward actual probability calculations, and thus probability talk functions more as a guiding analogy to keep one's head clear, or an after-the-fact rationalization of vastly complex intuitive judgments.

The fact that many philosophers remain deeply dissatisfied with the Bayesian account of inference to best explanation[12] has not prevented some philosophical theologians from making hearty use of this Bayesian way of formalizing inference to best explanation in their arguments for the existence of God.[13] More pertinently, the philosophy

[12] For a colorful review of the advantages and disadvantages of Bayesian probability in confirmation theory, see John Earman, *Bayes or Bust? A Critical Examination of Bayesian Confirmation Theory* (Cambridge, MA and London: MIT Press, 1992).

[13] A classic example is Richard Swinburne, *The Existence of God* (Oxford: Clarendon Press, 1979). He uses the basics of confirmation theory, limiting himself to judgments of "more likely" and "most likely" rather than attempting to assign numbers for probabilities. But he does not investigate the virtues of alternative hypotheses despite pointing out that it is important to allow for this (cf. 19), and he does not address in any

of science has demonstrated that the logic of confirmation is formidably complex in actual practice, certainly not reducible to the terms of Bayesian probability, and possibly not even fully rational at key decision points.[14] This leaves these theological adventures in confirmation theory looking both innocent and bizarrely abstract.

Recent philosophical attempts to refine (or to produce!) understanding of judgments of similarity and difference, of consonance and dissonance, of elegance and coherence, have turned especially on the integration of cognitive science and philosophy. Cognitive modeling has proved to be an important tool here, and not for nothing: such judgments occur in prodigiously complex brains that may have special ways of detecting overall resonance between two sets of biologically coded information.[15] These consonance-detection methods may be irreducible to simple probability calculations or even logical arguments. Yet they may still be logically pertinent if these biologically-based mechanisms for assessing resonance produce useful results not merely accidentally but on the basis of neural functions refined through evolutionary pressures. We might abstract from such processes a Bayesian framework for understanding them but, inevitably, such abstractions will not prove very illuminating.

Human beings may have natural consonance-detection abilities, but we are also vulnerable to serious errors of judgment. Our pattern-

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sustained way the difficulties facing attempts to determine the prior probability of a metaphysical hypothesis about ultimate reality. Also see Swinburne's *An Introduction to Confirmation Theory* (London: Methuen & Co., 1973).

[14] This reflects the debate between Imre Lakatos and Paul Feyerabend over the rationality of decisions to abandon apparently degenerating research programs. See Matteo Motterlini, ed., *For and Against Method: Including Lakatos' Lectures on Scientific Method and the Lakatos-Feyerabend Correspondence* (Chicago: Chicago University Press, 1999). The key background works are Imre Lakatos, *The Methodology of Scientific Research Programs,* John Worrall and Gregory Currie, eds. (Cambridge and New York: Cambridge University Press, 1978); Imre Lakatos and Alan Musgrave, eds., *Criticism and the Growth of Knowledge* (Cambridge and New York: Cambridge University Press, 1970); and Paul Feyerabend, *Against Method,* 3rd ed. (London and New York: Verso, 1993).

[15] Connectionalist models of brain processes are especially useful here because they can represent hypotheses as distributed activation patterns of nodes in a connectionist machine. This in turn allows consonance and dissonance to be represented as pattern similarity and overlap. Judgments of similarity are then akin to pattern recognition skills. For example, see Paul Churchland, *A Neurocomputational Perspective* (Cambridge, MA: MIT Press, 1989) and Paul Thagard, *Conceptual Revolutions* (Princeton: Princeton University Press, 1988).

recognition skills appear to be over-productive of hypotheses to explain the puzzles we come across. This is useful when we are searching for explanations, and thus highly relevant to evolutionary survival, which probably explains how we got this way. But it can also dangerously mislead us into trusting "feelings" of similarity where in fact this leads to mistakes—sometimes deadly ones.[16] In the context of comparative metaphysics and religion, especially, this propensity to trust feelings of consonance must be handled with extreme care. It takes decades of training both to help people make use of their abilities for inquiry and to train them to overcome their liabilities as inquirers. Even with such protracted training, experts still make errors of reasoning, particularly around questions of similarity and dissimilarity. Such errors in comparative religion have been traced with aggressive precision.[17] The result is that that a new collaborative approach has seemed necessary if we are to compare religious ideas with any degree of confidence.[18]

