

# The Logic of Probabilities in Hume's Argument against Miracles

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The position is often stated that Hume's discussion of miracles is inconsistent with his views on the logical or ontological status of laws of nature and with his more general scepticism. Broad, for one, has so argued.<sup>1</sup> Hume's views on induction are assumed to go something like this. Any attempt to demonstrate knowledge of matters of fact presupposes causal reasoning, but the latter is based not on any perception of necessary connections, but on an unreasoned expectation that because events have been constantly conjoined in the past they will be constantly conjoined in the future. The fact that our past experience gives rise to certain expectations provides absolutely no reason to think that these expectations will be fulfilled. But this is forgotten as soon as he turns to the topic of miracles where the argument requires certain assumptions about laws of nature. Here he claims that the laws of nature are based upon a firm and unalterable experience and dismisses what he apparently admits to be strong evidence for miracles on the basis of the claim that such events are absolutely impossible. The inconsistency between the discussion of miracles and the earlier discussions of induction and causality is clear. Nonetheless, there is a certain implausibility to this claim that makes it a difficult one to entertain seriously, since it is unlikely that a philosopher as careful as Hume would have failed to recognize the inconsistency if it existed. What I propose here to argue is that there is in fact no inconsistency, and that this becomes clear once one places the discussion of miracles in the broader context of the overall argument of the first *Enquiry*.<sup>2</sup> In particular, the charge of inconsistency disappears once one eliminates the caricature of Hume's views on causal reasoning upon which it rests.

To come to grips with the discussion of miracles in Hume it is necessary to place that discussion in its historical context.

In the generally empiricist atmosphere that developed in Britain following the mid-seventeenth century civil wars, the general defence of the reasonableness of Christianity consisted of two parts.<sup>3</sup> First, it was held that rational argument, whether causal or teleological or both, could yield a reasonable belief that a deity of a more or less traditional sort existed. Then, second, in order to establish further that Jesus was the Son of God it was held that one could rely upon a chain of testimony

leading back from the present to the past to infer the existence of **miracles** testifying to the divinity of Jesus. Hume attacks this second inference in the essay on miracles and the first in the essay that follows in the *Enquiries* on God's particular providence (the themes of which are developed more fully in the *Dialogues on Natural Religion*). Given the central place that the appeal to miracles held in Christian apologetics in the 17th and 18th centuries, Hume's systematic attack on the argument from miracles constituted a clear attack on Christianity. To be sure, Hume's argument would never have persuaded John Wesley, but that would hardly have surprised Hume himself, nor should it surprise us: those in the grips of religious enthusiasm, whether it be John Wesley or Jimmy Swaggart, will hardly be persuaded by rational argument, however much it is still true that they **ought** to be persuaded by it.

The appeal to miracles to justify specifically Christian beliefs had a long history. One can find it already in the late Roman period in Eusebius.<sup>4</sup> Muslim thinkers were to challenge this traditional defence by arguing that chains of testimony become more unreliable the longer they become. As for their own Islamic beliefs, these they admitted had also to be justified by an appeal to miracles, but there was, it was claimed, a unique self-justifying miracle in the Koran, the specially revealed Word of God.<sup>5</sup> The critical theme of the Muslim apologists, that the longer a chain of testimony the less assurance it gives of the fact that a miracle had occurred, was developed in Britain in the 17th and 18th centuries.<sup>6</sup> It seems to have been introduced by the Oxford orientalist Edward Pocock who had discovered this line of Muslim apologetics while studying in Aleppo.<sup>7</sup> It appears in Shaftesbury's *Characteristics* as part of the defence of deism,<sup>8</sup> to be criticized in Berkeley's "Alciphron."<sup>9</sup> Craig<sup>10</sup> gave it an unsound mathematical formulation,<sup>11</sup> to be followed by a reasonable analysis in terms of probability theory in an anonymous note, likely by Halley, in the *Philosophical Transactions of the Royal Society*.<sup>12</sup> This note received a popular, and accurate description in Ephraim Chamber's *Cyclopaedia*,<sup>13</sup> a source undoubtedly known to Hume (as were Shaftesbury and Berkeley). Hume clearly knew this argument — he uses it in the *Treatise*<sup>14</sup> — but like Bayle (who knew Craig's essay) Hume does not rely upon this in his attack on miracles. This is not to say that Hume thought the argument unsound — in the *Treatise* he indicates clearly that he does think it to be in general a sound way of reasoning,<sup>15</sup> and furthermore it clearly lies behind his unScottish reservations on the authenticity of the Ossian poems.<sup>16</sup> In the case of miracles, however, it is not the increasing unreliability of a chain of testimony that Hume uses to attack religion, in spite of the fact that he finds the argument to be sound in general and in spite of the fact that he recognizes it to

be a *very celebrated argument against the Christian Religion* (T 145). Instead, in the case of miracles what he raises is the more general issue of whether **any** testimony, even of just **one** testifier, could ever render it reasonable to believe that a miracle had occurred. He argues, of course, that it cannot. The argument that he uses, however, is not separate from the sort of considerations drawn from probability theory that are used to establish that a chain of testimony provides less and less probable evidence the longer it becomes. Indeed, in his argument Hume appeals to another principle that also appears in the anonymous note in the *Philosophical Transactions*, one that deals with the probability that two independent pieces of testimony are both true, given the probabilities for each that they are true.

The relevant definition of 'miracle' can be found in Locke's "Discourse on Miracles": "a sensible operation, which, being above the comprehension of the spectator, and in his opinion contrary to the established course of nature, is taken by him to be divine."<sup>17</sup> There are two points here which are prior to the inference that the event must be caused by the deity. The first is that the event must be beyond the comprehension of the spectator and the second is that the event is contrary to the established course of nature. Hume's discussion makes reference to both points. In particular, he adopts the Lockean criterion that a miracle is an event that violates a law of nature: *A miracle is a violation of the laws of nature* (E 114). It follows that since, for Hume, to understand an event is to subsume it under a causal law, any miracle must be beyond the comprehension of the spectator. Hume's crucial move is to insist that simply because an event is somehow incomprehensible to a spectator it does not follow that one can reasonably infer that it is a miracle, or even probably a miracle. Crucial to Hume's discussion of these points is his account of causation, or, what amounts to the same, his account of laws.

