Public Theology and Scientific Method:

Formulating Reasons That Count Across Worldviews

Hugh G. Gauch, Jr., John A. Bloom, and Robert C. Newman

Abstract

Scientific thinking is generally considered admissible in public discourse because it employs methods and reaches conclusions that are worldview neutral. On the other hand, theology is generally considered out of order in public discourse because it has methods, presuppositions, and conclusions that are worldview distinctive. To the contrary, this paper argues that this dichotomy between science and religion is wrongheaded on two counts. First, the worlview-neutral premises in scientific or empirical inquiries can support worldview-distinctive conclusions. Second, some theological inquiries involve empirical data, and in particular data on Biblical predictions and their outcomes can provide a powerful and public test of naturalism and Christianity. Thus, public theology is possible. The conclusion, "there is a God," can have the same logical status as, "there are elephants in Africa."

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Formulating Reasons That Count Across Worldviews

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> *Does the belief that there is a God have the same logical status as, say, the belief that there are elephants in Africa?* — Roger Trigg[1]

1. Introduction

The customary formula is that science has facts but religion has faith, so science is public but religion is private. This paper challenges that paradigm, showing instead that theistic propositions can be supported with reasons that count across worldviews, primarily because these reasons utilize empirical and public data, just like science and history. Thus it is possible for the conclusion, "there is a God," to have the same logical status as, "there are elephants in Africa." Accordingly, our objective is what may be termed "public theology." Our strategy has two components.

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[1] Roger Trigg, *Reason and Commitment* (Cambridge: Cambridge University Press, 1973), 27.

First, a general theory is developed of the requirements for reasons that count across worldviews, progressing from scientific to theological applications. Such reasons have three inputs: (1) presuppositions that are limited to the unproblematic and worldview-neutral offerings of rudimentary common sense; (2) logic that is standard; and (3) evidence that is empirical and public, is relevant for testing important worldview hypotheses such as whether God exists, and is sufficient for robust and definitive tests despite various imperfections in data quality and limitations in data quantity. The main result is that arguments with worldview-neutral premises can support worldview-distinctive conclusions.

Second, given this general theory, specific kinds of admissible and relevant data are sought that can support worldview-distinctive conclusions. The suggestion developed here is that data on Bible predictions and their outcomes can provide a powerful and public test of naturalism and Christianity. Eight criteria are specified for admissible and relevant prophecy data, and the resulting worldview test is shown to be robust against moderate data imperfections and to have an evidential weight that grows exponentially with the amount of data.

The most incisive role of good methodology is to draw attention to informative data. However, it is beyond this paper's ambitions to marshal and analyze the data, apart from a mere glance to show what prophecy data look like. Nevertheless, methodological considerations alone suffice to have important implications for the domain of scientific thinking, the definition and boundary of natural theology, the legitimate presuppositions of biblical scholarship, and most of all, the Christian worldview winning serious consideration rather than breezy dismissal.

2. Challenges to Public Theology

In his perceptive history of Christian philosophy during the past century, Charles Taliaferro chronicles the challenges from non-Christian worldviews.[2] He considers atheistic naturalism the greatest challenge, especially in recent decades. He quotes the "centerpiece in the debate" between atheism and Christian theism, Antony Flew's punchy parable of the invisible gardener.

> Once upon a time two explorers came upon a clearing in the jungle. In the clearing were growing many flowers and many weeds. One explorer says, 'Some gardener must tend this plot.' The other disagrees, 'There is no gardener.' So they pitch their tents and set a watch. No gardener is ever seen. 'But perhaps he is an invisible

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[2] Charles Taliaferro, "A Hundred Years with the Giants and the Gods: Christians and Twentieth Century Philosophy," *Christian Scholar's Review* 29 (2000): 695–712.

gardener.' So they set up a barbed-wire fence. They electrify it. They patrol it with bloodhounds. (For they remember how H.G. Wells's *The Invisible Man* could be both smelt and touched though he could not be seen.) But no shrieks ever suggest that some intruder has received a shock. No movements of the wire ever betray an invisible climber. The bloodhounds never give cry. Yet still the Believer is not convinced. 'But there is a gardener, invisible, intangible, insensible to electric shocks, a gardener who has no scent and makes no sound, a gardener who comes secretly to look after the garden which he loves.' At last the Sceptic despairs, 'But what remains of your original assertion? Just how does what you call an invisible, intangible eternally elusive gardener differ from an imaginary gardener or even from no gardener at all?'[3]

The force of this parable is not that Christianity has an insufficient quantity of evidence, but rather that it wholly lacks meaningful evidence of the right kind to merit a naturalist's consideration. Whereas this first charge at least invites some struggle over the evidence, this latter and enormously more serious charge is the basis for what Taliaferro aptly terms "breezy dismissals" of theism. For instance, he quotes a dictionary of philosophy, boldly proclaiming that "supernatural beings run no risk of having their existence disclosed by scientific or everyday observation." He interprets this barbed statement, saying that "supernatural beings are not thereby risk-free but doomed from the outset as unknowable, obscure, unnatural items" ready for breezy dismissal.

Similarly, but focusing on scientific ways of knowing in particular, the opinion that scientific method is not applicable to big religious or worldview questions is the official view endorsed in position papers from the American Association for the Advancement of Science (AAAS), which is the world's largest scientific organization and serves as the umbrella association for nearly 300 scientific societies. "There are many matters that cannot usefully be examined in a scientific way. There are, for instance, beliefs that—by their very nature—cannot be proved or disproved (such as the existence of supernatural powers and beings, or the true purposes of life)."[4]

More informally, the usual perception is that scientists typically get the same answers, such as all chemists saying that carbon atoms have six protons; whereas philosophers and theologians routinely get different answers, such as that there are zero, one, or many gods. Philosopher Anthony

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[3] Antony Flew, "Theology and Falsification," in *New Essays in Philosophical Theology*, Antony Flew and Alasdair MacIntyre, eds. (London: SCM Press, 1955), 96.

[4] American Association for the Advancement of Science, *Science for all Americans: A Project 2061 Report on Literacy Goals in Science, Mathematics, and Technology* (Washington, DC: AAAS, 1989), 26; also see American Association for the Advancement of Science, *The Liberal Art of Science: Agenda for Action* (Washington, DC: AAAS, 1990), 20-21, 26.

O'Hear observed that science is exceptionally prestigious and public since "the discoveries of science cut across political and religious divisions to a considerable extent . . . because its theories are about nature, and made true or false by a nonpartisan nature, whatever the race or beliefs of their inventor, and however they conform or fail to conform to political or religious opinion."[5] Not surprisingly, many persons conclude that science has facts but religion has faith, so science is public but religion is private.

Nevertheless, some philosophers take the opposite view, that scientific and public inquiries can support worldview distinctives. For instance, George Schlesinger claims that "upon a correct understanding of the methodology of science, it should become evident that Theism is in principle confirmable by all sorts of possible observations and is in fact confirmed by some actual observations."[6] Hence, he suggests that public theology is viable.

So, there are contrary positions. Can theology reach public conclusions, or not? In the opening quotation, Roger Trigg nicely expresses this same question in more concrete terms. This paper takes the position that scientific method applied to relevant data can produce public theology. There are two keys, precisely as specified in the above quotation from Schlesinger. First, scientific method must be understood correctly, particularly those specific elements of scientific method that make science public, producing reasons that count across worldviews. Second, theological method must identify those specific kinds of empirical and public data that are most informative about God.

3. Insights from Scientific Method

Scientific method is an involved subject that can be studied for various purposes.[7] For instance, the focus can be on those specific aspects that are most relevant for helping historians become better historians, or helping philosophers become better philosophers, or most obviously, helping scientists become better scientists. However, here the focus is on helping theologians become better theologians. Accordingly, this section pursues three particular insights from scientific method that prepare the way for following sections concerning some theological hypotheses and data.

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[5] Anthony O'Hear, *Introduction to the Philosophy of Science* (Oxford: Oxford University Press, 1989), 1-2.

[6] George Schlesinger, *Religion and Scientific Method* (Dordrecht: D. Reidel, 1997), 5.

[7] Colin Howson and Peter Urbach, *Scientific Reasoning: The Bayesian Approach*, 2d ed. (Chicago: Open Court, 1993); Hugh G. Gauch, Jr., *Scientific Method in Practice* (Cambridge: Cambridge University Press, 2002).

First, this section shows what enables natural science to produce public knowledge as a preliminary to pursuing public knowledge for the somewhat more difficult case of theology. Second, it explains the statistical reasoning used to test competing hypotheses that predict different proportions of possible outcomes, using an example concerning blue and white marbles, with particular attention to the aspects of this test that permit definitive and robust conclusions despite imperfect data and imperfect investigators. This prepares for an analogous test involving a particular kind of empirical and public data for which different theological hypotheses predict different proportions of the possible outcomes. Third, this section discusses the domain of scientific thinking.

Envision a simple exercise conducted in a statistics classroom. We receive an opaque urn, prepared by a technician as follows while hidden from our view. The technician tosses a fair coin. If it lands heads, three blue and one white marbles are placed in the urn; if tails, one blue and three white marbles. Our assignment is to devise an experiment for determining which hypothesis is true:

H_B: There are three blue and one white marbles in the urn, or
H_W: There are one blue and three white marbles in the urn.

Two experiments are discussed here. The first and simpler experiment is intended to reveal some philosophical principles, primarily what makes science so objective and public. The second and harder experiment explores some scientific principles, particularly what makes science so manageable and robust. Remarkably, even this simple marble example provides ample opportunity for reflection on exactly what makes scientific thinking public and robust.

The simpler experiment, revealing some philosophical principles, is to draw all of the marbles from the urn. Suppose that three blue and one white marbles are observed. Then the reasoning is:

Premise 1 [Evidence]: We see three blue and one white marbles in the urn.

Output [Conclusion]:   There are three blue and one white marbles in the urn.

As ordinary common-sense or scientific reasoning, this is fine. Nevertheless, this argument is incomplete and defective. Symbolize seeing the marbles by "S," and their existence by "E." Then this argument has the form, "S; therefore E," which is a *non sequitur*.

Consequently, another required premise is that "Seeing marbles implies their existence," or "S implies E." This is a presupposition:

Premise 2 [Presupposition]: Seeing marbles implies their existence.

With this addition, the argument now runs "S; S implies E; therefore E," which follows the valid argument form *modus ponens*. For full disclosure, however, this logic must also be expressed:

Premise 3 [Logic]: *Modus ponens* is a correct rule for deduction.

Incidentally, the manner in which *modus ponens* is mentioned here as a premise or input in an argument may seem problematic because logicians have long recognized that adding *modus ponens* to an argument sets up an infinite regress. Accordingly, the instruction to detach and assert the consequent (E) resides in the metalanguage, rather than the formal language. Here the intention is not to establish a system of formal logic, but rather merely to indicate in an informal but explicit manner that scientific thinking uses logic.

Now this argument is complete, properly supporting the above output or conclusion. Furthermore, its structure pervades all scientific thinking. When fully disclosed, every argument reaching a conclusion about the physical world has premises of three kinds: presuppositions, evidence, and logic.[8] When assessing whether an argument is rational and its conclusion is true and public, the first step is to disclose the argument fully so that each and every component is available for inspection.

The above example of full disclosure reveals the basic nature of presuppositions and evidence. A presupposition is a belief necessary in order for any of the hypotheses to be meaningful and true, but which is non-differential regarding the credibilities of the hypotheses. For instance, for either H_B or H_W to be true and known, it must be the case that the physical world exists and that human sense perceptions are generally reliable, so that seeing implies existence. But these presuppositions are completely non-differential, making H_B neither more nor less credible than H_W. Evidence has a dual nature, admissible and relevant. Evidence is admissible relative to available presuppositions, such as observation of marbles given these common-sense presuppositions. And evidence is relevant relative to the stated hypotheses, bearing differentially on their credibilities. Evidence is hypothesis neutral in the sense that it is admissible, counting across hypotheses, although evidence is hypothesis distinctive in the sense that it is relevant, favoring a particular conclusion. For instance, drawing mostly blue marbles is equally observable and completely admissible regardless whether either H_B or H_W is true (or is favored), and yet this evidence favors H_B.

Selection of proper presuppositions for science is a delicate matter of utmost importance. If science presupposes too little, then science will be ravaged by skepticism and will languish from inability to talk about a real,

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[8] Gauch, *Scientific Method in Practice*.

objective, and knowable physical world. But if science presupposes too much, such as relying exclusively on naturalism or Christianity or another worldview for an underlying story that grounds science, then science will lose its status as a shared public institution.

