Miracles and Probabilities

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Miracles and Probabilities

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I

The essence of Hume's powerful argument concerning miracles is of remarkable brevity; he said, ". . .no testimony is sufficient to establish a miracle unless the testimony be of such kind that its falsehood would be more miraculous than the fact which it endeavors to establish". One of the noteworthy aspects of this fascinating argument is that even though it clearly belongs to the philosophy of religion, in order to evaluate almost any part of the very extensive literature that has sprung up around it, the various features of probability theory need to be clarified.

In this essay I shall review some of the great variety of attempts that have been made to defend a belief in miracle-stories. Finally, I shall try to show that on certain assumptions concerning miracles, by employing some of the elementary theorems of probability a fairly simple reply to Hume is available. Interestingly enough, it will emerge that just in case we do *not* postulate that miracles take place only when it is ensured that everyone whose faith may be affected by it is informed about its occurrence, *then* such information provides rational support for a person's religious belief.

II

Let me begin by citing some of the older and fairly well-known attempts to answer Hume. There is the classic charge that Hume's argument harbors a subtle circularity. It has been pointed out that Hume proposes to infer that stories like those which tell us that dead men came alive must be false since their falsity may be infer-

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red from the true proposition 'No dead man comes alive'. The truth of that proposition follows from the premise that no such event has ever happened before. The critics complain, however, that the crucial premise is not really given unless what has been called an 'inference' is assumed in the first place. For if we do not begin with the presumption that religious stories about people awaking from the dead are false, we do not have the premise that such an event has never happened before. George Campbell argued this way more than two hundred years ago.

> Now, what has been observed and what has not been observed, in all ages and countries, pray how can you, sir, or I, or any man, come to the knowledge of? Only I suppose by testimony oral or written.[1]

But we do have written testimony by religious writers that cases of resurrection have been observed. If Hume refused to believe it because it clashes with an alleged law of nature established on the very presupposition that such cases have never been observed before then

> . . . he falls into the paralogism which is called begging the question[2]

It seems that Hume could reply very briefly, by saying, that his argument would be circular only if he required a strong premise like 'It is *known* that there have been no observed cases of resurrection', but he does not. He can do with a weaker premise, namely, 'In all the known cases of observation the dead seemed to remain in that state' which of course does not assume the falsity of the religious reports, it only fails to treat them as data.

It is not my intention to review all the attempts that have been made to reply to Hume, but I shall mention one other argument of Campbell which is perhaps his most noteworthy. His contention is basically that if Hume's advice to be sceptical about all testimonies concerning inexplicable events had been heeded, scientific progress would have very seriously been impeded. After all, many of the discoveries of scientists consisted in observing phenomena that are contrary to what we are familiar with. Fortunately, that has not created any obstacles for reasonable people to believe the reports of experimental scientists and treat them as data for the construction of their hypotheses:

> How easily this obstacle may be overcome by testimony might be illustrated, if necessary, in almost every branch of science, in physiology, in geography, in history. On the contrary, what an immense impediment would this presumption prove to the progress of

> philosophy and letters, had it in reality one fiftieth part of the strength, which the author seems to attribute to it. I shall not tire my reader or myself by referring to the philosophic wonders in electricity, chemistry, magnetism, which all the world sees may be fully proved to us by testimony, before we make experiments ourselves.[3]

I am not entirely certain what a Humean would regard as the best reply to Campbell's challenge. One line he might take is to distinguish between 'philosophic wonders' which may be quite unexpected and even stunning and sensational, and yet are not clearly violating any well established law of nature, and between events that are. To Europeans, description of kangaroos must have sounded quite fantastic, yet there were no known biological, or other laws, implying that such creatures cannot survive on this planet. There was no firm reason, therefore, to discredit the tales of returning travellers from Australia. Or rumors that it is possible to photograph the insides of opaque bodies have greatly astonished people, but not because they are obviously contrary to well confirmed laws. Had it been reported that such photographs were made with the use of regular light-rays, that would of course have implied a breach of what we believed on the basis of overwhelming inductive evidence to have been prohibited by nature. However, the reports concerned the bizarre behaviour of the newly discovered x-rays, none of the properties of which were yet known to anyone. Thus, however, unprepared we were for such startling phenomena, there was no positive evidential basis for rejecting them.