Here one must turn for detail to the *Treatise*. There are two definitions of 'cause.' The first defines cause objectively in terms of regularity.<sup>18</sup> Upon this definition there is no distinction between causal or lawful relations and accidental generalities.<sup>19</sup> This definition follows as a direct consequence of Hume's general argument against the rationalist ontology of objective necessary connections. Yet the notion of causation, Hume also insists, involves the idea of necessary connection.<sup>20</sup> This leads to the second definition of cause: a causal regularity, as opposed to one that is non-causal, that is, is an accidental generality, is one that we are prepared to use in making predictions and in supporting counterfactual inferences.<sup>21</sup> Thus, the moment of necessity that distinguishes causal from non-causal laws is subjective rather than objective. Not all causal judgments are rational, however: one must distinguish science from superstition. Those judgments are ra-

tional that conform to what Hume refers to as the *Rules by which to judge of causes and effects* (T 173-6), that is, the rules of eliminative induction ("Mill's Methods").<sup>22</sup> As for why thought is rational when it conforms to these rules rather than those of superstition, or even the rule of induction by simple enumeration, Hume offers a pragmatic justification for those rules of experimental science as better serving our passion of curiosity, our cognitive interest in the truth.<sup>23</sup> It is misleading to suggest as many do<sup>24</sup> that Hume abandons the attempt to find a justification for scientific inferences, and that he settles instead for a mere psychological explanation. To be sure, Hume does insist upon there being a psychological explanation for any and all our beliefs, both science and superstition, but science **alone** can satisfy our passion of curiosity or love of truth and therefore science alone is **rationally justified**.<sup>25</sup> Of course, this defence of reason is not the *a priori* sort that the Cartesian insists upon — it is rather *a posteriori* and fallible — but Hume not only has no reason to accept the Cartesian standard, he in fact argues for it being an unreasonable cognitive standard!<sup>26</sup>

Given Hume's general argument against objective necessary connections, there is no logical necessity attaching to any causal judgement; it is always possible that events will be contrary to any causal law. The human mind can therefore never achieve the level of absolute certainty that Cartesians and Aristotelians demand; all causal judgements are fallible. This amounts to scepticism provided that one thinks that such standards as those of the Cartesian are reasonable. However, given the argument against objective necessities, and therefore against the possibility of absolute certainty, it is not reasonable, Hume holds, to adopt the Cartesian standard. Hence, given the Humean argument his position cannot reasonably be characterized as sceptical.

This means in particular that Hume's pragmatic justification or vindication of the norms of empirical science as the defining standards of human reason is itself empirical and fallible. This does not imply, however, that Hume is a sceptic about science or about causal inferences. For, if a sceptic is one who holds that no causal judgement is ever reasonable or that all are equally reasonable, then Hume is no sceptic.

Now, the **basic** evidence for a causal judgement that all A's are B's is the fact that all observed A's are B's. Often enough, however, we observe a certain contrariety in effects; that is, A's are sometimes followed by B's and sometimes by C's.<sup>27</sup> We do not in such cases, at least we do not if we are philosophers, simply conclude that there is no causality here, that here it is chance and not causation that is operative. Rather, we infer that **there is** a hitherto unknown factor, call it D\*, such that an A is B just in case that it is D\* and is C just in case that it is not D\*. We make this inference on the basis of our past

successes in discovering previously unknown causal factors which can explain the contrariety of events.<sup>28</sup> The vulgar, of course, often do explain by appeal to chance the observed contrariety of effects; to use Hume's example, that my watch sometimes does not work properly is due to chance. But to the artisan such an explanation will not do: he knows better. What stops the watch is not chance but a hidden — unknown but not unknowable cause — for example, a speck of dust.<sup>29</sup> Science, or what is the same for Hume, philosophy, has systematically extended the watchmaker's experience to many other cases, and has been systematically successful in discovering causes for contrary effects. It is just this fact of experience, that science has been successful in discovering causes, that leads us to affirm the proposition, the law about laws to use Mill's phrase,<sup>30</sup> that for every event there is a cause, that is, the proposition that for every event there is a causal law under which it can be subsumed.<sup>31</sup>

Let us suppose, then, that we encounter an event that does not conform to the patterns that we have hitherto met in experience; for example, we may suppose that we are from the tropics and, going north, we encounter ice for the first time.<sup>32</sup> Here we run into a contrariety of effects in our experience. We thereby encounter an event which is, as Locke would say, beyond our comprehension, or, as Hume calls it in the essay on miracles, one which is marvellous. Yet we cannot count it a miracle. For we have the firm evidence of science that **there are** causes which account for this strange event.<sup>33</sup> It is to be sure not complete uniformity of experience which renders this judgement reasonable; after all, if there were complete uniformity there would be no contrariety. It is rather experience proceeding, as Hume says, *not directly ... but in an oblique manner* (T 133), that is, by inference from the law about laws that for the contrary effects there are laws, even if we don't know them, which explain those effects.

