

Hume's Maxim against Miracles

Hume's Miracle Maxim

Where It's Right and Where It's Wrong
(with comments on Garrett)



Professor Peter Millican

Gilbert Ryle Fellow and
Professor of Philosophy

Hertford College, Oxford

1

1

Introduction

- Hume's discussion of miracles in *Enquiry* 10 is highly regarded by many scholars:
 - “careful, detailed, and coherent” (Garrett 2002: 330)
 - refutes “a certain way of trying to rationally ground belief in Christianity” (Owen 1987: 348)
 - proves it “pretty well impossible that reported miracles” should effectively support theism (Mackie 1982: 27)
- Others fiercely abuse it, notably John Earman:
 - “a confection of rhetoric and *schein Geld*” (2000: 73)
 - “tame and derivative, something of a muddle” (2002: 93)
 - “a shambles from which little emerges intact, save for posturing and pompous solemnity” (2002: 108)

2

2

A Flawed Argument, but an Important and Enduring Moral

- Those who abuse the argument typically take it to be either trivial or question-begging. It is neither.
- But I shall argue that Hume's Maxim (with which Part 1 ends) is fundamentally flawed, in a way pointed out by early critics.
- Nevertheless it can be “salvaged”, in that there is a similar maxim which is non-trivial, potentially important, and also true.

3

3

1. Hume's Argument for his Maxim

For detailed interpretative discussion, please see:

Peter Millican, “Twenty Questions about Hume's ‘Of Miracles’”, *Royal Institute of Philosophy Supplement* 68 (2011), pp. 151-92.



4

4

Hume on Induction and Probability

- Hume's discussion in *Enquiry* 10 applies his theory of factual inference from *Enquiry* 4-6.
- He insists our only basis for such inference is *experience*, since “*a priori*, any thing may appear able to produce any thing” (12.29, cf. 4.18).
- We do – and have to – take for granted that “the future will resemble the past” (4.21)
- All “probable” evidence – including testimonial evidence – is therefore *inductive*: founded on experience, and proportional to the strength (e.g. the amount and consistency) of that experience.

5

5

“A wise man ...”

- “Though experience be our only guide in reasoning concerning matters of fact; ... this guide is not infallible ... Some events ... are found to have been ... variable” (10.3)
- “A wise man, therefore, proportions his belief to the evidence. [After uniform experience] he expects the event with ... assurance, and regards his past experience as a full *proof* of the future existence of that event. In other cases, he proceeds with more caution: He weighs the opposite experiments ...” (10.4)

6

6

Hume's Maxim against Miracles

Testimony as Inductive

- “To apply these principles to a particular instance ... there is no species of reasoning more common ... than that which is derived from the testimony of men, and the reports of eye-witnesses ... It will be sufficient to observe, that our assurance in any argument of this kind 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.” (10.5)

7

7

Denying any Privilege to Testimony

- Hume says we should treat evidence from testimony in much the same way as any other “probability”: on its inductive merits.
- And experience tells us that testimony tends to be more or less reliable, depending on its nature and other circumstances.
- Hume’s approach to probability can be seen as taking further the ideas in Locke’s *Essay* IV xvi 9, but with no exception for miracles.

8

8

The Factors to be Weighed

- Our confidence in testimony must be founded on experience ...
- ... and we find that various circumstances make a difference to its reliability, e.g.
 - the opposition of contrary testimony;
 - the character or number of the witnesses;
 - the manner of their delivering their testimony.
- Another factor we ought to consider is
 - the unusualness of the reported event.

9

9

“This contrariety of evidence ... 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 [delivery] ... There are many other particulars of the same kind, which may diminish or destroy the force of ... human testimony. Suppose, for instance, that the fact, which the testimony endeavours to establish, partakes of the extraordinary and the marvellous; in that case, the evidence, resulting from the testimony, admits of a diminution ... in proportion as the fact is more or less unusual.” (10.7-8)

10

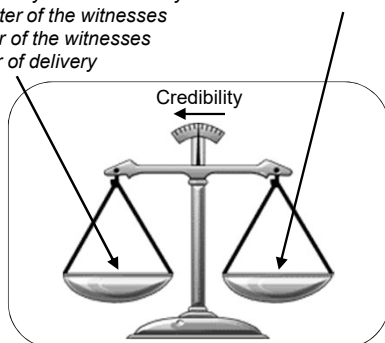
10

In favour of the testimony

Consistency of the testimony
Character of the witnesses
Number of the witnesses
Manner of delivery

Against the testimony

Unusualness of the event



11

11

The Case of Miracles

- The crucial issue (10.11) arises when:
 - “the fact [affirmed] ... is really miraculous”
- but:
 - “the testimony, considered apart and in itself, amounts to an entire proof”.
- We have “proof against proof” – one on *each* side of the scale – “of which the strongest must prevail, but still with a diminution of its force, in proportion to that of its antagonist”.

12

12

Hume's Maxim against Miracles

The Independence Assumption

- Hume seems to be assuming that different "kinds" of testimony (specified in terms of the character and number of the witnesses, the consistency, and manner of delivery etc.) carry a different typical probability of truth and falsehood (and can be judged as qualifying as a "proof", or not) *independently of the event reported*.
- Call this *the Independence Assumption*.