These two brief examples illustrate the point made earlier about a common feature of arguments about the credibility of testimonies affirming miraculous events. Both the critics of Hume and his defenders concern themselves with this or that aspect of confirmation theory. Neither advances arguments or claims involving the nature of theistic belief in general or the character and function of miracles in particular.

III

Now we shall look at a recent, remarkable agrument advanced by Robert Hambourger aimed at showing that regardless of how much smaller the probability of an event may be than the probability of the report of it having happened being false, reason demands that we trust the report.[4] He advances the following somewhat startling argument to show that this is so: Let us assume that there is a lottery in which there are a million participants and a single large prize. Following the day of the drawing a highly reliable newspaper like the *New York Times* reports that Smith was the winner. We shall unquestionably accept the report as true. But the probability that a paper like the *New York Times* should print an erroneous report, even though small, is not smaller than say 1/10,000. On the other hand, the probability that Smith is the winner is no more than 1/1,000,000. If Hume's principle were correct we would have to say that the reliability of the *New York Times* was not high enough to make us want to believe such a highly improbable story. But as we have said, we shall not hesitate in accepting the newspaper's report. It should follow then that it is reasonable to believe reliable witnesses regardless how improbable the events they may be reporting.

It is not too difficult to see however that this argument is basically flawed; the two situations are not at all comparable. Smith's winning a lottery is not what one may call a surprise event, whereas a miracle involving the violation of what is believed to be a law of nature, is. Paul Horwich in his *Probability and Evidence*[5] provides an instructive example illustrating the difference. He asks us to consider the case of A who wins a lottery amongst a billion people and that of B who wins three lotteries in succession among a thousand people each. Horwich points out that B's success is a surprise while A's success is not, even though that the probability of each event is precisely one in a billion.

I am sure everyone will agree with Horwich's claim concerning the basic difference in the correct characterization of the two events, though not necessarily with the way he proposes to account for the difference. His explanation involves a comparison between the chances of foul play in the two cases. One reason why I find this inadequate is because it does not work in the case of events where human manipulation is entirely out of question. For example, I suppose we should find it very surprising if the house of one and the same person is hit one day by lighting and the day after by a meteor and next by a tornado (assuming that the probability of each event was 1/1,000), but not if the same person has a *single* disaster, for which the probability was one in a billion, visited upon him.

The simple explanation seems to be, however, that when a certain kind of event is bound to happen anyhow and it is only a question to which particular individual is it going to happen, where each individual stands and equal chance, then when it happens to one rather than another, there are no grounds for surprise. Thus, when there is a lottery with a billion or even a trillion tickets, it is absolutely certain right from the start that one ticket must win and therefore, when A's ticket turns out to have done so, we cannot say that an unexpected sort of event has taken place. On the other hand, of course, in the second case it was not at all to be expected that *anyone* is going to win three lotteries in succession; the probability against this *kind* of event taking place was one in a billion; hence, its occurrence is cause for surprise.

It will be illuminating to treat the matter formally; however, before doing so I should like to point out that even in the absence of much knowledge of probability theory it ought to be fairly clear that the *New York Times* story cannot at all be compared to reports of miraculous events. Consider, for example, the story that Jericho was captured as a result of the spectacular collapse of the walls surrounding the city, at the sound of the Israelites' trumpets. According to Hume, it is unreasonable to believe this story. It is clear that Hume is not telling us: refuse to accept this report as authentic and instead believe rather than Jericho was actually captured as a result of some other, equally improbable miracle. This would be quite absurd—what reason is there for preferring one highly unlikely story to another? Thus, unquestionably what Hume is advising us is that we refuse to accept the traditional story and prefer to believe that the city was captured in some natural way, or perhaps that it was not captured at all. What Hume urges us to do, then, seems eminently reasonable, namely, to regard much more probable that whatever did take place was actually likely to happen in the first place, rather than that it was highly unlikely.