And so, while Hume claims against the rationalist that it is always possible that there are events which do not have natural causes,<sup>34</sup> he also claims on the basis of unalterable experience that events which violate laws of nature are absolutely impossible.<sup>35</sup> Contrary to what Broad, for example, argues,<sup>36</sup> there is nothing inconsistent in this. Hume's discussion of laws in the essay on miracles hangs together with his more general discussion of laws and causation in the *Treatise*. Moreover, Hume can quite easily say that miracles can **conceivably** occur while yet being impossible, again contrary to Broad's claim.<sup>37</sup> Finally, while it is true that for Hume laws are objectively nothing more than exceptionless regularities, it is also true that he allows laws, in particular laws about laws, to have logical forms more complicated than that of "All A's are B's." Laws about laws may include existential quantifications which enable one to infer the existence of an ex-

planatory law even where one does not know specifically what it is.<sup>38</sup> And so the fact that we run across an event that violates a regular pattern of our experience provides only evidence that that pattern is not a law, but it does not falsify the belief that **there is** a law which explains it, for the latter can be inferred on the basis of our more general experience which leads us to conclude that for any event there is a law which explains it.<sup>39</sup> Indeed, we all know from elementary logic classes that a single counterexample cannot falsify an existence claim! Thus, an event may be marvellous, and therefore, according to Locke's notion, beyond our comprehension, but at the same time not at all contrary, as Locke would also put it, to the established course of nature. Again contrary to Broad,<sup>40</sup> the fact that we discover exceptions to what we have previously thought to be regularities hardly testifies to there being events which are miracles, that is, events which violate laws of nature.

Since, as Hume holds, following Locke, a miracle is a violation of a law of nature, we can conclude that invariable and unalterable experience testifies to the impossibility of miracles. What, then, of the words of those who offer testimony that there are miracles?

In this case we have, on the one hand, the **testimony of reason** arguing that, since miracles are impossible, there are none. There is, on the other hand, the **testimony of some observer** that a miracle has occurred. **These two testimonies are in conflict.** Now, reason *must be consider'd as a kind of cause, of which truth is the natural effect*, according to Hume (T 180);<sup>41</sup> in which case reason must be taken as providing one instance of testimony and the observer a second, and independent instance. We have, then, two independent pieces of testimony.

The anonymous article in the *Philosophical Transactions of the Royal Society* dealt with this case in the second of its propositions.<sup>42</sup> (The first proposition dealt with chains of testimony.) The article reasons as follows. It lets each witness have a certain credibility, say  $p$ ;  $p$  represents the relative frequency of saying the truth to saying.<sup>43</sup> "there remains but an assurance of  $[1 - p]$  wanting to me, for the whole." And "towards that the second attester contributes, according to his proportion of credibility"; that is, he contributes  $p$  of  $(1 - p)$ . Hence, "there is now wanting but  $[1 - p]$  of  $[1 - p]$ , that is  $[(1 - p) \times (1 - p)]$ ."<sup>44</sup> We therefore have

$$p^2 : (1 - p)(1 - p)$$

as the ratio of truth saying to false saying. If we consider the case of testifiers with different credibilities (Proposition III of the anonymous article<sup>45</sup>), say  $p$  and  $p'$ , then the ratio of truth saying to false saying is

$$(*) \quad pp' : (1 - p)(1 - p')$$

The ratio of the truth saying cases to the total number of cases

$$(+ \quad pp' / [pp' + (1 - p)(1 - p')])$$

will represent the probability of the two testifiers asserting the truth.<sup>46</sup> (+) has been referred to as "Condorcet's formula,"<sup>47</sup> and the reasoning of the anonymous article that was used to justify the ratios has sufficient plausibility to be found repeated in its substance in Edgeworth's article on probability in the 11th edition of the *Encyclopaedia Britannica*.<sup>48</sup>

Now let the testimony of reason yield a probability  $p$  for the claim that a certain event occurred, and let  $p'$  be the testimony of an observer. It is evident from (\*) that if the evidence of reason yields only a very small probability  $p$  that a miracle occurred, then the credibility  $p'$  of the observer must be very large indeed if it is to outweigh the testimony of reason.

As Hume mentions (E 108), the sort of consideration that is being made evident here is that which was used by Archbishop Tillotson in his argument against transubstantiation.<sup>49</sup> The latter argued<sup>50</sup> that the irresistible evidence of sense (irresistible, but not completely infallible!) testified against transubstantiation, and that that evidence would systematically outweigh any claim that a miracle had occurred that testified to the truth of the papist doctrine. Indeed, since the evidence for the occurrence of the miracle would, ultimately, have to be based upon evidence of sense, to accept on that basis the occurrence of the miracle testifying to transubstantiation and therefore to the unworthiness of sense experience would be to undercut the evidential basis for accepting that miracle. It would require a man to "renounce his senses at the same time that he relies upon them. For a man cannot believe a miracle without relying upon sense, nor transubstantiation, without renouncing it."<sup>51</sup> Hume generalizes this point that Christianity and transubstantiation are 'ill-coupled', to argue that reason and miracles are similarly ill-coupled.

Reason, or at least empirical reason, is thought conforming to the "rules by which to judge causes"; that is, such habits of thought are those which are reasonable to have relative to the end established by our passion of curiosity or the love of truth. One of the rules that defines reason in this sense is the "same cause, same effect" rule that asserts that for every event there is a law that explains it.<sup>52</sup> Given that it is reasonable to accept the rules that define empirical reason, including this rule in particular, then one has accepted that miracles are, as one says, "contrary to reason." Reason in this sense is not infallible, but it

