MIRACLES, HISTORICAL TESTIMONIES, AND PROBABILITIES

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ABSTRACT

The topic and methods of David Hume’s “Of Miracles” resemble his historiographical more than his philosophical works. Unfortunately, Hume and his critics and apologists have shared the pre-scientific, indeed ahistorical, limitations of Hume’s original historical investigations. I demonstrate the advantages of the critical methodological approach to testimonies, developed initially by German biblical critics in the late eighteenth century, to a priori discussions of miracles. Any future discussion of miracles and Hume must use the critical method to improve the quality and relevance of the debate.

Hume’s definition of miracles as breaking the laws of nature is anachronistic. The concept of immutable laws of nature was introduced only in the seventeenth century, thousands of years after the Hebrews had introduced the concept of miracles. Holder and Earman distinguish the posterior probability of the occurrence of a particular miracle from that of the occurrence of some miracle. I argue that though this distinction is significant, their formulae for evaluating the respective probabilities are not useful. Even if miracle hypotheses have low probabilities, it may still be rational to accept and use them if there is no better explanation for the evidence of miracles. Biblical critics and historians do not examine the probabilities of miracle hypotheses, or any other hypotheses about the past, in isolation, but in comparison with competing hypotheses that attempt to better explain, increase the likelihood of a broader scope of evidence, as well as be more fruitful. The fruitful and simple theories of Hume’s later and better contemporaries, the founders of biblical criticism, offer the best explanation of the broadest scope of evidence of miracles. Moreover, they do so by being linguistically sensitive to the ways “miracle” was actually used by those who claimed to have observed them.

The lessons of this analysis for historians and philosophers of history—that the acceptance of historical hypotheses is a comparative endeavor, and that the claims of those in the past must be assessed in their own terms—ought to be clear.

I. INTRODUCTION

In his own day, David Hume was better known as a historian than as a philosopher. His History of England (1754–1763) was a bestseller for a hundred years, from its publication to the late nineteenth century. The income Hume derived from its sales allowed him to retire a wealthy man. However, following the
importation of scientific, critical, historiographical methods from Germany to the English universities in the last quarter of the nineteenth century, Hume’s historiography became obsolete. In comparison with the documentary-based critical methods of scientific historians, Hume seemed “pre-historic,” sloppy and uncritical of his limited sources; he had not found all the relevant evidence and had not compared sources critically. He appeared to be an amateur.

Hume’s philosophy underwent the opposite twist of fate. The founders of analytic philosophy in the English-speaking world, Russell and Ayer, considered the British Empiricists, and especially Hume, to be their immediate intellectual progenitors. Hume’s philosophy made it then to the recommended list of great books, to the philosophical codex. Hume’s little composition on miracles has shared the success of his philosophical treatises. It has accumulated many exegetical, polemical, and critical interpretations. Yet, the methods used and issues raised in Hume’s “Of Miracles” have more to do with his historiographical than his philosophical works, and consequently share some of the same problems as his historical writings. In particular, Hume—as well as his critics and apologists—has employed a pre-scientific, indeed ahistorical, approach to this topic. In this essay I demonstrate the limitations that this pre-critical approach has imposed on the debate about Hume’s denial of miracles and the superiority of the historical-critical approach to testimonies, developed initially by German biblical critics in the late eighteenth century, to the a priori discussions of miracles. One payoff of this demonstration is that it provides insight into the use and assessment of evidence in historical research. This should be helpful not only for all historians and philosophers of history, but especially for those who write about peoples who themselves use the category “miracle” and who describe events in their lives by means of miracle talk.

The philosophical debate about miracles has concentrated in recent years on probabilistic, Bayesian explications of Hume’s “Of Miracles.” I also use here a Bayesian approach for the analysis of belief in miracles. I abstain, however, from proposing an authoritative interpretation of Hume. Parts of Hume’s essay are ambiguous. Inconsistent Bayesian interpretations may claim to be equally supported by the text. In any case, the explication of the “correct” Bayesian interpretation of Hume is not crucially important for the present purpose of evaluating the probabilities of belief in miracles, given the evidence.


I proceed to argue, first, that Hume’s definition of miracles does not encompass the most paradigmatic cases of miracles. Ancient Hebrews and Greeks had no concept of a universal immutable law of nature, let alone a concept of events that violate such laws. I offer an alternative characterization of miracles by using the method of cases. Rodney Holder and John Earman distinguish two relevant Bayesian considerations: first, the posterior probability of the occurrence of a particular miracle; and second, the posterior probability of the occurrence of some miracle, some unspecified token event of the type “miracle.” Though I do not take issue with the technical aspects of these approaches, I argue that they are not useful for the consideration of the posterior probabilities of miracles. Even if miracle hypotheses have low probabilities, it may still be rational to accept and use them if there is no better explanation for the evidence of miracles. Usually, there are no multiple independent testimonies for any particular miracle hypothesis, and there is insufficient evidence for considering whether the evidence of some miracle is independent. Consequently, there is insufficient information to assign values to the variables, and therefore, the proposed formulae for computing the effects of multiple independent witnesses on the probabilities of miracles are not useful. I argue that these drawbacks may be avoided if the probability of miracles is not examined in isolation, but in comparison with competing theories that attempt to better explain, increase the likelihood, of the same or a broader scope of evidence, as well as be more fruitful. The fruitful and simple theories of Hume’s later contemporaries, the founders of biblical criticism, offer the best explanation for the broadest scope of evidence for miracles, just as the hypotheses that historians propose about the past are the best explanation for the evidence we have of past events.4

II. WHAT ARE MIRACLES?

One of the better methods for discovering the meaning of abstract concepts is the Socratic method of cases. It recommends listing several undisputed paradigmatic cases of abstract concepts to find what is common to all of them that is not shared by paradigmatic non-members of the set of positive cases. For example, if we want to understand what a scientific theory is, we might list the undisputedly scientific theories of Newton, Darwin, and Einstein and find what is common to all of them and is not shared by, say, contemporary astrology. Similarly, if we wish to understand what miracles are, we should list several paradigmatic biblical descriptions of events that all would acknowledge as descriptions of miracles and find out what is common to them:

1. Resurrections of the dead.
2. Transmutations of essential fluids (water, blood, and wine) into one another by messengers of the divine.