13

13

"Hume's Maxim"

- "The plain consequence is (and it is a general maxim worthy of our attention), 'That no testimony is sufficient to establish a miracle, unless the testimony be of such a kind, that its falsehood would be more miraculous, than the fact, which it endeavours to establish ...' (10.13)
- Hume's subsequent gloss on this (in the same paragraph) takes for granted that "more miraculous" means "even less probable".

14

14

2. Defending Hume's Maxim



15

15

Hume's Route to his Maxim?

	Testimony is true	Testimony is false
Nature is "false"	<i>true report that M occurred</i> M occurred	
Nature is "true"		<i>false report that M occurred</i> M did not occur

A "false positive" will be less likely than a "true positive" only if the falsehood of that kind of testimony is even less probable than that kind of event (i.e. Nature's falsehood).

16

16

The Mathematics of the Maxim

- Hume sees the overall judgement as deriving from a weighing-up between
 - the unlikelihood that testimony of this kind, considered apart and in itself, should be false*
 - and
 - the unlikelihood of the kind of event reported.
- If we presuppose the Independence Assumption discussed earlier, we should be able to multiply the relevant probabilities:

17

17

	Testimony true probability $1-f$	Testimony false probability f
Miracle occurs probability m	<i>true positive</i> witness asserts M occurred $m(1-f)$	<i>false negative</i> witness denies M occurred $m f$
Miracle does not occur probability $1-m$	<i>true negative</i> witness denies M occurred $(1-m)(1-f)$	<i>false positive</i> witness asserts M occurred $f(1-m)$

18

18

Hume's Maxim against Miracles

Deriving Hume's Maxim

- A report that M occurred is less likely to be a *false positive* than a *true positive* if and only if:

$$f(1 - m) < m(1 - f)$$

$$\therefore f - mf < m - mf$$

$$\therefore f < m$$

- i.e. the falsehood of the testimony, considered apart and in itself, is even less probable than the event reported, considered independently of the testimony. This seems to be, more or less exactly, Hume's Maxim!

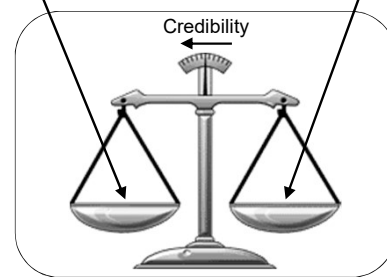
19

19

Earman's (Mis)interpretation

Probability that the event happened, given the testimony

Probability that the event didn't happen, given the testimony



20

20

A Diagnostic Example

- I am concerned about a genetic disease that becomes apparent only in old age, and afflicts one in a million of the population.
- I therefore take a test, which has a 99.9% chance of correctly reporting one's genetic disease state. It comes out positive! ☹️
- Hume asks:
"Would the falsehood of the test be more surprising than your having the disease?"

21

21

Probability and the Diagnostic Test

- Probability of the disease = 1 in 1,000,000
- Probability of false test = 0.1% (1 in 1,000)
- Take 1,000,000,000 people of whom:
 - 1,000 have the disease
 - 99.9% of them test positive: 999 true positives
 - 999,999,000 do not have the disease
 - 0.01% of them test positive: 999,999 false positives
- Probability I have it is 999,999 : 999 = 1,001 : 1 (i.e. 1 in 1,002 or a bit less than 0.1%).

22

22

The Non-Triviality of Hume's Maxim

- Probability of disease = 1 in 1,000,000
- Probability of false test = 1 in 1,000
- Hume asks:
"Would the falsehood of the test be more surprising than your having the disease?"
- Earman would have Hume asking:
"Having had a positive test, are you more likely to have the disease than not to have it?"

23

23

Enquiry Section 10 Part 2

- Hume's Maxim does not rule out the very possibility of testimony establishing a miracle, but the hurdle is very high!
- In Part 2, he points out reasons why religious testimony is particularly unlikely to do the job:
 - It tends to be transmitted from remote places and uncritical, unscientific witnesses;
 - People have a love of wonder and a tendency to lie or deceive themselves in religious matters;
 - There are lots of religions claiming different miracles against each other.

24

24

Hume's Maxim against Miracles

3. Attacking Hume's Maxim



25

25

Objections to the Independence Assumption (and Hume's Use of It)

- There's no reason why a "positive mistake" (e.g. mistaking a floating log for a sea monster) should have the same probability as a "negative mistake" (e.g. mistaking a sea monster for a floating log).
- Moreover – as Hume himself recognises in Part 2 – the probability of false testimony is highly topic-relative (e.g. religiously motivated claims may be less reliable).

26

26

Counterexamples to Hume's Maxim

- Suppose I meet a man at Hertford College, who says "My name is 'Hsueh Qu'". Should I believe him?
 - People give false names more than, say, 1 time in 150,000 (the approximate population of Oxford).
 - The initial probability that some random person's name is really "Hsueh Qu" is much smaller than 1/150,000 – without special evidence for this, it seems very unlikely that any inhabitant of Oxford actually has this name.
- Suppose a newspaper – which typically gets such things wrong 1% of the time – reports that Smith's ticket 271828 won (out of a million tickets). 1% is much greater than 1 in a million, but we would still believe it.