cannot accept a miracle without subverting itself. Moreover, the evaluation of the credibility of witnesses is itself a matter of empirical reason — *The reason why we place any credit in witnesses and historians, is not derived from any connexion, which we perceive a priori, between testimony and reality, but because we are accustomed to find a conformity between them* (E 113). Reason uses observed relative frequencies of the contrary effects of truth saying and false saying together with probability theory to estimate the relative credibility of testifiers and combinations of testifiers. These inferences involve reasoning in terms of what Hume calls in the *Treatise* the *probability of causes* (T 130-42), and this reasoning presupposes ordinary causal reasoning in terms of the *Rules by which to judge of causes* (T 132, 133).<sup>53</sup> The point is the simple one that these judgments are like ordinary causal inferences save that several relevant factors are not known explicitly. Their impact must therefore be estimated statistically rather than calculated directly. It follows that the very capacity to estimate rationally the credibility of witnesses is undermined by the acceptance of any testimony that a miracle has occurred. Reason being a habit of thought, including the habit of thought that all events are law-governed, it follows that any belief in a miracle must be a miraculous belief that violates the habits of rational thought — it must, in other words, be itself a miracle. *I weigh the one miracle against the other; and according to the superiority, which I discover, I pronounce my decision, and always reject the greater miracle. If the falsehood of his testimony would be more miraculous, than the event which he relates; then, and not till then, can he pretend to command my belief or opinion* (E 116). But of course, the evaluation of witnesses is not merely a matter of the abstract calculation of probabilities. Truth saying and false saying are the contrary effects of several different causal factors, including, naturally, reason. To estimate the credibility of a witness it is necessary to try to bring in and weigh these various factors — this, of course, is the point of cross-examining witnesses, and it is a point that any historian, Hume included, recognizes as he goes about evaluating the reliability of his sources. Mill<sup>54</sup>, and Edgeworth<sup>55</sup> following him, were to make this point; and Condorcet was to discover its validity empirically as he quite literally lost his head in the realization that it was not safe to assume that as the number of independent voters increased in the convention the more likely it would be that the decision arrived at was the truth. It is this point that Hume goes on to develop in Part 2 of the essay on miracles.

Hume here makes a variety of relevant points.<sup>56</sup> Miracles are reported in ages of credulity and superstition, not ages of science (E 119). External factors are relevant also, like the fact that rival religious traditions testify to different sorts of miracles that have contrary

implications; in that context the contrary traditions cancel each other out, decreasing the credibility of both (E 121). There are, moreover, the various passions that lead us to depart from the rules of reason; we know these to be frequent enough to undermine the credibility of most testimony to miracles (E 117). In particular, given how miracles appeal to the very human passion of wonder, it should not at all surprise us that they have a continuing fascination for people. As Hume himself indicates, there is a natural tendency to accept miracles. It is, however, a tendency that aims at satisfying passions other than that of curiosity (E 117), and it is therefore not remarkable that people should have beliefs that are contrary to those that one would have if one conformed, like a good academic sceptic, to the rules that have as their end the discovery of truth and the satisfaction of our love of truth alone.

*It is experience only, which gives authority to human testimony; and it is the same experience, which assures us of the laws of nature. When, therefore, these two kinds of experience are contrary, we have nothing to do but subtract the one from the other, and embrace an opinion, either on one side or the other, with that assurance which arises from the remainder. But according to the principle here explained, this subtraction, with regard to all popular religions, amounts to an entire annihilation; and therefore we may establish it as a maxim, that no human testimony can have such force as to prove a miracle, and make it a just foundation for any such system of religion.*  
(E 127)

What is crucial throughout Hume's discussion of these points is that the estimation of the credibility of witnesses is itself a piece of causal reasoning.<sup>57</sup> In the end, the estimation of probabilities is parasitic upon the use of empirical reason as defined by the *Rules by which to judge of causes* — as indeed Hume himself indicates when he discusses the *probability of causes* in the *Treatise*.

The general thrust of Hume's account of causal reason enables him to make a full reply to Price's critique of his essay,<sup>58</sup> even if one allows, as one no doubt should, that Hume did not fully appreciate the nature of Bayes' Theorem in probability theory.

Nothing in Hume's discussion turns upon his having known of Bayes' work — the source of his rules for combining probabilities of testimony derive far more probably from the anonymous article in the *Philosophical Transactions*. To apply Bayes' Theorem one must work in terms of conditional probabilities, whereas when Hume does discuss these things in the *Treatise* it is clear that he is thinking in terms simply of the relative frequency of contrary effects.<sup>59</sup> Since he seems simply to

apply these results straight forwardly to the case of testimony, with truth saying and false saying as contrary effects, it would appear that here, too, he is proceeding in terms of non-conditional rather than conditional probabilities, exactly as does the author of the anonymous note, but contrary to how he must be read if we are to make a Bayesian of him, as, for example, Owen<sup>60</sup> and Sobel<sup>61</sup> have tried to do, even in spite of their finding serious difficulties in that account (for example, it cannot allow that the probability of a miracle is straight off zero<sup>62</sup>). From this it does not follow that Hume's account of how to combine probabilities of testimony, that is, that of the anonymous note, is free from problems: it is not, as we have said, following Mill and Edgeworth. But Hume saw this also, which is why he went on in Part 2 of the essay to place these probability calculations in the broader context of an analysis of the factors that are causally relevant to the truth saying and false saying of witnesses. To suggest, as Price does, that in this context one can ignore the prior probabilities of event in estimating the worth of testimony<sup>63</sup> — so that the improbability of miracles cannot be used to count against the worthiness of testimony — is simply silly: the Roman proverb that Hume quotes from Plutarch, *I should not believe such a story were it told me by Cato* (E 113), makes the point forcefully enough. Price, moreover, simply misunderstands parts of Hume's discussion. Thus, for example, he suggests that the antecedent probability of miracles is no greater than that of electricity or magnetism before they were discovered.<sup>64</sup> But this is to miss the point that, while these may constitute marvels, they do not constitute miracles, nor did the relevant phenomena suggest anything of the miraculous before science succeeded in explaining them. Rather, what science was committed to, prior to successfully advancing explanations, was that these phenomena had not yet been explained but that we had good reason, based on past experience, to believe that **there were** laws which explained them. It is precisely this last which is by definition absent in the case of miracles.

What Price's discussion evidences is the presence of the notion of a natural law for which there could be exceptions.<sup>65</sup> It is precisely this that Hume is concerned to argue against. Within the context of a Aristotelian or a Cartesian metaphysics this notion in fact makes sense. But Hume has argued systematically against these positions, and defended the alternative view that, objectively, all that causation amounts to is matter-of-fact **regularity**. Once he has done this, and once he has vindicated the practice of science as including the rule that for any event **there is** a law which explains it, then there is simply no place for a miracle to occur, nor any plausibility to testimony that one has witnessed one: *a miracle, supported by any human testimony, [is] more properly a subject of derision than of argument* (E 124). **Science**

**and miracles — science and Christianity — are inconsistent: one cannot be both rational and Christian.** It is this thesis that Hume aimed to establish, and more or less succeeded.