4. Military victories by divine interventions, such as the ten plagues, the parting of the Red Sea, earthquakes, or the “bombardment” of the enemy by means of boulders falling from the sky.

5. Prophecy.

We may add more such cases, but this list of cases will do for now, especially since these miracles are described repeatedly in the various scriptures in different contexts as having been performed by different prophets.

Note immediately that none of these “miracles” is in violation of the laws of nature, as Hume claimed. Scientific and other models provide reliable predictions, medicine may cure a great variety of medical problems, and military technology has unfortunately invented more destructive means than anything in the Bible. It is not inconceivable that science may come up with a way to transmute fluids into one another—plonk producers already transmute water into wine. Radioactive decay transmutes heavier to lighter base materials. The city of Venice has initiated the appropriately called “Project Moses” to build enormous dams in the Adriatic Sea to prevent the water from flooding the city. The resurrection of the dead is currently beyond the scope of applied science, but as Earman notes, there is no law of nature that explicitly contradicts it.

We may distinguish events that would constitute exceptions to scientific laws irrespective of initial conditions (such as movement faster than the speed of light, or travel backward in time) from events that would contradict natural laws only relative to certain specified initial conditions (for example, boulders falling from the sky). Events that absolutely violate natural laws often necessitate changes in scientifically-ascertained universal constants such as the speed of light or Avogadro’s number. Descriptions of events that would violate laws of nature relative to initial conditions require exhaustive description of initial conditions plus scientific laws to demonstrate that descriptions of initial conditions plus the laws of nature cannot possibly entail a description of actual events. A contradiction of laws of nature could have been derived in the above biblical paradigmatic cases had the initial, pre-miracle, conditions been specified in detail. But since descriptions of initial conditions in the scriptures are sparse and scarce, no such contradiction can be derived. By contrast, an average science-fiction novel or a television episode of “Star Trek” contain many descriptions of “Humean miracles” that would violate laws of nature, such as space travel faster than the speed of light, instantaneous communication across vast distances, and time travel. Nevertheless, we do not consider Isaac Asimov to have been a writer of miracle tales or even a magical realist.

Hume’s definition of miracles as exceptions to universal immutable laws of nature is inappropriate because the ancient Hebrews who introduced the concept of miracles had no idea of universal laws of nature or even exceptionless natural regularities. Nor did ancient Greek philosophy, the other source of Christianity, have such ideas. The Hebrew and Greek words for law, chok and nomos respectively, had exclusively social and normative meanings and connotations. Such laws, unlike natural-descriptive laws, do have exceptions and can be broken. The

ancient Greeks perceived the order of nature, the *kosmos*, to be in a kind of equilibrium that could be pushed in an unbalanced direction and back, pendulum-like. For example, the Milesian Anaximander perceived nature as composed of opposites, which, like classes in Greek city-states, are in constant strife with each other. In nature, just as in society, there is a force ("the assessment of time") that enforces justice *dike* and punishes those who transgress the law. Similarly, Heraclitus’s fragment 30 says "The handmaid of justice holds the sun in its course;" the course of the sun must be enforced by a divine-like agency because Heraclitus had no concept of universal natural laws that governed the movement of heavenly bodies such as the sun.

The Greek *kosmos* meant initially the order or constitution of society. The Pythagoreans broadened its meaning to include the order of nature. Still, Plato’s *kosmos* requires in the *Timaeus* and *Philebus* a mind or guiding teleological intelligence. From this later Platonic perspective, the divine makes and keeps the order of nature when it becomes unhinged, rather than break an order of nature independent of the divine, as in Hume’s concept of miracles. Plato contrasted in the *Timaeus* what he called necessity, the necessary moving cause, with reason, divine guiding intelligence. “Reason” should “get the better of necessity,” to prevent it from moving the universe in a direction contrary to its *telos*. The later Plato perceived the order of nature as the result of strife between teleological divine reason and necessity. Plato had no concept of an inviolable order of nature. As far as mutual Greek–Hebrew influences are concerned, the Greek *nomos* did expand the conceptual scope of the Hebrew language during the Hellenic period, but the derived Hebrew word, *nimus*, means politeness, a concept foreign to biblical culture. Christianity could not have received a Humean concept of miracles from either its Greek or Jewish ancestors.

Given the absence of a concept of universal law of nature prior to the seventeenth century, Hume’s definition of miracles is clearly anachronistic, ahistorical. A cursory search in the library of rabbinical literature does not divulge any conceptual connection between miracles and scientific laws prior to the twentieth century. A similarly cursory examination of Catholic theology reveals the consideration of miracles as *suspensio legis naturae*, but only in the twentieth century. It is extremely unlikely that anybody could have associated miracles with scientific laws.

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7. Ibid., 197-200.
8. R. J. Hankinson’s massive and impressive *Cause and Explanation in Ancient Greek Thought* (Oxford: Oxford University Press, 1998) mentions laws of nature three times: twice in the body of the work to distinguish Greek thought from the modern concept of laws of nature, and once in the introduction to say that “The basic features which distinguish scientific from other sorts of explanation are their universality and simplicity. . . . Laws and regularities need not take the form of the contemporary mathematical conception of a scientific law, one in which (whatever your metaphysical predilections) physical quantities are related by general functions that establish their co-variability, along the lines of the classical modern account of the relations between law and explanation offered by Hempel. . . . Something of that kind of course will certainly count as a scientific law; but so, on this account, will something looser and less rigorous, namely any assertion of a universal or even general truth . . . .” (2-3). In the rest of this 450-page work, Hankinson does not require natural laws to describe and explain how Greek philosophers, medics, and astronomers explained and adduced causes.
entific laws prior to the seventeenth century. Perhaps Hume and his eighteenth-century contemporaries on either side of the debate wanted to say that the world is governed either by God or by natural laws, but not by both, as a metaphysical reflection of the Enlightenment political conflict between religion and science.