Indispensable presuppositions for anything recognizable as ordinary science include the presupposition about the physical world that it exists, the presupposition about ourselves that human sense perceptions are generally reliable, and the presupposition about the interaction between our world and ourselves that the physical world is substantially comprehensible to us. Fortunately, these beliefs are offerings of rudimentary common sense. These beliefs cannot possibly be proved (or disproved) by common sense or science or philosophy or any sort of human thought; rather, they are presuppositions that can be disclosed. Nevertheless, these common-sense presuppositions are admirably unproblematic in the sense that they are held by persons representing virtually every worldview. The only exception would be radical skepticism, which fortunately is a rare oddity.

This simple marble example can be generalized to understand the basic components pervading all scientific reasoning. First, science needs presuppositions that are unproblematic. A nice way to invoke science's presuppositions is to assert a reality check—a rudimentary exemplar of common-sense knowledge—and then to analyze it to see what has already been presupposed about ourselves and our world. A suitable choice is, "Moving cars are hazardous to pedestrians." Everyone knows this and acts accordingly to avoid accidents, so this belief is entirely unproblematic and completely worldview neutral. Yet implicit in this reality check are presuppositions such as that the physical world exists and sense perceptions are generally reliable, so in ordinary situations, seeing implies existence. Second, science needs logic that is standard. Otherwise, bizarre logic could be contrived in an *ad hoc* manner to support any desired conclusion. The elegant remedy is to axiomatize science's logic and mathematics so that a small number of choices provide a rich and standardized logic. Third and finally, science needs evidence that is empirical, admissible, relevant, and public.

As a simple example, given common-sense presuppositions and rudimentary logic, the observation of elephants in Africa (or even recent photographs thereof) constitutes compelling evidence for the conclusion that there are elephants in Africa. When two conclusions or beliefs can be supported by arguments with equally unproblematic presuppositions, standard logic, and decisive evidence—such as "there are three blue and one white marbles in the urn" and "there are elephants in Africa"—then they may be said to have the same logical status.

Progressing to a harder experiment, some scientific principles are explored. The above experiment can be modified by drawing one marble at

a time with replacement rather than drawing all at once. Then the conclusions will be probable rather than certain, as is often the case in scientific research.

That the selection of marbles placed in the urn was determined by a coin toss gives H_B and H_W initial odds of 1:1. The probabilities of a blue draw under H_B and H_W are 0.75 and 0.25, so a blue draw contributes odds of 3:1 for H_B:H_W, and similarly a white draw 1:3. For instance, after seven blue and three white draws, the odds for H_B:H_W are 81:1, so H_B has probability 0.987805.

How long would it take for the marble experiment to generate a conclusion with under one chance of error in 1,000 trials? Simple probability theory shows that 14 draws suffice on average. Since a blue draw contributes odds of 3:1 for H_B:H_W and a white draw 1:3, a blue-white pair cancels out, so the odds depend only on the margin of difference between the numbers of blue and white draws. Let M be the margin of blue draws over white, yielding odds of 3^M:1 for H_B:H_W. These odds first reach less than one chance of error in 1,000 runs when M = ±7, yielding odds of 2,187:1 favoring H_B for M = 7, or odds of 1:2,187 favoring H_W for M = -7. Each four draws give on average three draws that support the true hypothesis and one that supports the false hypothesis, so half the data cancel and half count. Hence, the length L required to achieve a margin of ±M averages about 2M. For instance, the present confidence level with its stopping rule of M = ±7 implies an average length of about 2 x 7 = 14 draws. More exact calculations show that for M equal to 2, 3, 4, or 5, the average length L is 3.2, 5.6, 7.8, or 9.9 draws; but thereafter the approximation that L ≈ 2M is quite accurate.

What if the confidence of a true conclusion were to be increased by a factor of 1,000 to only one chance of error in 1,000,000 trials? Then 26 draws suffice on average. Since these draws are independent events, the odds from each outcome are multiplied together, so the strength of the evidence increases exponentially with the amount of work. Increasing the confidence of truth by a factor of 1,000 does not require 1,000 times as much data in this case, but rather only about twice as much data.

For several related reasons, a practical sample from the possible data suffices. Particularly when the strength of the evidence increases extremely rapidly with its amount, probable conclusions based on a manageable amount of data can approach certainty. Consequently, additional data would bring no surprise and no learning or benefit. For instance, after the coin toss and before collecting data, whether the data will show mostly blue or else mostly white marbles is anyone's guess. However, after the first 50 draws have given 11 blue and 39 white draws favoring hypothesis H_W, there is only about one chance in 10^{13} that the next 50 draws would favor the alternative conclusion, H_B. Rather, almost certainly, additional data will repeat

the same story, but the further reduction in the probability of error is hardly worthwhile and nearly meaningless because it is already so small. So, data are informative not only for robust conclusions about which hypothesis is true, but also for reliable predictions about what additional data would look like were it collected.

Likewise, an essential source of science's robustness is that different investigators can encounter different subsets of the possible data and yet all can reliably reach the truth. For instance, suppose this statistics class performs this marble experiment for 20 minutes and thereby observes 250 draws. But suppose that one visitor comes for only a few minutes near the start of the experiment and observes just 50 draws, while another visitor observes 60 other draws near the end of the experiment. Despite having partly or wholly different datasets, clearly the class and both visitors are all nearly certain to agree on the same and true conclusion.

What if a marble experiment becomes messy in various ways? After all, science is a human and imperfect activity, so defective data and imperfect investigators can occur.

Suppose that the data become messy. For instance, because of intermittent problems with poor lighting, an experimentalist records the color for each draw accurately only half of the time, but for the other half just declares "blue" or "white" at random, and these good and junk data are all mixed together. Can these messy data still support a clear conclusion? Probability theory shows that on average 55 draws with these messy data result in the same confidence (under one error in 1,000 trials) as the original 14 draws with clean data. So, this problem can be overcome at the cost of collecting more data. Scientists ordinarily have imperfect data, and yet this rather extreme example of half junk data illustrates how imperfect data can still support a robust hypothesis test, though of course there are limits beyond which messy data are completely worthless.

In somewhat greater detail, the true proportion of blue marbles under H_B is 0.75, but with half junk data having an expected proportion of blue draws of 0.5, then the expected experimental proportion of blue draws becomes 0.625. Likewise, under H_W, the theoretical expectation of 0.25 becomes an experimental expectation of 0.375. Hence, an outcome for these imperfect data of 35 blue draws and 65 white draws should not be misinterpreted as evidence that the proportion of blue marbles is about 0.35, but rather should be understood as strong support for H_W, that this proportion is 0.25. More generally, if it is only known that the data are partly defective, but the exact fraction of junk data is unknown apart from the mild constraint that most of the data are accurate, and even if some of the junk data are not only unreliable but also biased, then the original expectations of fractions of 0.75 or else 0.25 blue draws become replaced by approximations, ≈ 0.75 or else ≈ 0.25. But again, if it is known from the setup that either hypothesis

H_B or else H_W is true, then this theoretical premise plus imperfect data can provide a perfectly reliable test of these hypotheses, although somewhat more data are required. In this situation, data quantity can substitute for data quality.

On the other hand, investigators can also be imperfect. For instance, suppose that initial opinions become biased. The tidy original setup gives everyone in the audience the same and proper initial odds of 1:1 for H_B:H_W. But suppose that a student, who has worked in the equipment room for this statistics class, recalls seeing a jar with many white marbles but only one blue marble, making H_B impossible, and this student is rather confident that there are no other marbles in that room (even though that supposition is false, there being in fact plenty of marbles of both colors). Consequently, this student rejects even odds, instead favoring H_W a million to one. Were H_B actually true, can the experiment still convince even a person with an extremely strong initial bias against the truth? Probability theory shows that 38 draws suffice on average to favor H_B more than a billion to one, thereby overturning the initial bias and declaring the truth with under one error in 1,000 trials. So, this problem of imperfect investigators can also be solved by collecting more data.

For another instance of imperfect investigators, consider the particularly drastic defect that a person's hypothesis set fails to include the truth among its alternatives. Envision that in actuality neither H_B nor H_W is true, but instead the true hypothesis is H_E that there are equal numbers, two blue and two white marbles in the urn. Relative to the original setup with its coin toss rendering either H_B or else H_W true, H_E might happen because of a mischievous experimentalist or merely an accidental mistake. What happens now? That the truth is actually H_E makes no difference whatsoever for the conclusion that seven blue and three white draws imply odds for H_B:H_W of 81:1. So, considering only H_B and H_W in light of the present data provides fairly strong evidence in favor of H_B, despite the fact that it is not true. Given only this modicum of data (only ten draws), an investigator is quite likely to happily accept the false H_B because there is no apparent cause for alarm. Far otherwise becomes the situation, however, if instead one collects an abundance of data. Then the data become surprisingly inconclusive, requiring 49 draws on average, instead of the expected 14 draws, until a conclusion is declared (at $M = \pm 7$). Also, the data become alarmingly inconsistent when the experiment is repeated since H_B would be declared true about half the time and H_W the other half, whereas only rare errors are expected. So, on two counts, something has gone wrong! And given abundant data, the needed correction is not hard to discover. Averaging over several runs of the experiment, each having about 49 draws, readily shows that the numbers of blue and white draws are nearly equal. So, this problem can also be

solved by collecting more data. Surprising data can precipitate a needed paradigm shift.

The crux of scientific method is the interaction between data and theory. This can be communicated most compactly by using conditional probabilities. By definition, the conditional probability of X given Y equals the probability of X and Y divided by the probability of Y, or $P(X|Y) = P(X \cap Y) / P(Y)$ provided that $P(Y) \neq 0$. Although $P(X \cap Y) = P(Y \cap X)$ so the order of X and Y does not matter, note that $P(X|Y)$ and its reverse conditional probability $P(Y|X)$ always have different meanings and also have different values apart from the happenstance that $P(X) = P(Y)$.

Let D represent data resulting from observing some physical system (such as marbles drawn from an urn) and let H_1 and H_2 be competing hypotheses or theories about that system. The outcomes observed and recorded in D refer to an external physical reality, whereas the hypotheses expressed by H_1 and H_2 pertain to ideas or beliefs in a person's mind. Also let H, without a subscript, represent a generic hypothesis that is part of a hypothesis set with two or more members.

The traditional and prevalent goal in science is to bring belief into agreement with reality, that is, to find the true hypothesis.[9] Pursuit of this goal involves two quantities that are quite different although superficially similar, the conditional probabilities $P(D|H)$ and $P(H|D)$.

$P(D|H)$ is the probability of observing particular data, given a specific hypothesis. For instance, recalling the above example, the probability of the datum that a blue marble has been drawn given the hypothesis that the urn contains one blue and three white marbles, namely 0.25, is a conditional probability of this sort, $P(D|H)$. Such probabilities result from theoretical reflection and deductive logic, not from observation and data collection. They express probabilities of *predicted* data or outcomes, given the assumption that a particular hypothesis or theory is true.

On the other hand, $P(H|D)$ is the probability of a hypothesis, given the data. For instance, it was calculated above that the probability of hypothesis H_B given seven blue and three white draws (and the setup involving a coin toss) is 0.987805. Such probabilities result from empirical observation and inductive logic, not from theoretical assumptions and deductive logic. They express probabilities of various hypotheses being true, given the observation of *actual* data.

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[9] Besides realist views of science with the goal of truth, there are also various anti-realist views with less ambitious goals, such as saving the appearances (O'Hear, *Introduction to the Philosophy of Science* and Gauch, *Scientific Method in Practice*). This paper's project is not to defend beliefs such as "moving cars are hazardous to pedestrians" and "table salt is sodium chloride," but rather to presume these trifling trinkets of knowledge are true and to progress to more challenging beliefs such as "there is a God."

These two quantities, P(D|H) and P(H|D), are related by a simple probability theorem called Bayes's theorem. For simplicity, this theorem is derived here for the case of two hypotheses. By the definition of conditional probability, $P(H_1|D) = P(H_1 \cap D) / P(D)$ and also $P(D|H_1) = P(H_1 \cap D) / P(H_1)$. These equations can be combined and algebraically rearranged to obtain $P(D) = P(H_1|D) / (P(H_1) \times P(D|H_1))$. The same holds for H2. Finally, those two equations for P(D) can be equated to each other and rearranged to obtain the ratio or odds form of Bayes's rule: $P(H_1|D) / P(H_2|D) = (P(H_1) / P(H_2)) \times (P(D|H_1) / P(D|H_2))$. The technical terms for these three ratios are the posterior, prior, and likelihood ratios, so the posterior equals the prior times the likelihood. Their meanings are the conclusion, the information from other data, and the information from the current experiment. For instance, in the above example, other information about the setup involving a coin toss gives prior odds for H_B:H_W of 1:1, and the current data about seven blue and three white draws contributes likelihood odds of 81:1, so the conclusion is posterior odds of 81:1.