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1. C. D. Broad, "Hume's Theory of the Credibility of Miracles," *Proceedings of the Aristotelian Society* n.s. 17 (1916-17): 77-94.
2. David Hume, *Enquiries Concerning the Human Understanding and Concerning the Principles of Morals*, ed. L. A. Selby-Bigge, 2nd ed. (1902; Oxford, 1972). Further references ("E") will be given in parentheses within the body of the text.
3. Cf. R. M. Burns, *The Great Debate on Miracles* (Lewisburg, 1981).
4. Eusebius Pamphili, Bp. of Caesarea, *The Proof of the Gospel (Demonstratio Evangelica)*, trans. W. J. Ferrar, 2 vols. (London, 1920); see esp. Book 3.
5. One can find exemplifications of this controversy repeated up into the 19th century; see S. Lee, *Controversial Tracts on Christianity and Mohammedanism by the Late Rev. Henry Martyn* (Cambridge, 1824).

In this volume Lee translates an arabic tract by Mirza Ibrahim. It was to this that Henry Martyn wrote several replies; it is these that are the "controversial tracts" that Lee is collecting and editing. But in addition, Lee includes a translation of a rejoinder to Martyn by Mohammed Ruza of Hamadan, together with a lengthy discussion of the same issues by Lee himself.

What we are here interested in is the case that Islamic scholars made for their religion, the case, that is, in the tract by Mirza Ibrahim. According to this tract, assurance is of the first importance since, for the defenders of any faith, "in the matter of a prophetic mission, nothing less than assurance can be admitted as of any weight" (p. 11); "the reality of a prophetic mission cannot be established, in the estimation of those who are not Prophets, but by the production of a miracle" (p. 2). The required miracle is the Koran itself. Now the Arabs knew the science of eloquence; "had therefore [Mohammed's] production originated in this science, they [the Arabs] could have produced its equal" (p. 10). But they have not; "in fact, no one of them, during the space of twelve hundred years, has yet produced the like, notwithstanding the continued allegations of the preachers of Islamism, that the Koran holds out a challenge to all" (pp. 10-11). The required assurance, then, is

to be obtained from an acquaintance with the sciences of eloquence, which must be founded upon a knowledge of the elements of language, just as it is from the unanimous consent of the learned; viz. that it is a miracle, and not the effect of eloquence alone: — an assurance, in which there can remain no doubt; and not less convincing than that of the miracles of the other Prophets. Nay, it is more so; for the impossibility of imitation is now just what it was at the first performance of the miracle, on account of its perpetuity, and its utter incapability of decay. And further, it will for ever remain just what it was at the first propagation of Islamism, contrary to the character of the miracles of other Prophets, of which we have now nothing remaining but mere relations, as Moses or Jesus, for instance, did this or that; or it is thus preserved by tradition. But no relation can have the evidence of an eye-witness. The miracles of other Prophets, moreover, in addition to their want of evidence, as already noticed, when compared with that of the Koran, will by length of time become less and less convincing; because in process of time any relation must become less impressive. But the miracle of the Koran, on the contrary, will, in process of time, become more so, because the learned who have confessed their inability to produce the like, will have been more numerous, though the miracle itself will remain exactly what it was at the first: and the conviction of its being a miracle will thus become more powerful. Hence will the mystery be explained, why this Prophet was, to the exclusion of all others, termed the seal of prophecy: because, as the evidence of their miracles is daily becoming weaker, a time must at last arrive, when it will fail of affording assurance, that they were miracles at all; whence would arise the necessity of the mission of another prophet and other miracles, "lest men should have an argument of excuse against God after the Apostles had been sent to them" [Sale's Koran, 1:117]: contrary to what is the fact, as it respects this Prophet and his miracles; which will remain to the day of judgment, not only what it was at the first, but more convincing. And hence there will be no necessity for another Prophet, or for other miracles to all eternity. (pp. 12-14)

6. Not surprisingly, the British thinkers did not develop the positive theme that the Koran was a self-validating miracle that justified the claims of Islam against those of the Christians.
7. See Edward Pocock, *Specimen Historiae Arabum* (Oxford, 1650), 195; this is the Arabic text and Latin translation of a work by Grigor (Abu al-Faraj), called *Bar Hebraeus*.
8. Anthony, Earl of Shaftesbury, *Characteristics of Men, Manners, Opinions, Times*, ed. J. M. Robertson, 2 vols. (1711; Indianapolis, 1964).

Shaftesbury writes: "It belongs to mere enthusiasts and fanatics to plead the sufficiency of a reiterate translated text, derived to through so many channels and subjected to so many variations, of which they are wholly ignorant" (p. 2:302).

Shaftesbury indicates familiarity with the Islamic position that Pocock had introduced: "The Mahometan clergy seem to have a different policy. They boldly rest the foundation of their religion on a book: such a one (according to their pretension) is not only perfect, but inimitable." Shaftesbury makes short work of this: he continues, "Were a real man of letters and a just critic permitted to examine this scripture by the known rules of art, he would soon perhaps refute this plea" (p. 301).

9. George Berkeley, "Alciphron," in *The Works of George Berkeley*, ed. A. A. Luce and T. E. Jessop, vol. 3 (London, 1732; Edinburgh, 1950). The argument is expressed in the dialogue by the main character, Alciphron:

Do you not see ... that all this hangs by tradition? And tradition, take my word for it, gives but a weak hold: it is a chain whereof the first links may be stronger than steel, and yet the last as weak as wax, and brittle as glass. Imagine a picture copied successively by a hundred painters, one from another, how like must the last copy be to the original! How lively and distinct will an image be, after a hundred reflexions between two parallel mirrors! Thus like and thus lively do I think a faint vanishing tradition, at the end of sixteen or seventeen hundred years. Some men have a false heart, others a wrong head; and, where both are true, the memory may be treacherous. Hence there is still something added, something omitted, and something varied from the truth: and the sum of many such additions, deductions and alterations accumulated for several ages doth, at the foot of the account, make quite another thing. (p. 222)

Berkeley goes on to argue (pp. 222ff.) for the unsoundness of this case for the unreliability of the argument for Christian beliefs based on tradition, that is, on chains of testimony.