Suppose we are willing to accept his advice. How are we to apply it to the newspaper report? Are we to insist on rejecting the belief that Smith is the winner and prefer to believe that someone else, who stood a better chance, was the actual winner? But we are given that every ticket had the same probability of winning! Thus, that there is going to be a winner was a certainty right from the beginning; the only question was which of the million participants is it going to be. Here we simply do not have the option of making any use of Hume's principle, and assume rather that some other ticket, with a better chance to have been drawn than Smith's, won the prize.

The following is a brief formal presentation of this case:

Let e = The *New York Times* reports ticket #*i* as the winner,

h = Ticket #*i* is in fact the winner.

$$P(\sim h/e) = \frac{P(e/\sim h)\cdot P(\sim h)}{P(e)}$$

$$P(h/e) = \frac{P(e/h)\cdot P(h)}{P(e)}$$

dividing the two equations:

$$\frac{P(h/e)}{P(\sim h/e)} = \frac{P(e/h)\cdot P(h)}{P(e/\sim h)\cdot P(\sim h)} \quad \ldots\ldots(I)$$

Now, of course, $P(e/h) \simeq 1$, since except for the remote chance of misreporting, if #*i* is the winner this is what the *New York Times* is going to print.

$P(h) = 10^{-6}$ and $P(\sim h) \simeq 1$

Then $P(e/\sim h) \simeq 10^{-4}\cdot 10^{-6}$ since first of all we have to assume an erroneous reporting whose probability is 10^{-4}. However, even *given* that the report is mistaken, there are 999,999 different ways in which this may be the case.

Substituting into (I): $$\frac{P(h/e)}{P(\sim h/e)} \simeq \frac{1 \times 10^{-6}}{10^{-4} \times 10^{-6} \times 1} = 10^4$$

Thus the *New York Times* report is 10^4 times more likely to be true than false.

We are, however, not going to get similar results on applying the same kind of reasoning to the situations referred to by Hume. To preserve the parallel between the two cases as much as possible, let us denote

E = Witnesses report that *m* (e.g., the walls of Jericho collapsing upon the sounding of the trumpet of the Israelites) has taken place

H = *m* has in fact taken place.

Once more we have $$\frac{P(H/E)}{P(\sim H/E)} = \frac{P(E/H)\cdot P(H)}{P(E/\sim H)\cdot P(\sim H)}$$

As before, we shall attempt to evaluate the four terms of the right hand side. Clearly, in the present case, precise numerical values cannot be assigned to the various expressions.

In order to evaluate P(H), two factors must be taken into account. First of all, the assumption that H, implies a violation of what has been established to be a law of nature, and this is extremely improbable. We shall denote the probability of such a violation by ϵ. Now even if it were given as a fact that Jericho was conquered as a result of a miraculous event, H would not yet directly follow. Clearly there is scope for a considerable number of different miracles to take place, each of which could have just as well ensured the fall of the city, and the collapse of the walls is just one of many equiprobable such occurrences. We shall denote by *n*—where *n* is a small fraction—the probability that it is specifically *m* that has taken place *assuming* that the conquest was a direct result of a miracle. It follows therefore that $P(H) = \epsilon \cdot n$.