Hypotheses H_1 and H_2 are testable by means of data D if these hypotheses make different predictions about expected data, that is, if $P(D|H_1) \neq P(D|H_2)$. Understand that there is a world of difference between the *predicted* data of P(D|H) and the *actual* data of P(H|D). Actual data trump hypothetical data, which is why the pursuit of realism and truth involves the adjustment of personal beliefs to correspond to physical reality, rather than the reverse. In general, rather similar hypotheses require more data for a definitive test, whereas substantially different hypotheses require less data. For instance, recall that when H_B and H_W compete, predicting 75% and 25% blue draws, reaching a verdict with under one error in 1,000 trials requires 14 draws on average. For comparison, consider the hypothesis H_E which is closer to H_W than H_B. When H_E and H_W compete, predicting 50% and 25% blue draws, reaching the same confidence of truth requires more data, 51 draws on average. This makes sense. Small differences are harder to detect than are large differences.

Bayes's simple theorem, which is derived so easily from the definition of conditional probability, has several profound and elegant implications. First, it shows how prior information is combined with new information in order to reach the current conclusion. This situation is common in science because of ongoing research with old and new data. Also, most theories have multiple implications, so multiple kinds of experiments or evidence are informative about a theory's truth or falsity.

Second, how much data a proposed experiment must generate in order to be influential can be calculated in advance, thereby helping to decide whether to do the experiment. For instance, if general experience gives a proposed drug prior odds of only 1:100 of being superior to the standard drug, then a proposed experiment must collect enough data to generate like-

lihood odds of 100:1 just to even the score, or preferably 10,000:1 or more to achieve a favorable verdict for the new drug.

Third and quite importantly, Bayes's rule disentangles the other information from the current information, thereby promoting objectivity. Different persons often have different collections of other information, so disentanglement is nice because it allows the prior odds from other information to be handled individually whereas the likelihood odds from a particular dataset can be a shared and public project. This is profoundly respectful, recognizing individual roles and responsibilities. The providers of the dataset bear the responsibility for collecting informative and unbiased data and analyzing it appropriately, whereas the users of this information bear the responsibility for assessing it and then incorporating it with their other knowledge, as well as bearing the responsibility for the consequences that follow from decisions and actions based on their informed choices. For instance, imagine that participants in the above marble experiment had different knowledge or beliefs about the setup. One person thinks the setup involves a coin toss so the prior odds H_B:H_W equal 1:1; another thinks it involves a die toss with H_W resulting for "one" and H_B otherwise, giving odds of 5:1; and yet another doubts that the equipment room has enough blue marbles to make H_B possible and accordingly adopts odds of 1:1,000,000. So, the prior odds are personal and controversial. Nevertheless, all three persons could together witness an experiment that gives seven blue and three white draws, and they would all agree that *this experiment* gives likelihood odds of 81:1 favoring H_B. Moreover, a larger experiment with 50 draws is almost certain both to find the truth and to achieve consensus despite individual differences.

In preparation for an application involving probabilities in the following sections, this marble example having multiple trials using the same urn with its same probabilities repeatedly is easily generalized to multiple trials using different urns with different probabilities. For example, envision three urns, one with 1 blue and 9 white marbles, another with 1 blue and 4 white marbles, and another with 1 blue and 19 white marbles, and hence probabilities of 0.1, 0.2, and 0.05 for a blue draw. Upon drawing one marble from each of the three urns, what is the probability that all three draws are blue? Since these are independent events, their joint probability is simply the product of the individual probabilities, 0.1 x 0.2 x 0.05 = 0.001. This is such a basic and intuitively obvious feature of probabilities that this rule is often taken to be one of the axioms for probability theory. Nevertheless, anyone with even the slightest doubt that this theory matches physical reality may personally check such answers using a few marbles and his or her own eyes and hands. Incidentally, the joint probability for N trials with different probabilities is equal to that for N trials all having an identical probability, namely the geometric mean of the original probabilities. The geometric mean is

calculated by summing the logarithms of the probabilities, dividing by N to obtain the mean, and then exponentiating this mean. For the present example, the geometric mean is 0.1 or 10%, and indeed 0.1 x 0.2 x 0.05 = 0.1 x 0.1 x 0.1, so the geometric mean provides a nice summary statistic for a number of different probabilities.

Finally, what is the domain of scientific thinking? Obviously, science itself concerns the natural world with its electrons, animals, stars, and such. But scientific thinking has a much broader applicability.

The official, mainstream view of the AAAS is that "scientific habits of mind can help people in every walk of life to deal sensibly with problems that often involve evidence, quantitative considerations, logical arguments, and uncertainty."[10] More generally, "science is one of the liberal arts" and "many of these fundamental values and aspects [of science] are also the province of the humanities" in a "wider world of ideas" that includes "religious, philosophical, and social thought."[11]

However, many persons suppose, in agreement with the AAAS claim quoted earlier, that scientific investigations cannot possibly prove or disprove the existence of supernatural beings. If scientific method really were impotent to help prove the existence of the very Being that endows theology with its subject matter, then for all practical purposes theology would lie outside the domain of scientific inquiry.

But what must be presupposed in order for this supposition to be true, that scientific method cannot prove or disprove the existence of supernatural beings? The required premise is that there are no observable interactions between natural and supernatural entities. (Incidentally, that might be simply because no supernatural beings exist, or because such beings do exist but they do not interact with physical things in any ways that we could observe.)

To see why this premise is necessary, an analogy may be instructive.[12] The most common type of agricultural yield-trial experiment generates yield measurements for a number of genotypes (G) grown in a number of environments (E, which may be different locations or years or both). Although such an experiment has *two* factors, it has *three* sources of variation. The obvious sources of variation in yield are the genotypes and the environments, but the additional one is the genotype-by-environment interactions (GxE). The key feature of this analogy for present concerns is that various agricultural specialists have different stakes. Agronomists work on improving environments, so their stake is E, but also G x E because it too involves environments. And plant breeders work on improving genotypes, so their stake is G, but also G x E because it too involves genotypes. Interestingly,

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[10] *Science for All Americans*, 13; also see 26.

[11] *The Liberal Art of Science*, xi, xii, 24.

[12] Gauch, *Scientific Method in Practice*.

the variability in yield associated with G x E is usually larger than G, so plant breeders can make even larger gains by handling G x E than by handling G. In getting the whole story, interactions are important!

Returning now to the present context, an analogous situation holds for the supernatural (S) of concern to theology and the natural (N) of concern to science, that an additional topic is supernatural-by-natural interactions (S x N). Scientists' stake is N, but also S x N if it exists because it too involves the natural world. Consequently, only if there are no interactions between supernatural and natural entities can it be presumed legitimately that no observations by scientific methods of natural entities could occur that have supernatural explanations and worldview import.

What could possibly legitimate the (implicit) presupposition of no such interactions? Recall that science's presuppositions were installed above by appeal to a mere scrap of common sense, the reality check, that was adopted by faith. Certainly, this installation provides no verdict whatsoever on whether supernatural beings exist, and if so, whether they interact with natural entities. Furthermore, to preserve science's status as a public institution, its presuppositions must suit a worldview forum that includes all worldviews (except radical skepticism). In science's worldview forum, beliefs about supernatural beings are simply controversial.[13] So, the implicit AAAS presupposition is problematic, constituting a nasty blow to science's public status. This is exactly the problem that the recommended installation of presuppositions avoids by relying instead on a shared, worldview-neutral scrap of common sense.

Scientific method, as grounded in presuppositions that are worldview-neutral and that preserve science's public status, implicates no verdict whatsoever regarding whether scientific observations might reveal supernatural beings. Maybe, and maybe not.

If the world is as some worldviews would have it, then no traces of supernatural activity will occur in scientific observations. But if the world is as some other worldviews would have it, then some scientific or physical observations that require supernatural explanations are to be expected. And if the world is as still other worldviews would have it, there may be no clear expectation either for or against observable S x N interactions. In any case, the important point from a methodological perspective is that precisely because hypotheses about physical reality interacting or not interacting with non-physical reality are not among science's legitimate presuppositions, such hypotheses retain eligibility to be considered in light of the data if admissible and relevant data can be identified and collected.

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[13] Greg Easterbrook, "Science and God: A Warming Trend?," *Science* 277 (1997): 890-93; Edward J. Larson and Larry Witham, "Scientists and Religion in America," *Scientific American* 281 (no. 3, 1999): 88-93.

In summary, what makes science public, definitive, and robust? In essence, unproblematic presuppositions, standard logic, and empirical evidence yield public conclusions. When the strength of the evidence increases extremely rapidly with the amount of data, definitive conclusions can approach certainty. Weighty evidence can support robust and reliable conclusions despite substantial defects in both data and investigators. A given experiment can be a shared and public project because its import can be disentangled from the other information and opinions that various individuals possess. Consensus can and does emerge when shared and public evidence outweighs differences coming from other data and opinions, which is particularly likely when the evidence's weight rises exponentially with its amount. Finally, the potential for scientific, empirical investigations to reveal miraculous events and supernatural beings does not turn on methods or presuppositions, but rather data. To determine whether supernatural beings interact with natural entities in observable ways, one has to look at the world to see what happens!

4. Bold Conjectures

The previous section concluded that one has to look at the world to see what happens. But look at what? Exactly which kinds of data could provide especially informative evidence for worldview inquiries?

Well, the pursuit of informative evidence begins with the search for bold conjectures. Ideally, bold conjectures delineate critical experiments that test exceptionally significant hypotheses with spectacularly decisive evidence, and yet the test requires only a reasonably manageable effort. The literatures in philosophical theology, natural theology, and Christian apologetics suggest many possibilities, of which one is pursued here. This section suggests that bold conjectures, which are fabulously rich in worldview implications, are the Bible's claim of prophetic accuracy and alternatively the denial of that claim.

The prophet Isaiah, for instance, is quite bold. "Future things I declare; before they spring into being I announce them to you. . . . I am the first and I am the last; apart from me there is no God. Who then is like me? . . . Let him . . . declare what is yet to come" (Isaiah 42:9, 43:9-12; also see Isaiah 41:21-24, 44:6-7, Jeremiah 10:1-16, Daniel 2:27-28, Amos 3:7, and 1 Peter 1:10-12). And the biblical standard for a genuine prophet of the true God is nothing less than complete predictive accuracy (Deuteronomy 18:22).

Repeatedly, the Bible prophets asserted five claims. (1) They claimed to be predicting the future with precise detail and perfect accuracy. This is a bold and extraordinary claim because of the universal human experience, expressed succinctly by James (4:14), that "You do not even know what will

happen tomorrow." (2) They claimed that their message was revealed to them by God—the true and living God who made the heavens and the earth and who alone knows the end from the beginning. They also joined these first and second claims as the antecedent and consequent of the implication that accuracy implies revelation. (3) They claimed that their prophecies and predictions served God's purposes, including calling people to repentance, authenticating both the real God and his true prophets, revealing God's character and will, and preparing later generations to recognize key events in their own times that fulfilled God's loving purposes for individuals and nations. Collectively these claims encompass the three stipulations in the standard definition of a miracle, "an event of an extraordinary kind brought about by a god and of religious significance."[14] This definition also fits with the common biblical language about miracles from God being "signs and wonders," where this first term indicates theological import and this second term indicates evidential weight.

And as an expansion on the second claim, the Bible prophets also explicitly denied all alternative explanations for the accuracy and source of their prophecies. (4) They denied that prophets of other (false) gods can predict the future with equal accuracy, and accordingly they confidently challenged all comers. (5) They denied that their prophecies were produced by themselves or by any other persons or physical means.

The manner in which Bible prophecy challenges other worldviews depends somewhat on the specifics of individual worldviews. There are three cases.

One case is another religion or theism that does not offer any predictions of the future. Then the challenge from Bible prophecy is, "Show the things that are to come hereafter, that we may know that you are gods" (Isaiah 41:23). This questions the competitor's very concept of God. That is, if Isaiah's God delivers knowledge of the end from the beginning, but the competing god does not, then this competitor's god lacks a quintessential property befitting a being rightly called God. A second case is another religion that does have a tradition of prophecies. Then the challenge is comparative, seeing whether one religion has decidedly more impressive and accurate prophecies than the other. Finally, a third case is atheism. From a naturalist's atheistic perspective, physical reality is all of reality, so the source of the prophets' predictions must be themselves (perhaps aided by other persons or physical things). Therefore, the prophets' affirmation that neither they nor others are the source of their predictions directly challenges the naturalist's only possible explanatory basis of physical things.