In the discussion of "free thinkers" in "Alciphron" Berkeley clearly has Shaftesbury in mind. That is one possible source of his knowledge of the sceptical argument from the regress of testimony. There is another possible source. Pocock was a friend of, and corresponded with Archbishop Marsh of Dublin whom Berkeley must undoubtedly have known when he was a student at Trinity College.

10. John Craig, "Theologiae Christianae Principia Mathematica", in *Craig's Rule of Historical Evidence, History and Theory*, trans. G. Nadel, Beiheft 4 (1699; The Hague, 1964).
11. See F. Wilson, "The Origins of Hume's Sceptical Argument against Reason," *History of Philosophy Quarterly* 2 (1985): 323-35.
12. "A Calculation of the Credibility of Human Testimony," *Philosophical Transactions of the Royal Society of London* 21 (1699). It is Pearson's considered opinion that this note is by Halley; see K. Pearson, *The History of Statistics in the 17th and 18th Centuries*, ed. E. S. Pearson (London, 1978), 466-7.
13. Ephraim Chambers, "Certitude," in *Cyclopaedia* (London, 1746). When the thesis of this article is joined to the thesis of the article on "Tradition," one has the attack on Christianity that one finds in the Muslim thinkers, in Shaftesbury, and in Berkeley.
14. It is the basis of Hume's well-known sceptical argument against reason in *A Treatise of Human Nature*, ed. L. A. Selby-Bigge, 2nd ed. (1888; Oxford, 1987), 180ff. (Further references ["T"] will be given in parentheses within the body of the text.) I have discussed this particular argument in detail in "Hume's Sceptical Argument against Reason," *Hume Studies* 9 (November 1983): 90-129; and in "Is Hume a Sceptic with regard to Reason?" *Philosophy Research Archives* 10 (1984): 275-320. Hume mentions this argument based on a long chain of testimonies earlier in the *Treatise* (pp. 145-6), and in a footnote (T 146) he indicates that the sceptical argument against reason has the form of this regress of testimony. I have argued in "The Origins of Hume's Sceptical Argument against Reason" (above, n. 11) that we should take Halley's treatment as the most reasonable source for Hume's discussion.
15. Every new probability diminishes the original conviction; and however great that conviction may be suppos'd, 'tis impossible it can subsist under such re-iterated diminutions. This is true in general (T 145).

16. In the unpublished essay "Of the Authenticity of Ossian's Poems," in David Hume, *The Philosophical Works*, ed. T. H. Green and T. H. Grose, 4 vols. (Oxford, 1882), 4:415-24, Hume writes,

*they were composed, you say, in the Highlands, about fifteen centuries ago; and have been faithfully transmitted, ever since, by oral tradition, through ages totally ignorant of letters, by the rudest, perhaps of all the European nations; the most necessitous, the most turbulent, the most ferocious, and the most unsettled. Did ever any event happen that approached within a hundred degrees of this mighty wonder, even to the nations them most fortunate in their climate and situation? Can a ballad be shown that has passed, uncorrupted, by oral tradition, through three generations, among the Greeks, or Italians, or Phoenicians, or Egyptians, or even among the natives of such countries as Otaheite or Molacca, who seem exempted by nature from all attention but to amusement, to poetry, and music? (p. 416)*

Hume was to continue his respect for the argument as applied to the Ossian poems until the end of his life: in 1776 he wrote to Gibbon that,

*I see you entertain a great Doubt with regard to the Authenticity of the Poems of Ossian. You are certainly right in so doing. It is, indeed, strange, that any men of Sense could have imagin'd it possible, that above twenty thousand Verses, along with numberless historical Facts, could have been preserv'd by oral Tradition during fifty Generations, by the rudest, perhaps of all European Nations; the most necessitous, the most turbulent, and the most unsettled. Where a Supposition is so contrary to common Sense, any positive Evidence of it ought never to be regarded. Men run with great Avidity to file their Evidence in favour of what flatters their Passions, and their national Prejudices. You are, therefore, over and above indulgent to us in speaking of the Matter with Hesitation. (David Hume, *The Letters of David Hume*, ed. J. Y. T. Grieg [Oxford, 1932], 3:310-11)*

17. J. Locke, *The Reasonableness of Christianity*, ed. I. T. Ramsey (Stanford, California, 1958), 33. Similar definitions were offered by others of the age. Thus, Samuel Clarke, in his Boyle Lectures,

defined a miracle as "a work effected in a manner ... different from the common and regular method of providence, by the interposition either of God himself, or of some intelligent agent superior to men" (*The Works of Samuel Clarke* [London, 1738], 2:701). Bishop Butler remarks that "... a miracle, in its very notion, is relative to a course of nature; and implies somewhat different from it, considered as being so" (*The Works of Joseph Butler*, ed. W. E. Gladstone [Oxford, 1896], 1:214).

Hume himself states that *A miracle may be accurately defined, a transgression of a law of nature by a particular volition of the Deity, or by the interposition of some invisible agent* (E 115, n. 1).