So if miracles are not divinely produced violations of the laws of nature, what are they? A definition of miracles that fits all the paradigmatic cases mentioned above and the Bible would be something along the line of “divine feats of strength.” Biblical miracles are presented as proofs for the strength of Jehovah not just in relation to humans but also in relation to other competing Gods:

Thy right hand, O Lord, is become glorious in power: thy right hand, O Lord, hath dashed in pieces the enemy. And in the greatness of thine excellency thou hast overthrown them that rose up against thee: thou sentest forth thy wrath, which consumed them as stubble.

. . . Who is like unto thee, O Lord, among the gods? Who is like thee, glorious in holiness, fearful in praises, doing wonders? (Exodus 15:6-7, 11)

The King James version translated the original Hebrew “Jehovah” as “O Lord.” In the earlier parts of the Bible, Jehovah is the national God of the tribes that compose the kingdom of Judea, who compete with other groups and their gods. Nes, the Hebrew word for a miracle, also means a banner. The Latin miraculum, the etymological source of the English miracle, is derived from the verb “to wonder,” so a miracle is wonder-ful, an event that causes wonder but is conceptually independent of scientific laws. Miracles are feats of strength that prove the supreme power of Jehovah, as the banner or standard of his people. This is obvious in the biblical story of the ten plagues in Egypt: Aaron casts his rod before Pharaoh and it turns into a serpent. But the Pharaoh’s wise men and sorcerers do the same. Yet, Aaron’s serpent swallows the other serpents (Exodus 7:10-12).

Miracles are not exclusive to Jehovah and his prophets. The Egyptian sorcerers are also able to produce miracles. But since Jehovah is the strongest, his miracles are mightier than those of competing gods. Likewise, the Egyptian magicians are able to match Moses’ and Aaron’s first two plagues, turning water into blood and bringing forth frogs. But though the magicians attempt to replicate the third plague by bringing forth lice, they fail (Exodus 8:18). The next seven plagues were obviously too difficult for the Egyptian magicians.

The competitive aspect of Jehovah’s miracles is lost in later monotheistic discussions of miracles that assume a one and only omnipotent God who does not need to prove that He is mightier than other gods. Following modern technological progress, our appreciation of biblical descriptions of feats of strength has also been suffering: Resurrection is still impressive, but unfortunately in comparison with contemporary bombs, boulders falling from the sky are child’s play.

Unlike some authors who accept Hume’s definition of miracles, the original biblical concept of a miracle does not distinguish the miraculous from the divine.9 As a divine feat of strength, there is no miracle that does not involve a divinity, though this divinity does not have to be the monotheistic God. A miracle hypothesis means, given the original meaning of the concept discussed

above, that a God such as Jehovah (who is not necessarily omnipotent, omnipresent, good, merciful, the one and only, and so on) performed or empowered others to perform a wonderful feat of strength.

Humean apologists may fall back on the position that Hume stipulated a definition of “miracle” rather than described its use in ordinary language in history. However, this salvation comes at the cost of damnation to irrelevance. If Hume analyzed the probabilities of “miracles” that have nothing to do with what Jews and Christians have been talking about for almost all of the past 3,000 years, then his discussion has no relevance for the philosophy of religion, or as a critique of traditional Judeo-Christianity, or for the way historians and philosophers of history should proceed with claims that a miracle has occurred. At most, Hume could offer a philosophical critique of certain aspects of science-fiction narratives, a metaphysics of “Star Trek.”

Of course, the meaning of “miracle” mutated through history. With the establishment of priestly monotheism, miracles ceased to prove the superiority of one deity such as Jehovah over other deities. A miraculous act performed by non-believers became “magic,” even “black magic.” In addition to the old feats of strength, monotheistic miracles attempt to provide some relief from the problem presented in the book of Job, the suffering of the righteous in a universe where God is supposedly omniscient, omnipotent, and good. Some miracles show that God is good despite all the evidence to the contrary, since He may intervene in the course of events to correct the suffering of the righteous and to punish the evil ones. Other miracles in paganism and mature monotheism are signs from the divine. In early monotheism, the prophet, Moses to Jesus, serves as a conduit for communication between God and humanity. Without prophets, messages from God to humanity must arrive in such a way as to authenticate their source. For example, the appearance of the stigmata in Catholicism is a symbol of sainthood, of resemblance to the wounds of Christ; it is a symbol of a message from the divinity. Again, none of the above requires breaking the laws of nature.

In contemporary ordinary (vulgar) language, “miracle” is used to describe meaningful yet improbable or unexplained events. For example, it is highly probable that someone will win the lottery; it is no miracle. However, if the person who wins it needs money urgently to pay for a complex operation on his or her brain, it is “a miracle.” To take another recent example, a decade-old toasted cheese sandwich was sold for tens of thousands of dollars on eBay because the toasting created a pattern on the white bread that resembles a beautiful woman, undoubtedly an iconic toasted representation of the Blessed Virgin Mary. The lucky seller no doubt became the toast of the town and inspired thousands of other money-hungry toasters to try their luck with their sandwiches. If enough toasters toast enough sandwiches, no doubt patterns will emerge. But they will not constitute an exception to any law of nature. Likewise, if a disease such as cancer goes into remission without treatment, this is a meaningful event that has no scientific explanation. However, science cannot explain many things because relevant evidence or theories are missing. Events that have no scientific explanation do not break the laws of nature. The interpretation of such events as
Humean miracles confuses epistemology, the consequences of limited evidence, with metaphysics, whether events obey laws of nature or not. Such modern concepts of miracles may react to the secular worldview of an indifferent world emptied of its anthropomorphic telos, a reaction to an existentialist crisis. Miracles, in this sense, overcome the scientific worldview and imbue the world with human meaning. The world is home again. However, conceptually overcoming the scientific, causally efficacious worldview does not refute science anymore than phenomenology refutes the philosophy of science; rather, both offer a complementary alternative. Finally, “miracles” are used metaphorically, as in “miracle drug” or “economic miracle,” to mean miracle-like in potency or strength, teleological meaning, improbability, or incomprehensibility. These uses obviously have neither a religious connotation nor a scientific implication.