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[14] Richard Swinburne, ed., *Miracles* (New York: Macmillan, 1989), 2; also see 2-10.

Note that biblical theism and these three groups of worldviews are mutually exclusive and jointly exhaustive of the possibilities. Either the true God is the Bible's God, or a different god or gods (either offering prophecies or else not), or there is no God. Consequently, the Bible prophets' claims of predictive accuracy are bold indeed not only because they go against the universal human experience of severely limited knowledge of the future, but also because these claims intentionally challenge *every* other worldview. Of course, the challenge goes both ways. Naturalism's claim that sober scrutiny must instead find poor predictive success is a direct and bold challenge to the Bible's veracity and hence to Christianity's credibility.

Although all worldviews are engaged, the emphasis in this paper will be on Bible prophecy as a critical test between naturalism and Christianity. This focus is motivated by the importance of naturalism as a major challenger to Christianity. Also, unlike the more involved comparison between Christianity and other religions offering prophecies, the present project has the advantage of simpler hypotheses generating a relatively easy test. Christianity predicts a high success rate for Bible prophecies, whereas naturalism predicts a low success rate.

Importantly, naturalism's prediction of a low success rate, by Bible prophets or anyone else, is not a shaky or revisable verdict based merely on current ignorance about how to achieve great predictions. Rather, it is a permanent verdict based on solid knowledge about inherent limits to prediction by any physical system because of unavoidable complexity, chaos, uncertainty, and measurement errors.[15] This situation is analogous to finding a rational expression for the square root of two. We are not waiting for a more clever mathematician to succeed, but rather this quest has already been proven to be impossible. Some things are just not possible, period. Incidentally, naturalism does have variants (which could have names such as secularism, humanism, atheism, and physicalism). But common to all variants is the central idea that physical reality is all of reality (or more exactly, some naturalists acknowledge the existence of tame immaterial entities, such as the concept of the integer, two; but the present concern is with considerably more exciting immaterial entities, such as angels and gods). Naturalism in any of its variants implies inexorably that there are severe limits to prediction.

Equally importantly, the Bible prophets' claims of predictive accuracy are not an optional or tangential claim that Christianity can surrender without great cost. There is no changing now of the fact that Isaiah and other

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[15] Roger Trigg, *Rationality and Science: Can Science Explain Everything?* (Oxford: Blackwell, 1993); Nicholas Rescher, *Predicting the Future: An Introduction to the Theory of Forecasting* (Albany, NY: State University of New York Press, 1998); Nicholas Rescher, *The Limits of Science*, Rev. Ed. (Pittsburgh, PA: University of Pittsburgh Press, 1999).

prophets have written these claims in the Bible. If those Bible prophecies that can be checked have regularly failed to come true, then by the Bible's own account and by any other sensible account, the prophets seem more pretentious than credible.

So, different expectations for the Bible's predictive success rate offer an important test between naturalism and Christianity. In approaching the data on Bible prophecies and outcomes, however, some technicalities need to be handled carefully. Accordingly, the next section discusses the robustness of this test despite possible problems with imperfect data and imperfect investigators, and the following section states eight criteria for admissible and relevant data.

5. Robust Tests

The Bible's text has about 1,000 pages, including roughly 1,000 prophecies having outcomes spanning over 2,000 years. Obviously, given such a vast dataset, there could be occasional problems in settling the interpretation of a given prophecy, in deciding whether a prophecy meets the four admissibility criteria specified in the next section, and in settling the historical and archaeological facts about the outcome (regardless whether a given outcome is claimed by someone as either a fulfilled or broken prophecy). There could be some imperfect data, not to mention some imperfect investigators.

Consequently, a critical distinction must be made between (1) the theoretical claim that the Bible has perfect predictive accuracy because of revelation from the All-Knowing Knower, and (2) the practical claim that available data can prove this accuracy in each and every case. The former could be believed whole heartedly while also exercising some humility about one's cognitive position and prowess.

So, the relevant question about Christianity and naturalism's different expectations for the Bible's prophetic success rate is not whether perfect tests with perfect data and perfect investigators are possible. Obviously not. Rather, the real question is whether robust tests with imperfect data and imperfect investigators can deliver a solid verdict that counts across worldviews.

In principle, all that need be said about imperfect prophecy data has already been said in the earlier discussion of imperfect marble data. Often imperfect data can support robust tests and conclusions. Nevertheless, a few remarks may be offered in this section regarding the present context of prophecy.

The modest proposal recommended here for protagonists of the Bible's claim of prophetic accuracy might be named "The 90% Clear Rule." For Bible prophecies meeting the four admissibility criteria, we suggest the fol-

lowing as a reasonable and realistic guesstimate: about 90% of admissible prophecies can be shown clearly and definitely to be fulfilled; but 10% could have enough exegetical or other difficulties to allow some room for interpretations yielding either a contrary verdict or else no verdict, given the present exegetical and archaeological resources. So, the protagonists' theoretical claim is 100% accuracy from revelation from God, but their empirical claim after acknowledging imperfect data is ≈ 90% or "high" accuracy.

Likewise, the sensible proposal recommended here for antagonists of Bible prophecy might be named "The 10% Luck Rule." What antagonists mean by poor predictive accuracy can be made more concrete by specifying a particular percentage, even though that value is obviously only a guesstimate, namely ≈ 10%. So, the antagonists' theoretical claim is 0% help from a nonexistent God, but their empirical claim after acknowledging mere luck is ≈ 10% or "low" accuracy.

Accordingly, the empirical test is between expectations of ≈ 90% or else ≈ 10% predictive accuracy. These two hypotheses are so widely separated that their test is perfectly robust. Indeed, even if perfect data were available, the efficiency of the test would increase only slightly. Of course, it would be problematic if data problems were so severe and pervasive that protagonists needed to adjust their empirical claim to merely 15% success because 15% and 10% are so narrowly separated that their test is bound to be indecisive. Fortunately, such is not the case. A perfect test is unnecessary because a robust test is sufficient.

Needless to say, effective handling of imperfect data is a standard topic in statistics.[16] Also, the ability to make sensible approximations or guesstimates and to deploy them in effective reasoning is widely recognized as a key educational outcome for science majors and nonmajors alike. So, the tools for benefiting from imperfect data in an imperfect world are well developed and readily available, and they are useful in certain types of theological or worldview inquiries involving empirical data.

6 .   *F u l f i l l e d   P r o p h e c i e s   a s   C a n n e d   M i r a c l e s*

Fulfilled prophecy is a distinctively accessible and testable kind of miracle. As J.L. Mackie observed: "[It] is worth noting that successful prophecy could be regarded as a form of miracle for which there could in principle be good evidence. If someone is reliably recorded as having prophesied at t_1 an event at t_2 which could not be predicted at t_1 on any natural grounds,

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[16] Rand R. Wilcox, *Introduction to Robust Estimation and Hypothesis Testing* (San Diego, CA: Academic Press, 1997); David R. Insua and Fabrizio Ruggeri, eds., *Robust Bayesian Analysis* (New York: Springer, 2000).

and the event occurs at t_2, then at any later time t_3 we can assess the evidence for the claims both that the prophecy was made at t_1 and that its accuracy cannot be explained either causally (for example, on the ground that it brought about its own fulfilment) or as accidental, and hence that it was probably miraculous."[17] Furthermore, as Schlesinger observed, the evidence for miracles in general and fulfilled prophecy in particular is important for Christian theism because "a miraculous event . . . is the most conspicuous candidate for constituting possible confirmatory evidence in support of Theism."[18]

The objectives of public theology, particularly its pursuit of reasons that count across worldviews, impose strict criteria for admissible evidence. These criteria are equally necessary and completely impartial, regardless whether a given prophecy and its outcome is cited as a fulfilled or broken prophecy. In essence, the following four criteria are an elaboration of the above quotation from Mackie.

(1) Clear Prediction. The prophecy must be publicly available with a reliable text and evident interpretation. Its predictions must be so specific and detailed that a fulfillment, and also a failure, would be recognizable without any ambiguity.

(2) Documented Outcome. The prophecy must have had its outcome already by the present time, with that outcome well documented by publicly available facts. For instance, reliable and independent historical records count, as do the stones and relics found at archaeological sites and museums. Evident facts of world history also count. But unverifiable reports do not count, especially reports of miraculous events that are exceedingly improbable from atheist or other perspectives.

(3) Proper Chronology. Definite empirical evidence must be available presently and publicly to document that indeed the prophecy does predate its fulfillment. For the Old Testament, this criterion includes all outcomes dated after 150 B.C., the average date of copies of Bible books among the Dead Sea Scrolls, which is also about the time when the independently-circulated Greek translation, the Septuagint, was prepared in Alexandria, Egypt. There are several kinds of substantial evidence for earlier datings, but the selection criterion adopted here stipulates indisputable evidence.

Likewise, for a collection of books such as is found in the Bible, the corpus or canon must have been settled before the considered outcomes began. Otherwise, knowledge of the outcomes could have influenced the selection process, canonizing those books with fulfilled prophecies while discarding

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[17] J.L. Mackie in Swinburne, *Miracles*, 90.
[18] Schlesinger, *Religion and Scientific Method*, 193.

other books with embarrassing ones, thereby producing a spurious prophet-
ic accuracy using the unfair advantage of hindsight.

(4) *Evidential Weight.* Predictions must be too specific and unusual to
make their fulfillments likely merely by chance. For instance, a generic
curse that a city will be destroyed has little evidential weight because most
ancient Near-Eastern cities have been destroyed many times. Furthermore,
there must be factual reasons for assigning particular odds of fulfillment by
chance, such as 1:5 in one case or 1:100 in another. For instance, the
antecedent odds for a city encountering some particular outcome can be
assigned by determining the proportions of the various possible outcomes
for a sizable and representative reference class of comparable cities.
Sometimes simply counting the number of antecedently equally probable
outcomes can provide a satisfactory assignment.

Likewise, to obtain the cumulative odds for several prophecies simply
by multiplying the individual odds together, there must be support for the
assumption of essentially independent events, or else any substantial depar-
tures from independence must be noted and the appropriate corrections
made. Finally, a prediction must not have been offered by a given person (or
group) and then fulfilled by the selfsame person who has power to bring it
about since a self-fulfilling prophecy has no evidential weight.

The above four criteria must be met for prophecy data to be admissible.
In addition, four more criteria are required for the data to be relevant and
practical for testing significant worldview hypotheses. The admissibility
criteria need to be checked for each individual prophecy, whereas the rele-
vance criteria are met by general methodological considerations applying to
a prophecy dataset as a whole, as explained next.

(5) *Testable Hypotheses.* Hypotheses are testable when they make dif-
ferent predictions about some observable outcome. The expectation of the
Christian worldview for the Bible prophets is high accuracy. Consequently,
any other worldview that expects a markedly lower accuracy has thereby
rendered the Christian and that other worldview testable.

(6) *Worldview Import.* The different predictions, such as high or else
low prophetic accuracy, must originate from causal explanations with sig-
nificant worldview import. For instance, in a competition between
Christianity and naturalism, the causal explanation for the prediction of high
accuracy is that God alone knows the end from the beginning and has
revealed the future to prophets, whereas the causal explanation for the low
accuracy is that humans (and more generally any physical systems) have
severely limited predictive powers, although occasional lucky guesses are
expected.

Causal explanations create a link between the data, constituting a rather
insignificant story in and of themselves concerning prophets and parchments
and cities and stones and such, and the worldview hypotheses, telling big

stories about whether or not God exists. Worldview significance arises from the causal explanations rather than from the empirical data themselves. Apart from causal explanations involving significant worldview beliefs, fulfilled prophecies in particular or miracles in general could be no more interesting than magic tricks, unworthy of philosophical reflection even if the evidence were absolutely compelling.

(7) Robust Conclusion. The verdict on the Bible prophets' claims of predictive accuracy must emerge from major and settled features of the data, not from picky and disputable details. Different persons with different data subsets, different analyses and interpretations, and even vastly different expectations originating from diverse worldviews, should all reach virtually the same conclusion. Two properties that greatly favor robust investigations are that the inquiry's data produce an evidential weight rising exponentially with the amount of data and that the inquiry's analysis is disentangled from other information and worldview beliefs.