18. A cause, upon this definition, is *an object precedent and contiguous to another, and where all the objects resembling the former are plac'd in a like relation of priority and contiguity to those objects, that resemble the latter* (T 172); or, it is *an object, followed by another, and where all the objects similar to the first are followed by objects similar to the second* (E 76).
19. Cf. F. Wilson, *Laws and Other Worlds* (Dordrecht, 1986).
20. An object may be contiguous and prior to another, without being consider'd as its cause. There is a NECESSARY CONNEXION to be taken into consideration; and that relation is of much greater importance, than any of the other two above-mention'd (T 77).
21. Upon this definition a cause is *An object precedent and contiguous to another, and so united with it in the imagination, that the idea of the one determines the mind to form the idea of the other, and the impression of the one to form a more lively idea of the other* (T 172); or *an object followed by another, and whose appearance always conveys the thought to that other* (E 77).
22. Hume's is the best statement of "Mill's Methods" between Bacon and Herschel. See also F. Wilson, "Is There a Prussian Hume?" *Hume Studies* 8 (April 1982): 1-18.
23. For the details of this pragmatic "vindication," see F. Wilson, "Hume's Defence of Causal Inference," *Dialogue* 22 (1983): 661-94.
24. E.g., Broad (above, n. 1), 91-2.
25. Cf. F. Wilson, "Hume's Defence of Science," *Dialogue*, 25 (1986): 611-28.
26. Cf. F. Wilson, "Hume's Cognitive Stoicism," *Hume Studies*, supplement (1985): 521-48.
27. *But as 'tis frequently found, that one observation is contrary to another, and that causes and effects follow not in the same order, of which we have had experience, we are oblig'd to vary our reason-*

ing on account of this uncertainty, and take into consideration the contrariety of events (T 131).

One, who in our climate, should expect better weather in any week of June than in one of December, would reason justly, and conformably to experience; but it is certain, that he may happen, in the event, to find himself mistaken. However, we may observe, that, in such a case, he would have no cause to complain of experience; because it commonly informs us beforehand of the uncertainty, by that contrariety of events, which we may learn from a diligent observation. All effects follow not with like certainty from their supposed causes. Some events are found, in all countries and all ages, to have been constantly conjoined together: Others are found to have been more variable, and sometimes to disappoint our expectations; so that, in our reasonings concerning matter of fact, there are all imaginable degrees of assurance, from the highest certainty to the lowest species of moral evidence (E 110).

28. From the observation of several parallel instances, philosophers form a maxim, that the connexion betwixt all causes and effects is equally necessary, and that its seeming uncertainty in some instances proceeds from the secret opposition of contrary causes (T 132).
29. A peasant can give no better reason for the stopping of any clock or watch than to say, that commonly it does not go right: But an artizan easily perceives, that the same force in the spring or pendulum has always the same influence on the wheels; but fails of its usual effect, perhaps by reason of a grain of dust, which puts a stop to the whole movement (T 132).
30. John Stuart Mill, *System of Logic*, 8th ed. (London, 1872), 3.5.2 and 3.21.2, 3.
31. On the logic of this inference, see F. Wilson, *Causation, Explanation and Deduction* (Dordrecht, 1985), 1.2, 1.3; and also "Kuhn and Goodman: Revolutionary vs. Conservative Science," *Philosophical Studies* 44 (1983): 369-80.
32. This is, of course, the example that Hume himself uses in the essay on miracles: *The Indian prince, who refused to believe the first relations concerning the effects of frost, reasoned justly; and it naturally required very strong testimony to engage his assent to facts, that arose from a state of nature, with which he was unacquainted, and which bore so little analogy to those events, of which he had had constant and uniform experience. Though they were not contrary to his experience, they were not conformable to it* (E 113-14).
33. *when any cause fails of producing its usual effect, philosophers ascribe not this to any irregularity in nature; but suppose, that some*

*secret causes, in the particular structure of parts, have prevented the operation* (E 58).

34. Thus, that the proposition that *Whatever has a beginning has also a cause of existence*... is utterly incapable of a demonstrative proof, we may satisfy ourselves by considering, that as all distinct ideas are separable from each other, and as the ideas of cause and effect are evidently distinct, 'will be easy for us to conceive any object to be non-existent this moment, and existent the next, without conjoining to it the distinct idea of a cause or productive principle. The separation, therefore, of the idea of a cause from that of a beginning of existence, is plainly possible for the imagination; and consequently the actual separation of these objects is so far possible, that it implies no contradiction nor absurdity; and is therefore incapable of being refuted by any reasoning from mere ideas; without which 'tis impossible to demonstrate the necessity of a cause (T 79-80).

*The mind can never possibly find the effect in the supposed cause, by the most accurate scrutiny and examination. For the effect is totally different from the cause, and consequently can never be discovered in it* (E 29).

35. *It is universally allowed that matter, in all its operations, is actuated by a necessary force, and that every natural effect is so precisely determined by the energy of its cause that no other effect, in such particular circumstances, could possibly have resulted from it. The degree and direction of every motion is, by the laws of nature, prescribed with such exactness that a living creature may as soon arise from the shock of two bodies as motion in any other degree or direction than what is actually produced by it* (E 82).
36. Broad (above, n. 1), 91.
37. Broad, 93-4.
38. Cf. Wilson, *Causation, Explanation and Deduction* (above, n. 32); and "Kuhn and Goodman: Revolutionary vs. Conservative Science" (above, n. 32).
39. Broad (above, n. 1), 90, does recognize this point but does not see its importance.
40. Broad, 93-4.
41. our assurance in any argument of this kind [that which is derived from the testimony of men, and the reports of eye-witnesses and spectators] *is derived from no other principle than our observation of the veracity of human testimony, and of the usual conformity of facts to the reports of witnesses. It being a general maxim, that no objects have any discoverable connexion together, and that all the inferences, which we can draw from one to another, are founded merely on our experience of their constant and regular conjunction;*