III. THE PROBABILITY THAT A MIRACLE TOOK PLACE

Philosophers have been trying to assess the posterior probability of concrete miracle hypotheses, for example, that Moses parted the Red Sea (actually this should be the “Reed Sea,” as the original King James translation had it correctly before a fateful typographical mistake “miraculously” transmuted the shallow Bamboo Sea into a deep Red Sea). Hume and his Bayesian explicators10 examine the posterior probability of a miracle hypothesis, given the evidence (most notably testimonies), background knowledge, and theories in isolation from alternative competing hypotheses that explain the same scope of evidence.

If we take $M$ to stand for a token miracle hypothesis, $E$ for evidence, and $B$ for background knowledge, then the standard Bayesian formula would imply:

$$Pr(E|M&B) = \frac{Pr(E|M&B) \times Pr(M|B)}{[Pr(E|M&B) \times Pr(M|B)] + [Pr(E|-M&B) \times Pr(-M|B)]}$$

Many of Hume’s interpreters have claimed that he considered the prior probability of any miracle hypothesis to be nil.11 If so, the posterior probability of any miracle hypothesis is zero, and so no evidence can change this pre-judgment. However, many interpreters since Price have also argued that Hume was wrong to assume a prior probability of zero.12 This is even more true if we interpret miracle hypotheses as claiming merely that a divinity performed, or delegated the power to perform, a particular wonder-ful feat of strength. The prior probability of such a miracle hypothesis is certainly higher than zero. The likelihood of the evidence for a feat-of-strength miracle, given such a miracle hypothesis, can be quite high.

At least since Laplace, the hypothesis that there was no miracle has been interpreted as a function of either intentional deception or involuntary information-

distortion due to confusion, bad memory, and the like on the part of those who
hold a miracle hypothesis.\textsuperscript{13} Accordingly, the probability of the no-miracle
hypothesis prior to the examination of the evidence is the sum of all the prior
probabilities of the individual deception and distortion hypotheses; the likelihood
of the evidence given the no-miracle hypothesis is the sum of all its likelihoods
given the same individual hypotheses. However, it is unclear if and how this can
be worked out in practice. In particular historical contexts, when there is suffi-
cient evidence, it is possible to evaluate the prior probability of some particular
hypotheses of deception or distortion. But the aggregation of all probabilities
requires more evidence than is usually available about particular historical con-
texts of alleged miracles. Hume made only general and vague comments about
how to evaluate the prior probabilities of deception hypotheses in comparison
with miracle hypotheses because he expected the first to win by default, by the
vanishing prior probability of any miracle hypothesis; however low the prior
probability of deception may be, he still expected it to be higher than that of a
miracle.

Moreover, a low posterior probability of any hypothesis, including a miracle
hypothesis, is not sufficient for rejecting it. It is rational to go on accepting and
using a low-probability hypothesis as long as there is no better explanation for
the evidence. Historians of science have shown that scientific communities have
not forsaken theories just because they accumulated anomalies and their posterior
probabilities sank. Scientists shift their theoretical allegiances only when an alter-
native theory repeatedly and consistently explains better the scope of evidence
for the previous theory, as well as its anomalies. Likewise, it is not reason-
able for people to relinquish their faith in particular miracle hypotheses until
better explanations of the evidence are proposed. As Salmon and Sober have
argued, it is neither realistic nor interesting to examine one isolated hypothesis,
in our case the literal truth of the evidence for a miracle, without comparing it
with its alternatives.\textsuperscript{14}

It has been recognized at least since Roman law that multiple independent wit-
tnesses increase the posterior probability of what they agree on: \textit{testis unis, testis nullus}. The reason is the low likelihood of agreement between false independent testimonies. To borrow Laplace’s example, if one number is randomly drawn in a lottery from the first one hundred numbers, the likelihood of any given number being reported falsely by a deceptive witness is 1:99. If two independent witnesses report the same number, the probability of deception is (1:99)\textsuperscript{2}; if three witnesses agree, the probability of deception is (1:99)\textsuperscript{3}; and so on.

Holder and Earman\textsuperscript{15} formalize the posterior probability of a miracle hypothesis
given multiple independent testimonies, evidence, and background knowledge as:

\begin{align*}
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\end{align*}

\textsuperscript{13} Pierre Simon Marquis de Laplace, \textit{A Philosophical Essay on Probabilities}, transl. Frederick

\textsuperscript{14} Wesley C. Salmon, “Rationality and Objectivity in Science, or Tom Kuhn Meets Tom Bayes,”
in \textit{Philosophy of Science: The Central Issues}, ed. Martin Curd and J. A. Cover (New York: Norton,
1998), 551-583; Elliott Sober, \textit{Reconstructing the Past: Parsimony, Evolution, and Inference}

\textsuperscript{15} Holder, “Hume on Miracles,” 53; Earman, \textit{Hume’s Abject Failure}, 55.
When M is the miracle hypothesis; E is the evidence; B is background knowledge; q₁ . . . qₙ represent the likelihoods of units of independent testimony for a miracle given that there was no miracle (-M) and background knowledge; and p₁ . . . pₙ represent the likelihoods of units of independent testimony for miracles given that a miracle took place (M) and background knowledge.