It seems reasonable to assume that if H should be true then anyone witnessing an event like *m* would not be likely to forget what precisely took place, (in the way people may forget everyday common occurrences). We may also assume that normally everyone should be very eager to inform others of such a momentous event. Hence $P(E/H) \simeq 1$. The value of $P(\sim H)$ is of course approximately one. The crucial term to evaluate is the last term, $P(E/H)$. Everything hinges on the fact that $P(E/\sim H)$ is not as small as $\epsilon \cdot n$. Hume has specifically made the point that men—especially in ancient times—have been prone to welcome wonderful and surprising events. It is clear, however, that even without this special reason of presupposing a human tendency to want to witness miraculous events and even more to tell tales involving miracles, it certainly does not require a violation of a law of nature for E to become true. Thus, let ϕ denote the value of the probability that reliable witnesses will report a miracle that never occurred, then we shall have to agree with Hume that $\phi > \epsilon$. It follows therefore that $P(E/\sim H) = \phi n$, i.e., the probability that they report a non-existent miracle times the probability that the particular miracle they pick will be *m*. Thus,

$$\frac{P(H/E)}{P(\sim H/E)} = \frac{P(E/H) \cdot P(H)}{P(E/\sim H) \cdot P(\sim H)} \simeq \frac{1 \cdot \epsilon n}{\phi n \cdot 1} \simeq \frac{\epsilon n}{\phi n} = \frac{\epsilon}{\phi}$$

In other words, applying the elementary techniques of probability theory vindicates Hume's view that when we receive a report of a miraculous event then the probability that the event has actually taken place is smaller than the probability that in fact it has not, just as ϵ is smaller than ϕ.

IV

The distinction we have just made between an unlikely event, the kind of which is bound to happen or is highly probable to happen, and an unlikely event which is also surprising, is of considerable practical as well as philosophical significance. Let me very briefly mention a famous historical episode illustrating my point, the trial of Captain Dreyfus. One important factor that led to his conviction was the discovery of a highly incriminating letter (the *bordereau*) which was alleged to have been written by Dreyfus. His superior, General Fabre for instance, testified in court saying:

> We were moved. . .by curiosity to compare his (Dreyfus') handwriting with that of the *bordereau*. I took out of my drawer a report of 1893 that he had filled out. We were struck by the fact that there was a similarity in the word "artillerie" in this report and the *bordereau* in both cases the middle "i" fell below both letters.[6]

General Fabre's belief that the singularities he detected in the two writings were very rare may be assumed to have been well founded. Does it therefore follow that Dreyfus is very likely to be the author of the treasonable document? Not if it is true that in every piece of writing a great number of exceedingly rare idiosyncracies are likely to be found. In that case, of course, while it is highly improbable that this or that particular oddity is going to be found in two specific unrelated letters, it is quite probable that *some* oddity will be found. And of course, the General would have been just as suspicious had he discovered any other graphical aberration in both documents.

Most unfortunately for Dreyfus, not until 1905 did the Government decide to consult reliable experts on the matter. At that time a committee of three members of the Academy of Science, which included the great mathematician Poincaré, was appointed which unanimously rejected the graphological evidence "because the rules of probabilities were not correctly observed". Thus, ten years had to elapse before it was made clear that the impossible oddities found in the two scripts submitted to the Court did not provide grounds for surprise since some queerness or another was not at all unexpected.

Thus, the Academy's ruling also implies that when Smith wins a lottery with any number of participants, there is nothing to be surprised about. Consequently, we are not about to doubt the accuracy of the report of his good fortune, nor for that matter should we suspect him of having rigged the drawing, should it be verified that he won. The reason is because unlike in the case where the same person wins three lotteries or in the case of a supernatural event, no unexpected *sort* of event has taken place; someone was bound to win the lottery anyhow.

V

It is important to point out that we should grant Hume only that it is unreasonable for a non-theist to accept miracle stories as credible. For a theist, on the other hand, it is quite rational to pay credence to such stories. This, of course, does nothing to defeat Hume since (a miracle is supposedly for the edification of the nonbelievers;) the converted are in no need of signs of God's existence. In fact, as we shall see, this important point works in Hume's favor, since with its aid he is able to deflect the kind of attack made against him, we shall discuss in the next section.

The point I am about to make involves one of the most elementary and quite undisputed principles governing all inductive reasoning, the principle prohibiting inferences based on biased sample classes. Suppose all the observed P's have been found to be Q's, then it is not unqualifiedly true that we are justified in generalizing inductively and asserting "All P's are Q's". For in case all the members of the sample class have in common a feature F and it is possible that it is this feature that is responsible for all the observed P's being Q's, then all that follows is that all P's which also exemplify F are Q's, but not necessary each and every P.