In light of these complexities, and without even touching on the distinctive considerations of ultimacy metaphysics, it is obvious that a Bayesian analysis of inference to best explanation is seriously deficient. The alternative analysis I have proposed stresses awareness of many relevant hypotheses, transparency of the comparative criteria that guide judgments of similarity and difference, and the dynamic complexity of both ontologies of nature and ultimacy theories. This approach still does not come to terms with the way we make judgments of similarity and difference, of simplicity and fit. But it has been made responsive to the problem by building in the kind of transparency and flexibility that

[16] There are many compendiums of errors due to biological limitations on human rationality, including examples of the ways that unscrupulous people exploit such vulnerabilities for their own profit and amusement. See, for example, Thomas Gilovich, *How We Know What Isn't So: The Fallibility of Reason in Everyday Life* (Free Press, 1993); Massimo Piatelli-Palmarini, *Inevitable Illusions: How Mistakes of Reason Rule Our Minds* (John Wiley and Sons, 1996); Scott Plous, *The Psychology of Judgment and Decision Making* (New York: McGraw-Hill, 1993); James Randi, *Flim Flam: Psychics, ESP, Unicorns and other Delusions* (Amherst, NY: Prometheus Books, 1982); Carl Sagan, *The Demon-Haunted World: Science as a Candle in the Dark* (New York: Random House, 1996); Michael Shermer, *Why People Believe Weird Things: Pseudoscience, Superstition, and Other Confusions of Our Time* (New York: W.H. Freeman and Company, 1997).

[17] See, for example, Jonathan Z. Smith, "In Comparison a Magic Dwells," in *Imagining Religion: From Babylon to Jonestown* (Chicago: Chicago University Press, 1982).

[18] This was the aim of the Comparative Religious Ideas Project; see fn 2.

facilitates correction of judgments in an ongoing process of adjustment and improvement.

Conclusion

I have argued that natural theology, properly understood, is possible in principle. I have also argued that its prospects are uncertain. It depends on a complex kind of comparative argumentation whose logical structure I have laid out even while acknowledging that many aspects of the judgments involved—especially those of consonance and dissonance, similarity and difference—remain problematic.

It is important in concluding to recognize that natural theology is only one aspect of theological reflection. Theology takes shape in traditions, with support from religious or secular scholarly institutions. When theology attempts to address metaphysical questions—a move whose current unpopularity I take to be a seasonal phenomenon—it is no less dependent on such traditions and institutions for the reception and carrying forward of its plausibility conditions and canons of rationality. The results of natural theology (in the comparative sense) can play an important role in structuring and adjusting these plausibility conditions and canons of rationality, thereby helping to guide metaphysical reflection on theological topics. Yet even with input from natural theology, it remains possible to defend within a robust social context and lively intellectual tradition almost any metaphysical theory of ultimacy. Such is the wealth of considerations that are relevant to judging the adequacy of any ultimacy metaphysics.

This non-decisive rational landscape is the inevitable character of metaphysics outside the domain of natural theology. We theologians can choose to learn from the constraints of natural theology, on pain of having to fight with the natural sciences—a possible but unappetizing battle. After that we build ingenious theories around ultimacy hypotheses that artfully balance criteria in a way that honors the struggles and strange currents of our own lives and the traditions that form us. It is a partly rational process, but also partly incomprehensible, the product of unfathomable drives and intriguing instincts and untraceable influences.

Metaphysics is not completely arbitrary, solely a matter of taste and tradition; natural theology properly understood shows that this pessimistic view is mistaken. But we also need to resist the fantasy that ultimacy metaphysics is exhaustively rational in the sense that every question can be decided. Correspondingly, we should heartily embrace the inchoate forces that dispose us to prefer one hypothesis over another, one aesthetic sensibility to another, one way of balancing criteria rather than another.

Surely it would be easier to embrace our personal involvement in metaphysical theory building if we knew that the Kantian and logical-positivist detractors, the Heideggerian anti-onto-theological and postmodern anti-logocentric accusers of metaphysics were at least partly mistaken. After all, none of us wants to be the poster child for deluded metaphysical speculation. But perhaps this is precisely what comparative natural theology offers: by eschewing rational overreaching, and by cautiously accepting the complexities of multidisciplinary crosscultural comparative inquiry, natural theology actually produces credible results that meaningfully constrain ultimacy metaphysics. It is not the grand achievement of now discredited traditional natural theology, to be sure, but that turns out to be a great advantage. Modest achievements build confidence precisely because they do not overreach and do not underestimate difficulties. Comparative natural theology creates confidence to venture speculative arguments about ultimacy and nurtures willingness to accept our emotional and spiritual entanglement in metaphysical theory building.