Statistical theory explicates the causal independence of two effects, such as testimonies from each other, as being “screened” from each other by a common cause such as an event that may be a miracle. Accordingly, Earman defines the independence of testimonies t₁, …, tₙ in terms of their likelihoods: If \( \Pr(t₁& …& tₙ|H&B) = \Pr(t₁|H&B)\times…\times \Pr(tₙ|H&B) \). However, it is necessary to compute the frequencies of t₁& …& tₙ to calculate such likelihoods. When it comes to testimonies for miracles, however, there is usually no basis for computing frequencies because they do not compose a part of a larger set, as in Laplace’s example where given deception or confusion, there are exactly 99 precisely equally likely possible different testimonies. Thus it is impossible to ascertain the independence of witnesses for miracles in the statistical sense.

However, there are other, non-statistical methods. Historians, biblical critics, detectives, judges, and jurors examine the independence of witnesses by examining whether the causal-information chains that stretch back from each of the testimonies intersect after the alleged time of the event to which they testify.¹⁶ For example, the police attempt to discover whether witnesses communicated after the time of the crime that they allegedly witnessed. Historians and biblical critics look for further evidence for these causal-information chains. When the testimonies are textual, they examine the date when they were composed, their relations with other evidence, who wrote them, how the authors could have received the information (if at all), and so on.

The case for multiple independent witnesses of miracles was articulated philosophically by the Spanish-Jewish philosopher Judah Halevi in his twelfth-century, Arabic-language, Platonic-style dialogue The Kuzari. In this dialogue Halevi listed the criteria for independence of evidence for belief in miracles: Miracles, intercourse between God and humans, must take place “in the presence of great multitudes, who saw it distinctly, and did not learn it from reports and traditions. Even then they must examine the matter carefully and repeatedly, so that no suspicion of imagination or magic can enter their minds.”¹⁷ Halevi presented the revelation on Mount Sinai as fitting these criteria:

The people did not receive these ten commandments from single individuals, nor from a prophet, but from God. . . . They did not believe Moses had seen a vision in sleep, or that some one had spoken with him between sleeping and waking, or that he only heard the words in fancy, but not with his ears, that he saw a phantom, and afterwards pretended that God had spoken with him. Before such an impressive scene all ideas of jugglery vanished.

The divine allocution was followed by the divine writing. For he wrote these Ten Words on two tablets of precious stone, and handed them to Moses. The people saw the divine writing, as they had heard the divine words. 18

For forty years of wandering through the desert, 600,000 people, comprising the Jewish nation at that time, were allegedly exposed repeatedly to miracles: “[T]he whole of Israel . . . knew these things from personal experience, and afterwards through uninterrupted tradition, which is equal to the former.” 19 The Pentateuch presents the commemorative feasts of Passover and Pentecost as markers that authenticate the traditions that should constitute independent multiple evidence for the miraculous events they commemorate. It is alleged that Passover and Pentecost have been celebrated every year since the miraculous exodus from Egypt and the revelation on Mount Sinai. Yearly commemorative celebration should validate the traditions that link contemporary Jews who celebrate commemorative feasts of miracles with their forebears who witnessed the miracles.

But the historical commemorative-feasts system in Judaism can serve as an effective marker only for the past 2,600 or so years. Independent extra-biblical markers are missing for the earliest 500 years or so of information-chains that should lead from Egypt and Mount Sinai. Worse still, there is internal biblical evidence for breaks in the alleged information-chains transmitted through the Jewish community. In II Kings 23:21-23 we are told that Passover was celebrated for the first time since the founding of the Davidian dynasty, several hundred years earlier, following the religious reforms of King Josiah in the late seventh century BCE. In other words, there is only a single testimony for the alleged miracles described in Exodus: that book itself; no multiple independent evidence exists. 20

Other descriptions of miracles in the Old and New Testaments do not claim to have been witnessed by multiple witnesses, as are the ones surrounding the exodus from Egypt. As the old joke goes, God cannot get tenure because he typically holds office hours on mountaintops in the middle of the night (He also wrote only a single book, and its authorship has been questioned by other scholars).

IV. THE PROBABILITY THAT SOME MIRACLE OCCURED

Though there may not be multiple independent witnesses to any token miracle event, there may be multiple independent testimonies to different miracles that may prove that a miracle, as a type, had at least one token instantiation, even though we would not know which one. The probability that some miracle took place increases by aggregating separate single testimonies for different miracle hypotheses.

19. Ibid, 47.
20. There are marked similarities between Halevi’s argument for the existence of God, and Saul Kripke’s theory of rigid designation in Naming and Necessity. Both rely on a tradition to authenticate existence and direct reference respectively. Accordingly, Kripke’s theory of language suffers from the same ahistorical flaws as Halevi’s proof for the existence of God. See Aviezer Tucker, “Kripke and Fixing the References of God,” International Studies in Philosophy 34:4 (2002), 155-160.
Earman argues that two conditions of independence, screening off, must hold for testimonies for token events of the same type to increase the probability that some token event of the type took place: First, the likelihood of each testimony must be screened off from all hypotheses that postulate tokens of the type of event it testifies for, except for the one and only one for which it serves as evidence. In other words, the likelihood of each testimony steeply rises when the testimony is affected exclusively by background knowledge and a single token miracle hypothesis. Though the prior probability of one miracle hypothesis may be correlated with the prior probability of another, the likelihood of the truth of its testimony can only be affected by the assumption of that unique miracle. Second, a particular miracle hypothesis should screen the likelihood of its testimony from any other testimony; in other words, the likelihood of a testimony for a token miracle should not be affected by the likelihood of any other testimony for other miracles.21

Earman concludes that if the two screening conditions hold, and the testimonies have a higher reliability than nil, multiple testimonies to different events of the same type increase the probability that one token of the event type, one miracle in our case, has occurred.