In his important book, *An Inventive Universe*,[7] K.G. Denbigh discusses at great length the wide applications of this principle. He shows how the history of science has been a continued "unfolding of the previously unsuspected forms of richness in nature". Consequently, there is always the possibility that the event we are currently concerned with may have (or lack) a unique feature that sets it apart from all the events of its kind we are familiar with. In that case, of course, all the evidence, however vast, may not be relevant to it, since it consists of a biased sample class in the sense that not one of its members possesses (or lacks) that crucial feature.

One of Denbigh's fascinating concrete examples concerns the predictions that were made not so long ago regarding what the temperature of the sun is going to be in a couple of years. Until a few decades ago, it was reasonable to suppose that the sun's rate of cooling was predictable on the same basis as the cooling rate of ordinary, terrestrial hot metal. The required calculations made on this basic supposition and the judicious assessment of the various constants led, however, to predicted results that were nowhere near the actual results. The reason, as we now know, was that a crucial tacit assumption was made by all, an assumption regarded as not even meriting a second thought—since its denial would have been thought of as the height of absurdity—that the sun is not gaining heat by some internal non-chemical process. To have suggested a hundred years ago that heat is being generated inside the sun by hydrogen being converted into helium would have been preposterous.

Nevertheless, of course, the unexpected value of the sun's temperature has not ultimately affected our confidence in the reliability of scientific method since it does not imply the violation of any established law of nature. All the members of the sample class that have obeyed the widely known laws of cooling had the bias of sharing a certain feature in common, significantly of being associated with relatively low temperature and pressure. There was, therefore, no real basis for assuming that it is legitimate to conclude that the case of the sun will be subject to laws essentially similar to those governing the members of the sample class. We have never before experimented under circumstances in which the temperature and pressure was anywhere as high as inside the sun. Under such extraordinary conditions it is plausible to entertain a hitherto unheard of process of heat generation.

This is of relevance to our inquiry. We must remember first, that miracles involving supposedly supernatural events are taken to be occurring only rarely and under very special circumstances. The theist is fully aware that the righteous are often permitted to suffer and cannot count on being miraculously rescued from their misfortunes (and he may or may not have a good solution to the problem—which is the problem of evil—why this should be so). Consider, however, the circumstances that obtain when an enslaved people believe in the existence of a Divine promise to be released from bondage, and Moses, a man of unsurpassed religious stature, predicts a miracle designed to promote that release and the forging of those people into a Kingdom of the Lord and thus, establish for the first time a widespread firm monotheistic belief others can emulate. Surely these would rightly be regarded as historically unique circumstances, in the context of which, a theist may well think it quite "natural" that a miracle should occur.

Let me put it more clearly. The theist readily agrees that there is a vast amount of evidence that water does not turn instantaneously into blood. He will point out, however, that the evidence is biased with respect to the situation under review. All the known instances in which water remained in its normal state lacked the unique feature that the transformation was announced to be forthcoming by a man of comparable calibre of Moses and would have served such a momentous religious function as in the case of Pharaoh. Given the theist's assumptions, there are excellent reasons for saying that the generalization concerning the immutability of water should not be extended to the unique conditions prevailing in Egypt where all the factors were present to make it essential from a religious point of view that the waters of the Nile turn into blood, assuming that God is omnipotent. Thus, the theist would employ the principle disqualifying biased sample classes from serving as evidence, in order to deny that the enormous amount of experience indicating the unchangeability of water is relevant to the issue at hand.

At this stage, I ought to point out that the principle discussed in this section requires a very important qualification. I believe it is obvious to everyone that given a finite sample class of individuals characterized by the property P, there is always a number of features common to all its members that is not necessarily exemplified by all particulars possessing P. It inevitably follows, therefore, that all sample classes employed in inductive reasoning are biased in indefinitely many ways. The explanation why nevertheless inductive reasoning is often possible, is clearly that not just any bias will create an obstacle, but only a bias that is *relevant*. A common feature F of course is relevant, if and only if, its presence is responsible for the exemplification of Q by every observed particular that had P.