Furthermore, in this imperfect world, human-sized abilities and reasonable approximations must suffice to achieve robust results. For instance, the assignment of particular odds to a given prophecy for its being fulfilled merely by chance does need a factual basis (as mentioned in criterion 4 above), but guesstimates are quite sufficient. If an author suggests odds of 1:10, whereas either picky haggling or careful reckoning prompts some reader to prefer rather different odds such as 1:3 or 1:30, that makes little difference because the cumulative case for a collection of prophecies grows exponentially. If such discrepancies are not systematic, so a reader sometimes prefers less impressive odds and sometimes prefers more impressive odds, they will tend to nearly cancel out. And even if they are systematic, an author's suggested cumulative odds of, say, one in 10^{20} might change to a reader's preference of, say, one in 10^{10} or else one in 10^{30}. So what? Any and all of these reckonings constitute the same verdict, namely a massively overwhelming case. Likewise, calculation of the cumulative odds by simply multiplying together the individual odds requires an assumption of independent events (as mentioned in criterion 4 above), but approximate independence suffices. If some events are somewhat negatively associated whereas others are somewhat positively associated, these departures from independence will roughly cancel out, so minute departures are hardly worth mentioning. But if there are any substantial departures from independence, then these can be noted and a somewhat more complex calculation can be substituted to account for nonindependence.

Likewise, in this imperfect world, imperfect data on Bible predictions and outcomes, as well as imperfect investigators, must suffice to achieve robust results. The earlier discussion of imperfect marble data foreshadowed the resolution for imperfect prophecy data that was developed in the previous section.

(8) Manageable Effort. The work needed to draw a definitive conclusion must be manageable. There are personal differences, of course, in interests and priorities. Ideally, those individuals with interest and leisure to pursue virtually all of the available data could obtain comprehensive materials, whereas those persons better served by a more manageable subset of the data could also obtain definitive results because its evidential weight is great. Otherwise, however significant a proposed inquiry might be, the required work might just be too much.

These eight criteria can be used to define first-tier and second-tier evidence. A prophecy dataset constitutes first-tier evidence if each prophecy meets the first four criteria for admissibility and also the dataset as a whole meets the remaining four criteria for relevance. But a given prophecy constitutes second-tier evidence if it fails somewhat to meet one of the criteria for admissibility. For instance, criterion 3 about proper chronology fails if no compelling empirical evidence proves that the prophecy predates its outcome. However, even if no copy of a prophecy older than its outcome has yet been found to provide this definitive evidence, there may still be several independent lines of circumstantial evidence that converge on an earlier traditional dating that predates the outcome, so there is a plausible or even probable case for meeting the chronology criterion. Likewise, the prophecy that a long-inhabited city will remain forever deserted after being destroyed is quite unusual since most destructions are quickly and repeatedly followed by restorations, but it is impossible to observe a perpetual desolation with final certainty until the end of the age has already come.

In the complete absence of any first-tier evidence, mere second-tier evidence might not be very exciting to a naturalist. But after first-tier evidence has already been tendered, second-tier evidence could have some supplementary interest and weight. First-tier evidence weakens or even unsettles the atheistic worldview assumptions that motivate extraordinarily stringent criteria for admissible evidence supporting biblical theism.

Because the canon and text of the Bible have now been fixed for almost two millennia, the Bible's predictive content is fixed. Scholars have provided comprehensive surveys of this predictive content, comprising about a fifth of the Bible's text.[19] So-called "typical" prophecies (such as the Passover lamb foreshadowing Christ's sacrifice) are not counted here because they are not suited to present purposes. What remains to be produced, however, is a comprehensive account of those particular prophecies that meet the above eight criteria for admissible and relevant evidence.

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[19] J. Barton Payne, *Encyclopedia of Biblical Prophecy: The Complete Guide to Scriptural Predictions and Their Fulfillment* (New York: Harper & Row, 1973); John F. Walvoord, *Every Prophecy of the Bible* (Colorado Springs, CO: Chariot Victor Publishing, 1999).

Incidentally, although the Bible's predictive content is fixed, its admissible fraction is contingent on factors that change over time, particularly because of admissibility criteria 2 and 3. Over the past two millennia, the number of prophecies that have already had their outcomes occur has steadily increased, including many outcomes during the past century. Likewise, accumulating archaeological investigations have steadily unearthed older and older copies of Bible books, especially during the last century with the discovery of the Dead Sea scrolls. This trend of an increasing fraction of admissible prophecies, which has already persisted unbroken for two millennia, may be expected to continue into the foreseeable future. Indeed, it is entirely possible that during the next decade or two, the status for several more Bible prophecies will upgrade from second-tier evidence (or even unavailable evidence) to first-tier evidence, and conceivably some of these may be spectacular, high-profile prophecies.

Fulfilled prophecy is different from other Bible miracles. Granted, we cannot watch the walls of Jericho fall, nor drink the miraculous wine in Cana. Nevertheless, there is one category of Bible miracles, fulfilled prophecies, that is empirically accessible here and now. In line with the above eight criteria for admissibility and relevance, the evidence is empirical, public, and testable. There are physical books with physical evidence of having been written before a specific date, and there are subsequent outcomes known from historical records and the stones and artifacts located at archaeological sites and museums open to the public. Whether the parchment and ink matches the stones and artifacts is a matter of empirical and public fact, not mere opinion or presupposition. Hence, fulfilled prophecy is a canned miracle—a miracle preserved for every generation to put to its most stringent test. Everyone gets a front-row seat.

The writings of the prophets and apostles are replete with *reported* miracles, such as raising the dead and walking on water. But what is relevant for present purposes are the prophets' claims that their very words in many predictive passages constitute *testable* miracles, namely specific, accurate, and supernatural knowledge of the future that the prophets had received by revelation from the true God who alone knows the end from the beginning.

Consequently, in the presence of genuine uncertainty or even entrenched doubt about the credibility of Bible miracles, it makes sense to settle the verdict on testable miracles first and then to progress to reported miracles. If the Bible's testable miracles fail, then its reported miracles are candidates for breezy dismissal. But if the case for the testable miracles of fulfilled Bible prophecies is overwhelmingly compelling, then a theistic worldview has been established and subsequently eyewitness reports of miracles merit serious consideration, especially given compelling criticisms of

Hume's argument against reported miracles.[20]   Hence, in any orderly and honest inquiry into Bible miracles, its canned miracles merit priority and primacy.

Finally, the present focus on testable features of a revelation should not completely distract attention from untestable features. The foremost purpose of a revelation from God is to communicate to us things that we could *not* know or test on our own. Upon having examined the data, if the Bible predictions whose outcomes have already occurred over the past two millennia prove invariably and miraculously accurate, then there is good reason to trust remaining predictions of still-future events, and more generally, there is good support for other teachings about the nature and worship of God that inherently are not empirically testable.[21]   Indeed, Christ's own sentiment, that a speaker's credibility in earthly matters affects that person's credibility in heavenly matters (John 3:12, Matthew 9:4-7), reflects this natural progression with the testable paving the way for the untestable. A revelation with an appropriate combination of testable and untestable elements suits both divine purposes and human needs.[22]   As Thomas Aquinas observed, revelation of "the truth about God," including the truth about God's relationship with us, is necessary to human well-being because "the human being is designed by God for a final purpose of a sort that is beyond reason's power."[23] Or in more familiar words, "man does not live on bread alone, but on every word that comes from the mouth of God" (Deuteronomy 8:3, Matthew 4:4). Therefore, the Bible's documentable credibility in earthly matters, such as testable prophecies, is important because this affects its perceived credibility in heavenly matters.

7 .   *A d m i s s i b l e   B i b l e   P r o p h e c y   D a t a*

This section takes a quick glance at admissible Bible prophecies. It draws heavily from the chapter by Robert C. Newman in the book on miracles

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[20] Joseph Houston, *Reported Miracles: A Critique of Hume* (Cambridge: Cambridge University Press, 1994); John Earman, "Bayes, Hume, and Miracles," *Faith and Philosophy* 10 (1993): 293-310; John Earman, *Hume's Abject Failure: The Argument Against Miracles* (Oxford: Oxford University Press, 2000); Rodney D. Holder, "Hume on Miracles: Bayesian Interpretation, Multiple Testimony, and the Existence of God," *The British Journal for the Philosophy of Science* 49 (1998): 49-65; David Johnson, *Hume, Holism, and Miracles* (Ithaca, NY: Cornell University Press, 1999).

[21] Richard Swinburne, *Revelation: From Metaphor to Analogy* (Oxford: Oxford University Press, 1992), 87-9.

[22] Swinburne, *Miracles*, 6-10; Swinburne, *Revelation.*

[23] Thomas Aquinas as quoted in Norman Kretzmann, *The Metaphysics of Theism: Aquinas's Natural Theology in Summa Contra Gentiles I* (Oxford: Oxford University Press, 1997), 34-6.

edited by R. Douglas Geivett and Gary R. Habermas.[24] That chapter has five criteria for admissibility with essentially the same content as our four criteria (and likewise essentially the same content as the above quotation from J.L. Mackie), and that book received eighty pages of careful discussion by Evan Fales and his respondents in a recent issue of this journal.[25] The evidence of Bible prophecy is also discussed in several other books.[26] The present extremely brief presentation must relegate documentation of the facts to these references. It makes frequent use of approximations or guesstimates, given the result from Section 5 that this is sufficient for a robust test. Of course, this mere one section of one paper is not intended to marshal the evidence, but is rather meant to demonstrate by example what prophecy evidence looks like.

Concerning the nation of Israel, Hosea (3:4) predicted that "the sons of Israel will remain for many days without king or prince, without sacrifice or cult pillar, and without ephod or teraphim." The term "Israel" here is somewhat ambiguous, as it is used sometimes to refer to all the Israelites and sometimes to the ten northern tribes in distinction from the southern tribe, Judah. In either case, this prophecy has been fulfilled in the history of the surviving Jewish population, thereby including people from the Northern Kingdom who had moved to Judah. It has also been fulfilled in the history of the Samaritan sect, the survivors of the Northern Kingdom who were not exiled. This prophecy does not just vaguely predict a dispersion of Israel. Rather, it details several specific cultural features that the Israelites would lose, including Davidic kingship and lesser national rulers, (orthodox) sacrifice, idolatrous cult rituals using pillars, the priestly ephod (either the priesthood itself or the specific garment), and the teraphim (household idols). Although some aspects of the prediction were fulfilled earlier, many were fulfilled after there is empirical evidence that this prophecy had already been written, namely 150 B.C.

Surely "many days" in the life of a nation is much longer than "many days" in the life of an individual. For a nation to be "without king or prince" occasionally and briefly is to be expected, but that this would be predicted for a long period is rather surprising, with estimated odds of 1:5. And for a

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[24] Robert C. Newman in R. Douglas Geivett and Gary R. Habermas, eds., *In Defense of Miracles: A Comprehensive Case for God's Action in History* (Downers Grove, IL: InterVarsity Press, 1997), 214-25.

[25] Evan Fales, "Successful Defense? A Review of *In Defense of Miracles,*" *Philosophia Christi* 3 (2001): 7-36; responses 3 (2001): 37-87.

[26] Robert C. Newman, ed., *The Evidence of Prophecy: Fulfilled Prediction as Testimony to the Truth of Christianity* (Hatfield, PA: Interdisciplinary Biblical Research Institute, 1990); John W. Montgomery, ed., *Evidence for Faith: Deciding the God Question* (Dallas, TX: Probe Books, 1991), 173-214; Dennis McCallum, *Christianity, The Faith That Makes Sense: Solid Evidence for Belief in Christ, Revised Edition* (Wheaton, IL: Tyndale House, 1997), 49-103. Also see papers and resources on prophecy data available at www.ibri.org.

nation to be left in a state of religious limbo "without sacrifice or cult pillar, without ephod or teraphim" is also unlikely. The total disappearance of the high-priestly line with the destruction of Jerusalem in 70 A.D. left Israel without ephod and the proper personnel to perform acceptable sacrifices, not to mention the loss of the temple itself. Given the dispersal of Jews through the Roman Empire by this time, the fact that this critical family line had no members living outside of Jerusalem—or any who were able to flee Jerusalem's destruction—and thus was completely lost is striking. This seems especially unusual given the universal recognition of the importance of the Aaronic priesthood to the nation of Israel, giving estimated odds of 1:10. Moreover, that Israel would forever abandon idolatry, being without pillar or teraphim, is also surprising, given Israel's proclivity to it in the past and the popularity of this form of worship in the Near East until Islamic times, yielding estimated odds of 1:5.

Hosea's prophecy continues with the prediction of eventual return. "Afterward the sons of Israel will return and seek the Lord their God and David their king; and they will come trembling to the Lord and to his good- ness in the last days" (Hosea 3:5). Another passage is Isaiah 11:10-12, pre- dicting a second return "from Assyria, Lower Egypt, Upper Egypt, Cush, Elam, Babylonia, Hamath, and the islands of the sea . . . [and] from the ends of the earth." (The first return is generally taken as being the return of a remnant from Babylonian and Assyrian exile after Cyrus authorized the rebuilding of the Jerusalem temple in 537 B.C.) Additional passages include Ezekiel 36:24-31, Zechariah 12:10-13:9, and Revelation 11:1-13.