Let us denote the posterior probabilities of various miracle event hypotheses by $P_1$, $P_2$, …, $P_n$. Let us assume that these probabilities are independent of each other in Earman’s sense. The probability that some miracle has happened ($P_1 \lor P_2 \lor P_3 \lor \ldots \lor P_n$) is:

$$P_1 + (1-P_1) \times P_2 + (1-P_1) \times (1-P_2) \times P_3 + \ldots + (1-P_1) \times (1-P_2) \times (1-P_3) \times \ldots \times (1-P_{n-1}) \times P_n$$

If these posterior probabilities are identical ($P_1=P_2=\ldots=P_n$), the marginal increase in the probability of the occurrence of some miracle decreases with each testimony by a factor of $(1-P)$. This reduction in the marginal increase in the posterior probability may affect the extent to which multiple independent testimonies to different tokens of the same type of event can increase that posterior probability above 0.5. This depends, of course, on the exact posterior probabilities of each token hypothesis and the total number of testimonies.

Earman correctly doubts the usefulness of the formula for inferring the probability that some miracle has occurred because testimonies to different miracles probably do not satisfy the screening conditions he set to ensure their independence. Earman notes, for example, the similarity in description and details between various descriptions of alien abductions that may indicate their reliance on descriptions of alien abductions in television and books.22 Earman does not mention that descriptions of miracles in the scriptures are repetitive as well: The three essential fluids (water, wine, and blood) are transmuted into one another in various miracles, and sickness (especially leprosy and infertility) is as routinely cured as contemporary magicians pull rabbits out of their hats. Jesus is described in the New Testament as an amalgamation of all the prophets of the Old Testament, especially his fellow Galilean Elijah, and he correspondingly repeats their miracles but does not add new ones; he does not transmute water into, say,

22. Ibid, 60-61.
champagne or brandy. Undoubtedly, the authors of the New Testament were familiar with the Old Testament.

Earman stresses that evaluating the independence and reliability of witnesses is not the business of philosophy, but of empirical research. This may be true, but relevant philosophy must attempt to understand and explicate actual empirical research, in this case research in history and biblical criticism, that should form the empirical basis for relevant philosophy of history, just as relevant philosophy of science illuminates scientists’ methods of empirical research.

V. THE BEST EXPLANATION OF THE WIDEST SCOPE OF EVIDENCE

Scientists and historians rarely consider the merits of hypotheses in isolation. Usually scientists assess the ratio of probabilities among competing hypotheses. It is rational of scientists to hold onto a theory or a hypothesis, however improbable by itself, as long as no better, more probable, alternative is available. Consequently, some Bayesian philosophers of science suggest comparing the likelihoods of evidence in light of competing hypotheses and shared background information. The same evidence is more likely given better hypotheses, and less likely given less competitive hypotheses.23 Elliott Sober interprets the choice of hypotheses and theories according to relative likelihoods of evidence as the choice of the best among competing explanations of the evidence.24 Additional criteria for distinguishing among competing scientific theories that explain the same evidence are cognitive values, scope, fruitfulness, and simplicity. Scope measures the number of different classes of phenomena that each theory explains. Fruitfulness measures the extent to which new phenomena and evidence are discovered and explained as a result of a theory. Simplicity measures how many ad hoc co-hypotheses must be added to the theory to fit the evidence. I have argued that this is the basic content of historiographical debates, the weighing of competing explanations of the evidence.25

Two types of hypotheses may explain the evidence for miracles: literal hypotheses and critical hypotheses. Literal hypotheses explain evidence for miracles by suggesting that they are literally true. Critical hypotheses suggest explanations of the evidence alternative to literal hypotheses, for example, that these stories should be read as metaphors or as fabrications in the service of the political or other interests of their authors.

Critical hypotheses were introduced by Hume’s later contemporaries, the founders of biblical criticism at the theology centers at the universities of Halle, Jena, and Göttingen, and later at the newly created University of Berlin. These hypotheses are as simple as literal hypotheses, but they have wider scopes and they are more fruitful. Most significantly, they usually increase further the likelihood of the evidence. They explain not just the content of the evidence, but also its form and linguistic medium, and they direct the discovery of more evidence and its explanation. They explain who wrote the evidence, why, how, when, and

25. Tucker, Our Knowledge of the Past.
where it was written, along with many other new pieces of evidence that are discovered and were written for the same reason at the same period and area, and often by the same kind of people.

Today, contemporary biblical criticism uses further sources of evidence that were not available during the eighteenth century, material evidence from archeological digs in the areas where events in the Bible took place, and documentary evidence from archeological discoveries of ancient archives in Mesopotamia and Egypt that were translated once linguists learned how to decipher these languages in the nineteenth century. Advanced methodologies such as the computerized analysis of composite texts allow textual critics to distinguish precisely linguistic layers that were written in different linguistic communities. Contemporary successful hypotheses in biblical criticism must explain better than competing ones, and increase the probability of the broadest range of different types of evidence. 26