This, however, gives rise to the following question: whether a bias is or is not relevant can be determined only on the basis of experience; should we always wait until experience assures us concerning the nature of the bias we are facing, we shall never make a single prediction or advance any generalization that included hitherto unobserved instances. This would bring the whole scientific enterprise to a complete halt. Even the most uncompromising experimentalist is not prepared to carry his empiricism that far. Instead, the standard practice is not to wait until there is positive evidence for the absence of relevant bias but to be satisfied with the mere *absence* of positive evidence for the existence of relevant bias as well as the absence of a good reason for thinking that the bias is relevant.

It follows, therefore, that the non-believer is not committed to the line of reasoning adopted by the theist and will, for example, not look upon the sample class of water that has no members turning instantaneously into blood, as having any relevant bias. The feature common to all the members of the sample class, namely, that not one of them has been observed in a situation in which its transformation into blood would have been of major religious significance, is not the kind of bias which in his opinion has any bearing on inductive practices. According to him religious concepts do not represent anything real and thus, the feature shared by all the members of the sample class, namely of not being associated with situations where certain occurrences have religious significance, is of no genuine substance.

VI

R. Sorenson in *Analysis* (1983) has claimed that if Hume's argument is sound then a case by case scepticism is established. That is, given a list of reported miracles, the wise man should withhold assent from each. However, it may be the case that each report is improbable and yet the probability of at least one of the reports being correct is high. After all the probability that a given ticket of a lottery is the winning ticket is exceedingly low, yet one can be certain that one of the tickets is the winning ticket. Thus, Sorenson claims Hume has not shown why it is irrational to maintain "There has been at least one miracle."

A simply reply to this might be that all the reports concerning the various miracles with which Hume is concerned come from the same source, namely, the Scriptures. Let us, however, assume that they come from different sources. It would still seem that Hume may well insist that the situation cannot be compared to the one obtaining in the case of a lottery. The different disjuncts are independent in that case, but they are not in the case of miracles. Let H and K be two descriptions of miraculous events. Then

$$P(H \vee K) = P(H) + P(K) - P(H \cdot K) = P(H) + P(K) - P(H) \cdot P(K/H)$$

Now, of course, $P(K/H)$ is by no means equal to zero; in fact, it might be claimed to be much closer to 1 than to 0. To put it somewhat artlessly: Hume should be prepared to concede that one miracle is as possible or impossible as any other; thus, given the truth of H there would be no basis left for his strong objection to believing K. To put it more perspicuously: Hume would concede that if (virtually per impossible) H should turn out to be true, he would not declare induction to have been proven altogether a wrong method. He then would prefer to admit that our reasoning that outlawed H, was faulty, since the sample class did after all have the bias the relevance of which he was earlier unwilling to concede: all its members occurred in situations where the realization of H would have been devoid of momentous religious significance. But once this is admitted, K should be thought likely to be true as well, given reliable evidence. Thus $P(K/H)$ is practically one. Hence $P(HvK) = P(H) + (K) - P(H) = P(H)$, and additional reports do *not* raise the chance that at least one miracle has occurred.

VII

In order to find an adequate reply to Hume, it is crucial to realize that it is by no means essential to show that every rational being is obliged to accept testimonies concerning miracles. After all, everyone agrees that the acquisition of information about miraculous events is not an end in itself, and its religious significance to any given individual consists in its capacity to increase theism's credibility for that individual. Therefore, it is obvious that if it can be demonstrated that testimony about miracles—quite regardless whether they are or not to be credited—substantially enhance the probability of theism to every recipient, nothing more need be said. Thus, let us have:

G = God exists:
H = A given miraculous event has taken place;
E = Witnesses testify to the truth of H.