By the time of Esther and Xerxes (486-465 B.C.), there were Jews in all the provinces of the Persian empire from India to Ethiopia (Esther 8:9). The conquests of Alexander (334-323 B.C.) encouraged their spread westward from Palestine, and by the first century A.D., Jews were found all over the Roman empire (Acts 2:8-11). Thus a return of Jews "from the ends of the earth" could not have taken place before the Christian era. Until 70 A.D., the Jews continued to live in their own land as a national entity, though subject to the dominant empires, whether Persian, Greek, or Roman. Finally, how- ever, the Jews rebelled against Rome, and the Romans destroyed Jerusalem and the Jewish state in two wars, 66-73 and 132-135 A.D. From that time until recently, there has been only a small struggling Jewish population in Palestine. But especially since 1948, millions of Jews have returned to Israel, particularly from the modern equivalents of the specific nations list- ed by Isaiah. Although caution is required when judging whether recent events fulfill a prophecy, that the state of Israel has survived now for over 50 years seems significant, though most of these return passages contain ele- ments that have not yet happened. For instance, most modern Israelis show little interest in seeking "the Lord their God." If one reads these prophecies

as lists of unfolding events, generally the first item is a return to the land, so apparently some of the following steps are still future.

What are the odds that a people group will be globally dispersed, yet retain its identity for centuries independently of a homeland, survive almost continual persecution and harassment, and then return to reestablish their nation? Few peoples from Old Testament times survive today as the same ethnic groups, and the few who do stayed in or close to their homelands. Given the upheavals in the Near East, only about a tenth of these people groups have maintained their ancient ethnic identity in the region over the centuries. The Jews, who were dispersed globally, faced much lower odds. That a globally-dispersed group would return to their native land and resettle it after 2,000 years is unique in history. Perhaps the closest analogy would be if the Mennonites returned to their European homelands and formed a new nation, or the gypsies to theirs. The odds of Israel regathering, being unique in history, may be estimated conservatively as 1:1,000. Combining the above four odds regarding Israel, antecedently the cumulative odds for these predictions coming true are 1:250,000.

Concerning Old Testament prophecies of the coming Messiah, Christians see these prophecies as being fulfilled in Jesus, as reported in the New Testament. But to counter claims that the New Testament was explicitly written to fit these predictions, the fulfillments examined here happened long after the New Testament had already been written, were such that the New Testament writers could not possibly have engineered these outcomes, and are now evident and unquestionable facts of world history.

Isaiah 42:6-7 says that the Servant is to be a "light to the gentiles." Isaiah 49:5-7 develops this theme further, predicting that the Servant will be powerful, bringing God's "salvation to the ends of the earth," and yet he will be "despised and abhorred by the nation" of Israel, although rulers of the gentiles will "bow down" to him.

Has there ever been any Jewish person who fits these words, having begun a world religion of gentiles? Well, for starters, there are only a handful of major world religions, about five, so the search among the possibilities is rather manageable! Surely the only candidate—and one who claimed to be the Messiah at that—is Jesus of Nazareth. Before the first century A.D., only the Jews and a few Greek philosophers were believers in one God, and only a small percentage of the world's population had any awareness of the Hebrew Scriptures. But now, about a third of the world's people accept Jesus as the Messiah. They are mostly gentiles and are found on every continent. As predicted by Isaiah, Jesus has become a light to the gentiles as news of him has spread throughout the world.

How does one calculate the probability that a Jew would found a world religion? A reasonable assumption is that a founder belongs to some people group. Then what fraction of the world's population, at the time the

prediction was made or the time it was fulfilled, were Jews? The current fraction of Jews in the world is 0.3% and the fraction in Isaiah's time and New Testament times was not drastically larger. Since the world has produced about five founders of major religions and since about one in 300 persons are Jews, a guesstimate for the antecedent odds of this prophecy coming true is 1:60. Furthermore, that this expected Messiah would be despised by his own nation certainly gives him a tough start on becoming a world leader, and Jesus in particular is reliably reported to have been executed as a criminal. Despised and executed criminals are not likely candidates for becoming major figures in world history, so the antecedent odds for this particular candidate, Jesus, to overcome these severe handicaps and still become a worldwide religious leader may be estimated conservatively as 1:10.

Another striking prophecy points to the specific time of the Messiah's coming, the prophecy of Daniel's seventy weeks. While Daniel is praying, the angel Gabriel gives him a message. "Seventy 'sevens' are decreed for your people and your holy city to finish transgression, to put an end to sin, to atone for wickedness, to bring in everlasting righteousness, to seal up vision and prophecy and to anoint the most holy. Know and understand this, that from the issuing of the decree to restore and rebuild Jerusalem until the Messiah, the ruler, comes, there will be seven 'sevens' and sixty-two 'sevens.' After the sixty-two 'sevens,' the Messiah will be cut off" (Daniel 9:24-26).

There are various interpretations of this text. The most plausible reading is that this decree to restore Jerusalem is that of Artaxerxes I in the twentieth year of his reign, namely 445 B.C. (Nehemiah 2:1-6), and that these 'sevens' are sabbatical cycles. The starting point falls in the seven-year cycle 449-442 B.C., so 69 'sevens' later is 28-35 A.D. The technicalities are relatively unimportant, however, because all of the other plausible construals also result in the Messiah being cut off during some year within this same interval.

Consider Jesus as a candidate for Daniel's then future Messiah who was to die around 28-35 A.D. The apostles report that after Jesus' death, on the third day he rose again. Naturally, the credibility and acceptance of this reported miracle is highly worldview dependent. On the other hand, these numerous eyewitnesses report that Jesus was crucified under Pontius Pilate, suffered death, and was buried. The historical evidence for Jesus' death is strong by any rules of historical evidence that make any sense or that are used when people honestly want to know what happened. His death is simply a fact of history that counts across worldviews, even if his resurrection is more contested. Furthermore, the best scholarship dates Christ's crucifixion around 29-32 A.D., which agrees with Daniel's prediction.

What is the chance that Daniel would luckily hit the time of Jesus' death from a distance of hundreds of years earlier? The size of his "gun sight" is seven years. The size of the prophetic span given is 490 years, resulting in odds of 1:70. But there is no antecedent reason why the prophet need limit himself to 490 years in the sweep of his prophecy. If instead one took the length of Jewish history up to the time of fulfilment, that would be about 1,500 years (from Moses), or else 2,000 years (from Abraham), resulting in odds of 1:200 or 1:300. If one took the length of Jewish history to date, the odds are about 1:500 to 1:600. As a middling guesstimate, 1:200 suffices.

Combining the above three odds regarding the Messiah, antecedently the cumulative odds of these prophecies being fulfilled are only a meager 1:120,000. Accordingly, it is incredibly unlikely that history would offer even one candidate for such an unusual person, and certainly there are no other candidates beyond Jesus of Nazareth.

The cumulative odds for this tiny sample of Bible prophecies coming true by luck is only 1:30,000,000,000,000, or roughly one in 10^{10}. Of course, whether hagglings or refinements might adjust this result to one in 10^5 or 10^{20} is quite immaterial. It would boggle readers' minds to contemplate how rarely, if ever, they make practical decisions that go against such astronomical odds.

When considering whether an examination of Bible prophecy might actually deliver a critical test of miracles in particular or of theism more generally, a rough estimate of the total amount of admissible data is helpful. From a quick scan of the prophecy literature, and bearing in mind the four admissibility criteria (clear prediction, documented outcome, proper chronology, and evidential weight) required for a study of prophecy to deliver reasons that count across worldviews, a number of admissible Bible prophecies may be identified. Brevity necessitates that the following lists are only partial, although we suspect that they locate the majority of the admissible passages. We suggest that most and perhaps all of the following prophecies meet the admissibility criteria. Doubtless, more refined lists could be produced, but these lists provide a useful point of departure.

First-tier admissible prophecies concerning the nations surrounding Israel include: (1) Philistia to be overcome and incorporated into Israel and the Philistine peoples to perish—Ezekiel 25:15-17; Amos 1:8; Obadiah 19; Zephaniah 2:4-7; Zechariah 9:7; (2) Edomites to be overcome and incorporated into Israel and the Edomite peoples to perish—Genesis 25:23, 27:29, 37, 40; Numbers 24:19; Jeremiah 12:16; Ezekiel 25:12-14; Obadiah 18-21; Malachi 1:4-5; (3) Edom region to become desolate and Petra abandoned—Jeremiah 49:16-18; (4) Ammon to be eliminated by Nabatean Arabs—Ezekiel 21:31-32, 25:4-7, 10; (5) restoration of Moab—Jeremiah 48:47; (6) Transjordan and Dead Sea areas to be occupied by Israel—Jeremiah 49:2; Obadiah 19; Zephaniah 2:9-11; (7) Babylon to be

deserted—Isaiah 13:19-22, 14:21-23; Jeremiah 25:12, 30:11, 46:28, 50:3, 11-13, 39-40, 51:25-26, 29, 34-43, 57-64; (8) peculiar fates of Memphis and Thebes—Ezekiel 30:13-16; (9) Egypt's woes but survival of its people—Isaiah 19:5-7; Ezekiel 29:14-16, 30:12-16; and (10) the fate of Tyre as compared with Sidon—Ezekiel 26, 28:20-24; Joel 3:4.

First-tier admissible prophecies concerning Israel and Palestine include: (1) the persecution and scattering of the Jews—Leviticus 26:31-33; Ezekiel 36:33-35; Hosea 3:3-4; Micah 4:6-7; Zephaniah 3:10, 19; Zechariah 13:8-9; (2) Abraham to have a great name and the survival of Israel as a people—Genesis 12:3; Leviticus 26:44; (3) the Eastern "Golden" Gate of the Temple to be closed up—Ezekiel 44:1-3; (4) Jerusalem to grow in nine sequential steps but Zion to be outside the city walls—Jeremiah 31:38-40; Micah 3:12; (5) Samaria site to become a cultivated field—Micah 1:6; and (6) the fates of Capernaum, Chorazin, and Bethsaida—Matthew 11:20-24.

The predictive material identified in this section comprises 191 verses, which are about 3.5% of the Bible's entire predictive content of approximately 5,500 verses. Incidentally, the most frequent reason for inadmissibility is simply chronology. Either a prophecy's outcome occurred before 150 B.C. when there is available physical evidence that the Old Testament had already been written (about 55%), or else its outcome has not yet occurred, primarily because of two topics that loom large in Scripture, Christ's second coming and our eternal destiny (another 25%).[27] Of the remaining 20%, many prophecies involve an outcome of a sort that does not leave physical evidence still available centuries later.

Predictions do not individuate uniquely because various features could be grouped or separated. Nevertheless, as a typical example, the analysis of predictions regarding Israel and the Messiah given earlier in this section was conveniently packaged into seven specific predictions, with each assigned approximate odds for its coming true. Our inspection of these 191 verses indicates that similar packaging would result in about 50 specific predictions. Or in other words, there is several times as much first-tier predictive content as that already analyzed to yield cumulative odds of about one in 10^{10} for coming true by chance. Remembering that the weight of prophecy evidence grows exponentially with its amount, a careful account of these predictions and their outcomes has potential for a critical test of naturalism and Christianity.

Needless to say, whether the Bible contains miraculously accurate prophecy is contested ground. Fortunately for readers of this journal, they need not look far to find a discussion of supposedly invalid or broken prophecies. In a recent issue of this journal, prophecy antagonist Evan Fales offers numerous examples in his review of a chapter written by prophecy

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[27] Payne, *Encyclopedia of Biblical Prophecy*, 631-59.

protagonist Robert C. Newman, and Fales's review also includes a response from Newman.[28] Readers can judge that exchange for themselves. But to give one further example, Fales's comments directed to Newman conclude with a question that can be addressed here: "And what does he [Newman] have to say to us concerning the certifiably false prophecies of the Bible—most poignantly, Matthew 16:27-28?"

There are several passages in the New Testament that have commonly been seen as prophetic failures. Two of the most common are Jesus' remarks: "some who are standing here will not taste death before they see the Son of Man coming in his kingdom" (Matthew 16:28 and parallels), and "this generation will certainly not pass away until all these things have happened" (Matthew 24:34 and parallels). If Jesus meant to say that he would physically return in the lifetime of those living at the time of his earthly ministry, then these are certainly failed prophecies. But several alternative explanations have been given for these predictions, as may be seen from the numerous commentaries on these passages, both liberal and conservative. We would venture the following suggestions.