But Hume’s later contemporaries, the founders of biblical criticism, did not possess any evidence that was not available to Hume. They had the same scriptures, though they read them critically and in the original languages, and so were able to distinguish linguistic and stylistic layers to conclude that the Bible was a composite of separate documents that were stitched together long after the events they purported to describe were supposed to have taken place. Johann Gottfried Eichhorn’s Einleitung in das Alte Testament (1780) 27 introduced effectively for the first time (others had upheld this hypothesis previously, but they had not founded actively-pursued, institutionally-based research programs) the hypothesis that the scriptures are composites of many different documents that were written by different people at different times in different places and were edited and stitched together without sensitivity to historical authorship. Eichhorn supported this hypothesis by a comparison of linguistic similarities and differences in the Bible. He assumed a theory of the historical development of language as constantly mutating. Consequently, texts that share a similar vocabulary and grammar were written at the same time and place. Since the language of the Pentateuch, especially Deuteronomy, is not significantly different from that of Samuel and Kings, it could not have been written 500 years earlier, but must have been given its current form at the same time as Samuel and Kings. Languages absorb foreign words during historical periods when their speakers interact with speakers of source languages. For example, the later texts in the Bible can be dated according to their use of Aramaic words, borrowed after the Babylonian exile. This linguistic theory explains a very wide scope of evidence—indeed, practically all ancient texts in all languages whose provenance is uncertain. It has been immensely fruitful. Immediately after its use in biblical criticism, this theory was adopted and has been used extensively by historians


and classical scholars.\textsuperscript{28} For example, the standard division of Platonic dialogues into three groups is based on differences in the Greek vocabulary among the groups of texts.

W. M. L. de Wette in \textit{Beiträge zur Einleitung in das Alte Testament}\textsuperscript{29} proposed a theory of the role of history in traditionalist cultures to explain the evidence for miracles (among other things): When the legitimization of institutions, practices, social stratification, ritual, and so on is founded on their history, on precedent, interest groups will try to present, even falsify, history to create a precedent for a social state of affairs that they desire. Like Eichhorn, de Wette argued that the Pentateuch was composed much later than the events it describes could have taken place; in fact, some of its parts may have been composed as late as after the Babylonian exile. De Wette suggested that the discovery of the Book of Law in the Temple during the reign of King Josiah, as described in the closing parts of II Kings, refers to a part of Deuteronomy. Much of the Pentateuch is likely to have been written to legitimize King Josiah’s late-seventh-century bce reforms to centralize and monopolize religious worship in the Jerusalem Temple by projecting on the mythical founders of the nation newly introduced practices in Jerusalem. The best explanation for the fact that the Pentateuch is not mentioned in Samuel and Kings is that it had not been written yet.

Gramberg concurred and suggested that the precedents were invented as part of the religious and political struggle of the Jerusalem religious center and priesthood against existing decentralized polytheistic practices.\textsuperscript{30} Gramberg suggested that the best explanation for biblical prophecies is that they were written after they had been “fulfilled” to increase the posterior value of a hypothesis, much like unexpected evidence increases dramatically the posterior probability of a hypothesis that predicted it, however low is its prior probability. Since \textit{ex-post-facto} expectancy of old evidence is a unity, a hypothesis that merely infers the high likelihood of an event or events that have already happened does not have a particularly high posterior probability. However, if unscrupulous people have a favorite hypothesis, and can “pre-date” its introduction prior to the event or events it predicts, they can increase the apparent posterior probability of the hypothesis quite dramatically. For example, if a Jewish priestly aristocrat writes a hundred years after the destruction of Jerusalem that it happened because the people of Judea sinned against Jehovah, this hypothesis has to compete against other hypotheses, such as that as a result of religious fanaticism and megalomania the priestly aristocracy of the small Judean kingdom promoted a disastrous foreign policy that provoked the much stronger northern regional superpowers, first Assyria and then Babylon, to destroy it. However, if that priest can “pre-date” his hypothesis to decades prior to the end of the kingdom of Judea when there had been no competing hypotheses that would have predicted the destruction of Jerusalem, the posterior probability of the “prophecy” appears to increase, and there is another argument in favor of recent priestly monotheism.

\textsuperscript{28} Tucker, \textit{Our Knowledge of the Past}, 46-91.
\textsuperscript{29} Wilhelm Martin Leberecht De Wette, \textit{Beiträge zur Einleitung in das Alte Testament} (Halle: Schimmelpfennig, 1806–1807).
\textsuperscript{30} Carl Peter Wilhelm Gramberg, \textit{Kritische Geschichte der Religionsideen des Alten Testaments} (Berlin: Duncker und Humblot, 1830).
Likewise, the best explanation for many other miracle stories may be that for political, religious, and institutional reasons they were written hundreds of years after their alleged occurrence. The historical content of the Passover may well have been invented during the reign of Josiah to transform an agricultural fertility feast into a politically meaningful historical marker, an excuse and justification for the political ambitions of the kingdom of Judea and the priestly class in Jerusalem after the fall of the kingdom of Israel. Other stories about the migration from Egypt may have been added later, during and after the Babylonian exile, to create a precedent for a migration back to the lands of the Judean kingdom. Most notably, the various stories of miracles, of feats of strength, were written down in the context of the struggle of the Jerusalem temple and the priesthoods of Jehovah and Elohim for supremacy over competing cults and priesthoods, before, during, and after the Babylonian exile. It is less plausible that they preserved authentic information through unwritten memories and traditions about actual events for hundreds of years.

The same methods of textual criticism were used to analyze the New Testament. The similarities among the texts of the apostles indicate that the linguistically later one, John, copied from the earlier three. Matthew, Mark, and Luke were probably based on two earlier sources, one book of epigrams and wisdom attributed to Jesus, and another that told stories of the life of Jesus. Jesus and the apostles who witnessed his life all spoke Aramaic, so at a certain point texts or oral accounts must have been translated into Greek by people who did not know Jesus. At the earliest, the present texts were written at a distance of two generations from the events they describe. More significantly, the authors of the earlier texts were writing for a Jewish audience, attempting to convince it that Jesus was the greatest prophet, the messiah. This interest makes the descriptions of the miracles of Jesus that repeated those ascribed in the Old Testament to other prophets highly likely. The authors had to describe Jesus in such terms to convince their audience to accept him as a prophet in the tradition of biblical prophets. The resurrection has no Jewish precedents; it may have been introduced later to convince a pagan audience of the divinity of Jesus, as stories of divine death and resurrection were rife in ancient Near East mythology. Of course, this does not imply that the probability of the miracle stories and the resurrection are nil, only that simpler, more fruitful, explanations of a broader scope are available as competitors and that these are more probable.