- it is evident, that we ought not to make an exception to the maxim in favour of human testimony, whose connexion with any event seems, in itself, as little necessary as any other* (E 111).
42. "A Calculation of the Credibility of Human Testimony" (above, n. 12), 361-2.
  43. The article puts it in terms of what one would be willing to wager: "**Moral Certitude Incomplete**, has its several Degrees to be estimated by the Proportion it bears to the **Absolute**. As if one in whom I have that degree of Confidence, as that I would not give above One in Six to be ensur'd of the Truth of what he says, shall inform me ... concerning 1200£: I may then reckon that I have as good as the Absolute Certainty of a 1000£, or five sixths of Absolute Certainty for the whole Summ." ("A Calculation of the Credibility of Human Testimony" [above, n. 12], 359)
  44. "A Calculation of the Credibility of Human Testimony," 361.
  45. "A Calculation of the Credibility of Human Testimony," 362.
  46. This formula can also be given an interpretation in which  $p$  and  $p'$  are taken to be conditional probabilities, rather than absolute or non-conditional probabilities as the author of the anonymous note in the Royal Society Transactions. The formula understood in terms of conditional probabilities can be easily derived from Bayes' Theorem: cf. D. Owen, "Hume *versus* Price on Miracles and Prior Probabilities; Testimony and the Bayesian Calculation," *Philosophical Quarterly* 37 (1987): 191n. Owen proposes that Hume be construed as using conditional probabilities and that he used (+) so understood in the argument against miracles. But wherever Hume speaks of probabilities it is clear that he is thinking, as is the author of the anonymous note, in non-conditional terms (e.g., T 124ff.). That means that in attempting to interpret Hume we must, contrary to Owen, understand (+) and (\*) in non-conditional terms.
  47. Cf. Ilkka Niiniluoto, "L. J. Cohen versus Bayesianism," *The Behavioral and Brain Sciences* 4 (1981): 349-50. For Condorcet, see Marie-Jean-Antoine-Nicolas Caritat, Marquis de Condorcet, "Mémoire sur le calcul des probabilités," section five of which is entitled, "Sur les probabilités des faits extraordinaires," in *Histoire de l'academie royale des sciences* (1786), 554-5. As Isaac Todhunter (*A History of the Mathematical Theory of Probability* [Cambridge, 1895; New York, 1965]) observes (p. 400), Condorcet gives his formula "with every little explanation"; it is therefore not exactly clear how he has arrived at it. The anonymous note in the Royal Society Transactions is more clear on this point.
  48. Francis Y. Edgeworth, *Encyclopaedia Britannica*, 11th ed., s.v. "probability."

49. John Tillotson, "Sermon 26," in *Works* (London, 1820), 2:407-52.
50. Tillotson, 2:447ff.
51. Tillotson, 2:449.
52. See Wilson, "Is There a Prussian Hume?" (above, n. 23).
53. For a detailed analysis of these inferences, see Wilson, "Hume's Sceptical Argument against Reason" (above, n. 11).
54. *System of Logic* (above, n. 31), 3.18.3.
55. Edgeworth (above, n. 49).
56. These he has already summarized in Part 1 of the essay: *This contrariety of evidence, in the present case, may be derived from several different causes; from the opposition of contrary testimony; from the character or number of the witnesses; from the manner of their delivering their testimony; or from the union of all these circumstances. We entertain a suspicion concerning any matter of fact, when the witnesses contradict each other; when they are but few, or of a doubtful character; when they have an interest in what they affirm; when they deliver their testimony with hesitation, or on the contrary, with too violent asseverations. There are many other particulars of the same kind, which may diminish or destroy the force of any argument, derived from human testimony* (E 112-13).
57. Were not the memory tenacious to a certain degree, had not men commonly an inclination to truth and a principle of probity; were they not sensible to shame, when detected in a falsehood: Were not these, I say, discovered by *experience to be qualities, inherent in human nature, we should never repose the least confidence in human testimony. A man delirious, or noted for falsehood and villany, has no manner of authority with us* (E 112).
58. Richard Price, "On the Importance of Christianity, the Nature of Historical Evidence, and Miracles," in *Four Dissertations*, 5th ed. (Harlow, 1811).
59. He adopts the classical or ignorance view of probability that was later to be defended in detail by Laplace; cf. T 125-6.
60. David Owen, "Hume *versus* Price on Miracles and Prior Probabilities: Testimony and the Bayesian Calculation" (above, n. 47).
61. J. H. Sobel, "On the Evidence of Testimony for Miracles: A Bayesian Interpretation of David Hume's Analysis," *Philosophical Quarterly* 37 (1987): 166-86.
62. And this is clearly what Hume means to assert about miracles when he states that as a *uniform experience amounts to a proof, there is here a direct and full proof, from the nature of the fact, against the existence of any miracle* (E 115).
63. Price (above, n. 59), 234ff. For comments on Price's case from the context of the Bayesian perspective of Price himself, see J. H. Sobel,

"On the Evidence of Testimony for Miracles: A Bayesian Interpretation of David Hume's Analysis" (above, n. 62), 177ff.

64. Price, 244.

65. Price waffles here. He considers the usual "supposition that a miracle ... implies a **violation** or **suspension** of the laws of nature"; and argues, "But, in reality, this is by no means necessarily included in the idea of a miracle. A sensible and **extraordinary effect** produced by **superior power**, no more implies that a law of nature is **violated**, than any **common effect** produced by **human power**" (p. 253). However, while this allows that there can be miracles that do not involve violations of any law of nature, it does so only at the cost of extending the notion of 'law of nature' to include **non-sensible** factors among those which are covered by the laws. But this already is excluded by Locke and by Hume who both insist that if the relevant force is non-sensible then the event is a miracle. Thus, as Hume puts it, *A miracle may be accurately defined, a transgression of a law of nature by a particular volition of the Deity, or by the interposition of some invisible agent* (E 115, n. 1).

Price's suggestion that God can be treated as a non-natural cause that intervenes in the course of events without violating laws of nature in the way in which humans intervene in the course of events without violating laws has recently been revived by Robert Larmer, "Miracles and the Laws of Nature," *Dialogue* 24 (1985): 227-36; see his p. 231. The problem does not concern the nature of agency, as Larmer suggests (p. 231), but rather the intelligibility of the idea of a supra-sensible or non-natural cause. But in any case, the suggestion does not establish that there can be miracles that do not violate laws of nature, since God's intervention will still violate the **order of natural causes**, the regularities governing sensible occurrences, and as Locke and Hume indicate, it is precisely this that the Christian needs and uses to justify his claims.