Both of these predictions are intentionally ambiguous—a feature not uncommon in the teachings of Jesus. They are both structured in such a way as to raise expectations that he might return soon, but they are balanced by other passages suggesting that his return might be a long way off, such as "this gospel . . . will be preached in the whole world . . . and then the end will come" (Matthew 24:14). In fact, at least one of the individuals standing there did see Jesus coming in his kingdom before he died—the apostle John, who saw the visions of the book of Revelation late in his life. It is also of interest that all three gospels that recount this saying of Jesus immediately follow it with his transfiguration (Matthew 17:1-13 and parallels), in which Peter, James, and John see the glorified Jesus in company with Moses and Elijah, the latter of whom at least was expected at the eschatological coming of the Messiah.

As for the other prophetic passage in Matthew 24:34, its meaning turns on that of "this generation." Some commentators have noted that the Greek word translated "generation" can mean "race," and suggest that this is another prediction of the survival of Israel to the end. But in context, it seems more likely that "this generation" refers to the future generation that will see the signs Jesus has just listed, and he is telling them that things will wind up quickly after the crucial signs have occurred. It is a common feature of biblical predictions (such as Genesis 49) to speak to one's audience as though they will see the events predicted, even though it will actually be their descendants.

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[28] Fales, "Successful Defense?"; Newman in *In Defense of Miracles*, 214-25.

It would seem that Fales's most poignant example of "certifiably false prophecies of the Bible" depends on a particular and precarious interpretation that goes against a standard and sensible rule of exegesis, that a passage should be interpreted in context rather than in isolation. But the most important point regarding certifiably false prophecies is that on their own account, prophecy antagonists expect false prophecies to outnumber lucky prophecies greatly by a factor something like nine to one. Hence, as scholarship on Bible prophecy continues in the future, were 50 or so admissible predictions found to be certifiably fulfilled prophecies, then the generous response to be expected from prophecy antagonists is to exhibit their 400 or 500 or so certifiably false prophecies (rather than just a few examples depending on precarious interpretations).

Finally, this paper's one out of ten sections that merely glances at the data should not obscure this paper's focused and limited objectives, which concern method in public theology. Accordingly, the discussion returns to methodological considerations.

What is the bottom line for this paper's methodological considerations, even apart from, or prior to, a vigorous inspection of prophecy data? The bottom line can take the form of a reflection on the opening question from Trigg: "Does the belief that there is a God have the same logical status as, say, the belief that there are elephants in Africa?" Of course, what makes this question so striking is the contrast between one belief that is paradigmatically controversial and private, and another belief that is paradigmatically certain and public. However, for the evidence from sightings or photographs of elephants to be admissible, science must invoke common-sense, worldview-neutral presuppositions about the existence and comprehensibility of the physical world, and these selfsame presuppositions without addition also suffice to allow evidence from parchments, ink, stones, and artifacts. More pointedly, an inquiry into prophecies and their outcomes can entirely avoid presuppositions that would prejudice the conclusion either for or against either naturalism or Christianity. Furthermore, standard logic serves for either inquiry, including standard arithmetic, probability theory, and statistics. So, methodological considerations alone suffice to show that it is a distinct possibility that both of the beliefs presented in Trigg's question could have the same logical status. Both could be decisive and robust conclusions that count across worldviews because all premises are worldview-neutral and the decisive action is in empirical and public evidence supporting a virtually certain conclusion. The remaining issue is the substantive question about whether this possibility is actualized. The answer to this question depends on the data, which are beyond this paper's scope. Nevertheless, what can be said even apart from evaluating the data is that whatever else the God of the Bible is or is not, He is not an Invisible Gardener who never risks disconfirmation. The Bible's numerous, detailed,

bold predictions of the distant future risk loads of disconfirmation if Isaiah's bold claim of predictive accuracy is mere pretense.

Flew remarked, in his commentary following the parable quoted in Section 2, that unfalsifiable assertions are "the peculiar danger, the endemic evil, of theological utterances."[29] Apparently, the implicit assumption here is that Flew's own position, atheism or naturalism, is not thus flawed. Presumably, falsifiable assertions characterize atheistic utterances. Otherwise, Flew's parable devolves to the pot calling the kettle black, which hardly justifies its punchy rhetoric. Yet curiously, Flew offered not a word in his paper regarding whether or not naturalism is falsifiable (and neither did any of his three responders). Accordingly, it is significant to note that the Bible prophets' claim of miraculously accurate prophecy is one of the lines of theistic evidence that does render naturalism testable and falsifiable.

8. Testing Comprehensive Theories

Theism and atheism are alike in this, that both are comprehensive theories. God's existence, or else nonexistence, has implications for many aspects of life. Hence, the discrepant predictions by theism and atheism about prophetic success, as discussed in the previous section, constitute but one difference. Additional differences regard whether creation shows signs of a Creator, whether prayers are answered, whether lives are transformed, and so on. Therefore, the question arises of the significance of testing just one component of a comprehensive theory.

A familiar story in the history of science can provide an instructive case study of testing comprehensive theories. Newton's mechanics is a comprehensive theory of gravity and motion, which gave predictions that had proven invariably accurate. But Einstein's theory of relativity made numerous and diverse predictions that were substantially different in special situations, such as locations near massive bodies or speeds near that of light.

Relativity's first empirical test concerned the orbit of Mercury. It had long been known that Mercury's orbit precessed at a rate of 574 arc seconds per century, whereas perturbations caused by the other planets accounted for only 531, leaving an unexplained discrepancy of 43 arc seconds per century. But in 1915, Einstein's theory predicted this discrepancy, even though this general theory was not designed to explain this particular fact.

Did that success prove that relativity is true? Well, it certainly did provide spectacular support, at least that relativity is considerably more accurate than Newton's theory, even if the future may bring a still more accurate or comprehensive theory. This success well justified the costly expeditions

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[29] Flew, *New Essays in Philosophical Theology*, 97.

mounted in 1919 to test another prediction, the bending of star light by the sun's gravity, which could be observed only during a total eclipse of the sun (and preferably during an eclipse that happens to occur when the sun appears near several stars bright enough not to be obscured by the sun's corona). This second test also confirmed relativity. Incidentally, about a quarter of the data for this second test were from photographs with poor quality and those data appeared to confirm the Newtonian prediction, but of course some messy data presented no obstacle to reaching a definitive verdict in favor of Einstein's prediction from the other sharper photographs, and that verdict has subsequently been validated again and again. Then in 1960 a gravitational red shift was measured, in 1979 a gravitational lensing was observed, and so on. Consistent victories for relativity have motivated increasingly difficult and expensive tests. Recently, two facilities for detecting gravitational waves have been constructed, at the enormous cost of several hundreds of millions of dollars, and they should soon become operational.

Three morals may be drawn from this familiar story. First, theory can lead the way in identifying those specific kinds of observations or experiments that can provide critical tests, even despite expected limitations in data quantity and quality. Second, just one little but solidly-established fact is all that it takes to overturn a reigning paradigm. The world has lots of objects having lots of motions. But just one planet's unexplained precession of just 43 arc seconds per century decisively challenged Newtonian mechanics. Third, just one little success for a new paradigm should be taken at the very least as a justification for undertaking further tests, which may be more costly tests.

Returning to the present context of Bible prophecy, whether the findings at an archaeological site happen to confirm a Bible prophecy might seem spectacularly obscure and inconsequential. But facts about such sites are like facts about Mercury's orbit—they do have power to challenge and shift paradigms. By its very nature, a comprehensive theory risks disconfirmation on many fronts, even from seemingly obscure facts.

The biblical worldview offers additional tests besides prophetic accuracy, including some costly tests. Christ offers the ultimate test, "Whoever is willing to do what God wants will find out whether my teaching comes from God or whether I speak on my own" (John 7:17).

Perhaps a positive outcome from the easy public test of Bible prophecy would be best construed not as proof that the biblical worldview is true, but rather as justification for the costly personal test of trust and obedience to see whether these things be true. Miracles and especially canned miracles may comprise the most conspicuous evidence for theism, but personal experience and transformation are the most compelling evidence. An especially important motivation for this construal is that on the Bible's own account,

nothing less than this ultimate test of obedience suffices to confer a personal and eternal benefit (John 6:29, James 1:22-25, 2:19).

Finally, this section's ideas about testing comprehensive theories in no way contradict an earlier section's claim that a test of prophetic accuracy is disentangled from other tests and presuppositions. The comprehensive theory of relativity has tests of orbital precession, star light bending, gravitational red shift, and so on. Likewise, the comprehensive theory of theism has tests of prophecy, prayer, obedience, and so on. In both cases, each test stands or falls on its own merits. Precisely because these theories are comprehensive, outcomes from previous tests and even presuppositions about how things are may affect a person's expectations for what the next test will reveal and may also affect one's willingness to pay the costs needed to conduct that test. But what expectations and willingness cannot affect are simply the facts of the case.

For instance, the observations of orbital precessions are the same for everyone regardless of expectations, just as the facts of prophetic outcomes are the same for everyone regardless of expectations. The factual independence of the various tests of a comprehensive theory is precisely what supports the motivational nonindependence of these tests. And conversely, the broad sweep of a comprehensive theory is precisely what endows its individual tests with great significance, even if some such test seems in itself to concern rather obscure and unimportant matters.

9. Challenges from Public Theology

This paper is methodological, as its title makes plain. It does not marshal and analyze data (apart from a glance in Section 7), but rather it prepares for data by clarifying method.

What is at stake from data with worldview import is conclusions about which worldview is true. By contrast, what is at stake from method with worldview applicability is conclusions about whether worldview claims merit breezy dismissal or else serious consideration, at least from the perspective of a public forum in which respectable reasons must count across worldviews.

This paper's thesis is that worldview-neutral premises can support worldview-distinctive conclusions. However, this thesis faces the antithesis that likewise can be expressed in a mere six words: worldview-neutral premises cannot support worldview-distinctive conclusions. This antithesis appears frequently in an astonishing variety of forms across science, theology, and philosophy. The resulting blunders stifle intellectual life.

It might seem surprising that a test of Bible prophecy could have implications for diverse academic disciplines and numerous scholarly communi-

ties. But as argued in the previous section, this miracle claim is part of a comprehensive theory, Christian theism. Accordingly, this section challenges six blunders.

(1) Hobbled Science. How informative can empirical data be if pushed to their limits? Granted scientific experiments can tell how rapidly an enzyme catalyzes a reaction, and historical evidence can tell when a city was conquered. But can empirical, strong, public evidence also inform big worldview beliefs, such as whether God exists? This is the most intriguing and significant question that can be asked about science.

Conventional wisdom, for instance as reflected in the official AAAS position papers quoted earlier, has been that scientific investigations cannot possibly prove anything about big worldview issues, such as life's purpose or God's existence. Such ideas effectively discourage even attempting to apply scientific, empirical approaches to resolving worldview questions.

To the contrary, public theology's methodology, even apart from its data, challenges this hobbled science. Upon a correct understanding of the methodology of science, it is perfectly possible that observations of physical entities might reveal interactions with supernatural entities. And upon a passing awareness of the invitation from theology, it is evident that specific kinds of admissible and relevant evidence are on offer for testing major worldview beliefs, such as whether God exists. So, public theology frees hobbled science. It grants scientific thinking vastly greater significance, responsibility, and glory.

However, this possibility of worldview conclusions emerging from scientific investigations (or more broadly, from empirical investigations) should never be confused with the pathology of worldview presuppositions masquerading as scientific findings. For instance, in the strongest language available to a scientific organization, the AAAS insists that "There can be no understanding of science without understanding change and the fact that we live in a directional, though not teleological, universe."[30] Now "teleological" just means purposeful, so here science declares as fact (while tolerating no dissent on pain of excommunication from the realms of scientific understanding!) that we live in a purposeless universe. But not one shred of argumentation or evidence is offered, so this highly controversial claim appears in the logical role of an unexamined presupposition, quite contrary to the AAAS's sustained rhetoric against dogmatism.[31] And quite awkwardly, this pronouncement is flatly incoherent with their other declaration, noted earlier, that science cannot prove or disprove anything about the purposes of life.[32] To the extent that scientists and their organizations fail in the profes-

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[30] *The Liberal Art of Science*, xiii.
[31] *Science for All Americans*, 13, 27, 139; *The Liberal Art of Science*, xi, 11.
[32] *Science for All Americans*, 26.

sionalism of clearly distinguishing presuppositions from conclusions, the responsibility for that discernment falls to their readers.