In sum, testimonies for miracles are usually neither literally true, nor senseless gibberish; they are interesting as pieces of evidence that may teach us quite a lot, if not about the universe and our place in it, then about distant periods, about the people who authored them, their interests, rivalries, audiences, background, and systems of belief.

VI. CONCLUSION

Though Hume expected the vanishing prior probability of any miracle hypothesis to settle the issue, he outlined other considerations that should increase the likelihood of the evidence for miracles given alternatives to miracle hypotheses.
as “fallback” positions in case his first argument fails:31 “The wise lend a very academic faith to every report which favors the passion of the reporter: Whether it magnifies his country, his family, or himself, or in any other way strikes in with his natural inclinations and propensities. But what greater temptation than to appear a missionary, a prophet, an ambassador from heaven?” 32 Religious and presumably other kinds of enthusiasm may lead people to see things that are not there. Hume also suggested that the likelihood of the evidence given the alternatives to the miracle hypothesis is affected by whether the witnesses contradict one another and their reliability, character, interests, and manner of delivery. Hume compared likelihoods of evidence given the miracle and a competing concrete hypothesis only twice. For example, he compared the likelihood of Tacitus reporting a miracle cure performed by Emperor Vespasian, given that Vespasian indeed performed the cure and given the hypothesis that Tacitus sought political patronage from Vespasian’s Flavian dynasty. 33

Earman considers Hume’s notes about the credibility of testimony, its likelihood given its literal truth or alternative hypotheses, to be “platitudes.” 34 I disagree. Such considerations inaugurated scientific knowledge of the past by evaluating the likelihood of evidence given various competing theories that offer alternative explanations of the evidence, not just in biblical criticism but also in historiography. Since, as Earman acknowledges, there is no mathematical-probabilistic a priori “super-highway” that can acquaint us with the posterior probability of each miracle, the philosophical explication of the scientific inference of the posterior probability of miracle hypotheses must consider computations of reliabilities that are complex and that concern the transmission of information in time; they are anything but “platitudes.” Once textual critics, philologists, and historians began to do so in the mid-eighteenth century, they produced scientific knowledge of the past for the first time.

The main problem with Hume’s alternative hypotheses to the literal truth of miracles is that they are too vague for inferring the likelihoods of the evidence for miracles. The theories of biblical critics, especially their breakthroughs in historical linguistics, allowed them to present the best explanations for evidence of biblical miracles. Their theories are fruitful because they lead to the discovery and successful explanation of aspects of the texts that serve as evidence for miracles that other theories do not notice, and they have a broader scope than competing theories because they are useful for the explanation of a range of textual evidence in historiography and classical studies, as well as in biblical studies.

Hume and Earman did not examine the evidence for each miracle to reject the hypothesis that asserts its literal truth. Hume thought he could reach this conclusion by postulating vanishing prior probabilities for all miracle hypotheses. Earman disagrees, but thinks that he can reach Hume’s conclusion on the basis of the absence of independent witnesses for a miracle and probably for some miracle as well, and the low reliability of such testimonies, without getting into the

33. Ibid, 142-148.
34. Earman, Hume’s Abject Failure, 44-45.
details of such "platitudes" or attempting to explicate philosophically the actual methods that historians and biblical critics use to examine the evidence.

But there are no a priori shortcuts. To reach any reasoned conclusion about miracles or any other past event, it is necessary to examine hypotheses about the past in competition with one another over the best explanation that increases most the likelihood of the broadest scope of evidence. For all that we know, some divinity may decide to impress us once in a while with its feats of strength, and we may react rationally then by airing our grievances to it. In each case, it is necessary to examine the best explanation for the evidence, using fruitful theories about language, human motivation, and politics in traditional societies to explain the broadest range of evidence.

Hume’s failure to understand the meaning of “miracle” in the linguistic communities that generated the concept stresses the need to understand the meanings of historical concepts through the examination of the contexts of their use, as the founders of textual criticism did. Ordinary language philosophy, especially J. L. Austin’s, emphasized understanding meaning (semantics) through the use of words in context (pragmatics). However, this insight, born as much out of the practices of classical philologists such as Austin as it was inspired by the later Wittgenstein, has been applied by philosophers mostly to the understanding of contemporary ordinary spoken language, without much sensitivity to historical evolution and changes in the meaning of words.

The same consideration is applicable to some interpretations of Hempel’s covering law. If it is interpreted metaphysically to claim that the universe is constructed of causes that bring about effects according to laws, no discussion of the history of the concept of law is relevant for the criticism of the covering-law model. However, if it is interpreted semantically as holding that any statement of cause and effect implies a covering law that may be known by philosophical analysis, it cannot possibly be true for any causal statement made prior to the seventeenth century. As noted above, the Greeks had no need for natural laws to cover their statements of cause and effect; they were quite content with covering Gods.

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35. In the case of miracles, it is almost astonishing to notice that no philosopher I have read has noticed that Hume connected a concept that originated about 3,000 years ago with a concept that was introduced only in the seventeenth century. If I may offer a speculation, based on some anecdotal encounters, it appears to me that Hume has become the prophet, the philosophical miracle man, of the “religious atheists.” Hume has acquired among those atheists who turned their disbelief into an article of faith, a dogma, a status similar to that of Aquinas for Catholics or Maimonides for Orthodox Jews. Some religious atheists base so much of their system of belief on Hume’s rejection of miracles that the prospect of his collapse is frightening: If Hume was wrong, they all go to hell! But in this world the road to hell is paved with dogmas and trodden by fanatics, not critical thinkers.