$$\text{Then, of course, } P(G/E) = \frac{P(H/E)\cdot P(G/H\cdot E)}{P(H/G\cdot E)}$$

and therefore,

$$\frac{P(G/E)}{P(G/\sim E)} = \frac{P(H/E)}{P(H/\sim E)}\cdot\frac{P(G/H\cdot E)}{P(G/H\cdot\sim E)}\cdot\frac{P(H/G\cdot\sim E)}{P(H/G\cdot E)}\ldots(\Psi)$$

The first of the three factors is greater than one. It will not be denied by anyone, no matter how small a probability he is willing to assign to H, that in the absence of any testimony of the truth of H, H is even less probable than when there is no such testimony. To be precise our previous computations show that

$$\frac{P(H/E)}{P(H/\sim E)} = \frac{1}{\phi\cdot}$$

That is, while Hume may well claim that no testimony may be sufficient to raise the probability of H to a degree that reason should require to accept it, given that the probability that reliable informants will mislead us is rather small, i.e., ϕ, such testimony does raise H's probability from $e\cdot n$ to $e\cdot n/\phi$.

Concerning the second factors, one might argue that it is more than 1, but I can certainly not think of a plausible way of arguing that it is less than 1. Let us therefore take its value to be at least 1.

In order to deal with the third factor, we shall obtain the best result if we make certain assumptions, that are by no means outlandish, regarding the nature of miracles. The majority of theists hold that miracles are very rare occurrences. In fact, many maintain that the era of miracles is long past and that it is only in biblical times that such events ever took place. The most convincing explanation for this has been that from a religious point of view, it was at a time when monotheistic belief was to be established in the world that miracles occurred under very special circumstances, namely, when their occurrence provided most effective testimony to God's existence. These events played a pivotal role in the genesis of religious belief. Once theistic belief has become widely held among a considerable segment of the population, its continuance was to be assured through religious teachings and tradition.

The important implication of this view of the function of miracles for our present purposes is that in post-biblical times the religious welfare of an individual does not demand that he should have knowledge of every, or any, miracle that has taken place. Nowadays we are supposed to derive our faith by different means that have become available. It follows, therefore, that it makes no difference to the probability of a miracle whether or not I happened to have heard about it. In other words, the probability of H is wholly determined by the question whether God exists and whether at the time at which the event referred by H the circumstances characteristic to those, which from a religious point of view demand the occurrence of a miracle, obtained. This, of course, implies that $P(H/G\&\sim E) = P(H/G\&E)$ i.e., that the last factor equals 1.

It follows, therefore, that the left-hand side of equation (Ψ) is considerably greater than one, i.e., $P(G/E)$ is considerably greater than $P(G/\sim E)$. This means, that the mere fact that I am aware of a testimony concerning a miraculous event raises the credibility of G, which is now a good deal greater than what it would be in the absence of such testimony. On its own, this of course does not mean that if I am a rational person then even though hitherto I may have been a non-believer, after receiving the testimony in question I am bound to embrace theism. Whether or not such conversion is inevitable will depend on the prior credibility assigned to G.

Our result seems quite in keeping with common sense. Hume may be right that in case H refers to the kind of event whose occurrence would violate inductively well established laws, no testimony may be sufficient to make H credible. But it would be contrary to good sense to go as far as to claim such testimony is to be dismissed altogether as devoid of all value. The existence of positive testimony is not without any consequence whatever; it raises the credibility of theism, and for some people at least, it raises it sufficiently to be of crucial consequence.

Notes

[1]George Campbell, *Dissertation on Miracles* (Edinburgh, 1763), p. 69.
[2]*Ibid.*, p. 70.
[3]*Ibid.*, pp. 107-8.
[4]"Belief in Miracles and Hume's Essay," *Noûs*, 1980, pp. 150-1.
[5](Cambridge, 1982), pp. 100-4.
[6]L.L. Synder, *The Dreyfus Case* (Rutgers University Press, 1974), p. 6.
[7](New York, 1975).