(2) Aloof Religions. Gellman expresses the common view that all religions are "evidence-free . . . in the sense that either they are not based on evidence at all, or if based on evidence, one could not show that the evidence was adequate without making some of the assumptions" peculiar to a given religion—so, reasons do not count across worldviews.[33] Similarly, Adler claims that "The propositions entertained as true in religious creeds or in articles of religious faith are entirely beyond proof" because their "correctness cannot be ascertained by any conceivable mode of empirical research or rational inquiry."[34] So, religions are evidentially aloof from each other.

To the contrary, as argued earlier, data on Bible prophecies and outcomes are relevant for competitions between biblical and other theisms, provided only that the other theism predicts that the Bible's prophetic success rate is low. This condition is met automatically by the many theisms with no prophetic tradition and no claim that any god knows the end from the beginning, and it is also met by some other theisms that would instead attribute perfect prophetic success to another tradition or scripture. So, whatever may be an accurate verdict for other kinds of evidence, Bible prophecy constitutes a clear exception to the general claim that all religions are evidence-free relative to each other. Incidentally, the adherents of Christianity, atheism, and other religions, comprise about 32%, 19%, and 49% of the world's population, currently around six billion persons.[35]

(3) Natural Theology's Incoherent Definition. Customarily, natural theology has been defined as "the search for knowledge of God without appeal to revelation," as in the call for papers for the recent Gifford conference in Aberdeen in May 2000. In his will endowing lectures on natural theology, Lord Gifford required that this subject be treated "without reference to or reliance upon any supposed special exceptional or so-called miraculous revelation," but rather be treated as "a strictly natural science . . . just as astronomy or chemistry."[36] Likewise, Kretzmann requires "forgoing appeals to any putative revelation" since "That's what makes it *natural* theology," in line with Aquinas's "reason unsupported by revelation."[37] The *Oxford*

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[33] Jerome Gellman, "Religious diversity and the epistemic justification of religious belief," *Faith and Philosophy* 10 (1993): 345-64.

[34] Mortimer J. Adler, *Truth in Religion: The Plurality of Religions and the Unity of Truth* (New York: Macmillan, 1990), 17-18.

[35] John McManners, ed., *The Oxford Illustrated History of Christianity* (Oxford: Oxford University Press, 1993), 648-9.

[36] Lord Gifford in Stanley L. Jaki, *Lord Gifford and his Lectures: A Centenary Retrospect* (Edinburgh: Scottish Academic Press, 1986), 74.

[37] Kretzmann, *The Metaphysics of Theism*, 2, 7; Norman Kretzmann, *The Metaphysics of Creation: Aquinas's Natural Theology in Summa contra gentiles II* (Oxford: Oxford University Press, 1999), 5, 7.

English Dictionary (2d ed., 1989) defines natural theology as "theology based upon reasoning from natural facts apart from revelation," and the *Merriam-Webster's Collegiate Dictionary* (10th ed., 1999) defines it as "theology deriving its knowledge of God from the study of nature independent of special revelation."[38]

To the contrary, this standard definition of natural theology combines inconsistent positive and negative elements. The positive element stipulates that natural theology uses natural reason and empirical evidence to support public knowledge of God. The negative element excludes revelations because they seem to lack the sort of objective reasons and evidence that enable natural science (and natural theology) to deliver public knowledge. However, these two stipulations are coherent only if one presupposes, or better yet establishes, the proposition that all revelations contain nothing by way of natural reason and empirical evidence that support public knowledge of God. But surely there is no philosophical basis for such a presupposition; so, after looking at the world, there may be found compelling reasons for rejecting such a proposition, especially in case some particular revelation is readily testable and actually true.

Consequently, natural theology should be defined positively as the search for knowledge of God with appeal to relevant evidence that is empirical and public, rather than being defined with inconsistent positive and negative elements. This paradigm shift expands natural theology's boundary to include empirical and public evidence contained in revelation, specifically Bible prophecy. What natural or public theology rightly foregoes from revealed theology is presupposed authority, not empirical evidence.

(4) Problematic Presuppositions in Biblical Studies. The naturalistic outlook that currently prevails in scholarship in general also prevails in biblical studies. The presupposition that miracles do not occur undermines the credibility of the Bible authors, given their incessant reports of miracles. More generally, a naturalistic worldview without miracles leads to a "liberal" Christianity quite unlike the worldview of the Bible authors themselves. And regarding prophecy more specifically, this presupposition against miracles means that some argument for a late dating is automatically accepted in order to avoid miraculously accurate prophecies that truly predate their outcomes. Hume's argument against miracles has been quite influential in biblical scholarship.[39]

To the contrary, this methodological paper shows that a verdict on miracles should not be an unchallenged presupposition, but rather can be a hard-won and legitimate conclusion. The claim of the canned miracle of

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[38] These dictionary definitions can be consulted via the internet at *www.dictionary.oed.com* and *www.m-w.com*, respectively.

[39] Johnson, *Hume, Holism, and Miracles*, 3-4, 75-6.

prophetic accuracy provides an empirical, public test of whether miracles occur. Accordingly, a test of this claim should be performed before adopting worldview presuppositions that drive Bible interpretations. A positive outcome of miraculous Bible prophecies would fundamentally challenge the entire fabric of naturalistic, liberal, dismissive Bible scholarship. Indeed, the only thing that could constitute an even nastier blow to liberal Bible scholarship would be the second coming of Christ accompanied by trumpet blasts!

(5) Languishing Postmodern Philosophy. A particularly foundational and pervasive tenet of postmodern thinking is incredulity toward metanarratives.[40] Metanarratives (*grand reçits*) are claims to legitimate a story by an appeal to universal reason, rather than an appeal to an interpretive or epistemological framework that is accepted merely within a given worldview or culture or tribe. Translating this incredulity into this paper's terminology, postmodernism denies that reasons can count across worldviews for worldview distinctives such as that God exists.

To the contrary, public theology's method and data present a powerful remedy to this languishing despair of universal reason and worldwide community. The whole point of this methodological paper is that worldview-neutral premises can support worldview-distinctive conclusions.

Furthermore, the ontological story underlying postmodern epistemology is that all we have in this world is fallible persons and disagreeing tribes, with everyone thinking and doing what is right in his or her own eyes. If this is all that exists, then the postmodern analysis is rather plausible. But if there also exists an omniscient Being who speaks to humans, then postmodernism is untenable.[41] Since Christianity, which is the world's largest and fastest-growing worldview, claims that such a Being exists (as well as several additional major religions), the presumption that such a Being does not exist is more than what postmodernism is entitled to for free. To secure its future credibility, postmodernism *must* prove that there is no God who lifts humans into a position of really knowing important truths, and this proof *must* include a refutation of the claims of public theology. And contrary to the postmodernist's usual timid ambitions, in order to do its job, this proof *must* be of a sort that counts across worldviews.

(6) Breezy Dismissals. The most obvious debate over miracles concerns whether or not they occur, but the more fundamental and influential

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[40] Jean-François Lyotard, *The Postmodern Condition: A Report on Knowledge* (Minneapolis, MN: University of Minnesota Press, 1984); Bruce Ellis Benson, "The End of the Fantastic Dream: Testifying to the Truth in the 'Post' Condition," *Christian Scholar's Review* 30 (2000): 145-61; James K.A. Smith, "A Little Story about Metanarratives: Lyotard, Religion, and Postmodernism Revisited," *Faith and Philosophy* 18 (2001): 353-68.

[41] Donald A. Carson, *The Gagging of God: Christianity Confronts Pluralism* (Grand Rapids, MI: Zondervan, 1996).

debate concerns whether a verdict is forthcoming from breezy methodological considerations or arduous empirical investigations. This unsettled contest between method and data as the prime determinant of a verdict on miracles is evident in recent discussions of miracles.[42] Earman provides an insightful history of these debates, noting that prior to David Hume's famous critique of miracles, the contest took the form of detailed historical and empirical inquiries into Bible miracles, principally the reports of the resurrection of Jesus.[43] But Hume's innovation was an in-principle, methodological attack on the possibility of establishing the credibility of reported miracles since miracles are contrary to uniform experience. After three centuries of enormous influence, it appears that Hume's arguments are finally falling on very hard times indeed, so interest in reported miracles may revive. But be that as it may, the present concern is that methodological considerations had rendered any data on reported miracles quite impotent, so such data merited breezy dismissal.

To the contrary, it is essential to discern that Hume's arguments attack *reported* miracles known through others' testimony, rather than *testable* miracles known through immediately available evidence.[44] Hume specifically mentioned prophecies as a kind of miracle used even for the purpose of supporting a particular revelation and religion.[45] But he assumed that the only kind of evidence for Bible miracles is testimonial evidence about reported miracles.[46] What Hume failed to realize, however, is that Bible prophecies are testable, canned miracles available for every generation to assess with empirical, admissible, relevant data. Hence, they are wholly immune to his critique of reported miracles (even under the generous assumption that his critique was valid and could stand the test of time).

Hume's attack on miracles is just one in a long line of attempts to render the debate over miracles something other than a vigorous look at the data. For instance, some argue that believing theism is a precondition for finding miracles credible, so the evidence for miracles may comfort a theist but cannot be expected to impress a naturalist.[47] Perhaps this is sensible for some other kinds of miracles or evidence. But in the present case, to the contrary, the naturalist's nontheistic expectation of poor prophetic success is precisely the precondition for rendering complete success to be surprising and relevant evidence. Likewise, some argue that the very concept or definition of miracles (which includes fulfilled prophecies) presumes God's

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[42] Geivett and Habermas, *In Defense of Miracles*; Fales, "Successful Defense?"

[43] Earman, *Hume's Abject Failure*.

[44] J.L. Mackie in Swinburne (1989), 85-96.

[45] Earman, *Hume's Abject Failure,* 153.

[46] Johnson, *Hume, Holism, and Miracles*, 1-2.

[47] J.A. Cover in Michael J. Murray, ed., *Reason for the Hope Within* (Grand Rapids, MI: Eerdmans, 1999), 345-74; also see Earman, *Hume's Abject Failure*, 63.

existence and activity, which is unfair and meaningless for naturalists.[48] But clearly the debate here between naturalists and Christians is not whether the description, "a supernatural Person who knows the end from the beginning," uniquely picks out God. Rather, the debate is whether or not there is satisfying evidence for (or against) this being's existence. Definitions do not make anything either exist or not exist.

1 0 . Conclusions

Historically there have been numerous attempts to render the debates over theism and miracles (including prophecies) anything other than an energetic look at admissible and relevant evidence, thereby justifying breezy dismissals of theism. Naturalists presume that theists have no evidence whatsoever of the right kind, namely empirical and public evidence. Scientists presume that empirical data cannot test worldview hypotheses. Hume argued influentially that in principle the testimony of others cannot establish reported miracles, while ignoring the possibility of testable Bible miracles. Postmodernists claim that epistemological frameworks for receiving evidence are unique to a given person or tribe, so reasons for worldview distinctives cannot possibly count across worldviews. And perfectionists think that imperfect data and imperfect inquirers prevent a test of worldview hypotheses from reaching a robust conclusion.

To the contrary, unproblematic presuppositions, standard logic, and public evidence can support conclusions that count across worldviews. Furthermore, hypotheses with rich worldview content can be tested, provided that they predict different observable outcomes and that admissible and relevant data are available. Thus an argument with worldview-neutral premises can support worldview-distinctive conclusions.

Bible prophecy is a particularly valuable test of Christian theism and competing worldviews because it carries great evidential weight, counts across diverse worldviews, and conveys substantial theological content. This combination of strengths is rare. Philosophical arguments exhibit a pervasive negative relationship between the strength of the case and the size of the conclusion.[49] But the present test is a welcome exception to that pernicious trend. Furthermore, because the weight of the evidence rises exponentially with its amount, definitive conclusions can emerge from manageable effort comparable, say, to the amount of time that people happily spend on matters of far less moment, such as planning a family vacation.

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[48] See discussion in Earman, *Hume's Abject Failur*e, 14.

[49] Earman, *Hume's Abject Failure*, 3.

Therefore, Bible prophecy is the centerpiece of what Christian philosophers and theologians could contribute to public theology.

If only scientific, historical, and other empirical methods are a success, then the reach of human knowledge is sorely limited; but if theological method is also a success, then the extent of human knowledge is gloriously expansive. Furthermore, this vision of public discourse and expansive knowledge is critical to the mission of a university as a place in which to pursue, in community, a unity of truth across a diversity of disciplines.

The physical world with its empirical data has been the focus of this paper on public theology. But this world has lasting significance and glorious meaning only insofar as it is sacramental, the seen pointing to the unseen and the fleeting pointing to the eternal.[50]