27

27

False Positives are Improbable!

- These sorts of examples were pointed out by Campbell (1762, pp. 30-2) and Price (1767-8, pp. 407-9) – and anticipated by Butler (1736, II ii 3) – but they did not explain exactly *where* Hume's argument goes wrong.
- Hume's reasoning fails because the probability of a false report *of that specific type of event* cannot be calculated correctly from any *general probability of error* deriving from the testimony "considered apart and in itself".

28

28

"Ticket 718 won"
(in a lottery of a thousand)

Newspaper gets it right probability 90%
Newspaper gets it wrong probability 10%

Ticket 718 did indeed win
probability = 0.1%

Newspaper correctly reports win of 718	Newspaper falsely reports win of 718
0.09%	= 9.99% (??!!)

Some other ticket won
probability = 99.9%

On this reckoning, it's 111:1 against a correct report!

29

29

Campbell's Comet Example

- Imagine a newspaper report on 15 March 2013: "Tonight, a comet will be visible in a clear sky near the stars γ -Pegasi and χ -Pegasi."
- The "initial probability" of such a comet sighting is *tiny*, certainly less than 1 in a trillion.
- The probability of error in a typical newspaper report is much greater, perhaps around 1 in a 100 or 1000.
- Yet we are *right to believe the report!*
 - We should ask: what is the probability that the newspaper would make *that very report* ("near the stars γ -Pegasi and χ -Pegasi" etc.) *falsely*?
 - The probability of such falsehood is *even tinier* than the probability of the event reported! So we believe the report.

30

30

Hume's Maxim against Miracles

Price and Independence

- Price drew a different moral, *defending*, in effect, a principle of Independence:

"suppose ... there are no motives to deceive ... Now, I say that such testimony would communicate its own probability to *every* event reported by it of which sense is *equally* a judge, whether the odds against that event ... [are] more or less. ...

If in any case it cannot be supposed that a witness is deceived, his report will give an event that precise degree of probability which there is of his not intending to deceive, be the event what it will."

(Price 1768, pp. 414-6)

31

31

Hume, Price, and a Double Irony

- So on the one hand, the Independence Assumption is implicitly presupposed by Hume's argument, yet Hume himself seems ultimately to reject such independence.
- While on the other hand, Price recognises that Hume's Maxim is faulty, yet seems fully to endorse the Independence Assumption from which the Maxim plausibly follows.
- As we shall see, Hume is closer to the truth, but his Maxim must be modified ...

32

32

4. Salvaging Hume's Maxim



33

33

The ABCD Lucky Draw ...

- Every day a "lucky draw" takes place, with four possible outcomes A, B, C, and D:
 - A is by far the most likely outcome;
 - B is 100 times less likely;
 - C is 100 times less likely again;
 - D is 100 times less likely again.
- So out of every 1,010,101 draws, we would expect A 1,000,000 times, B 10,000 times, C 100 times and D only once.

34

34

... And An Unreliable Newspaper

- The clerk who records the result for the newspaper gets it right 97% of the time, but otherwise goes wrong randomly (with a 1% probability of reporting each of the three wrong outcomes).
- So out of 100 A wins, the newspaper will typically report A 97 times, B once, C once and D once. And likewise for the other possible outcomes.

35

35

- In this scenario, out of every 101,010,100 draws, we can expect *reported* results as follows:

Report	Total	True	False	True%
A	97,010,101	97,000,000	10,101	99.99%
B	1,970,101	970,000	1,000,101	49.24%
C	1,019,701	9,700	1,010,001	0.95%
D	1,010,197	97	1,010,100	< 0.01%
(all)	101,010,100	97,979,797	3,030,303	3%

- Note (for future reference): this means that an A report is extremely credible (99.99% likely to be true); while a B report is very nearly 50% credible.

36

36

Hume's Maxim against Miracles

Implications for Hume's Argument

- Hume is *right* (and Price mistaken), in that a report of the "miraculous" D is for that reason vastly less credible than reports of the more ordinary A and B, even when the testimony is of the very same "kind".
- This casts serious doubt on talk of the force of the testimony "considered apart and in itself". The epistemic weight of the testimony varies hugely depending on what it reports, *and for the very reason that Hume identifies*.

37

37

From Inverse to Direct Probability

- Here it is tempting to change focus from the *epistemic* probability of testimony (arguing "inversely" from what the testimony reports, and taking this as evidence of the source event), to the *direct* probability of testimony (of the relevant kind) *being produced*.
- Then we do have a consistent probability of true and false testimony, *irrespective of the event that actually took place* (i.e. 97% probability of truth; 3% of falsehood).

38

38

Checking the Figures

- Putting this into Hume's Maxim would suggest we shouldn't believe a B report unless B's prior probability is at least 3% (this being the probability that false testimony will be generated).
- But this isn't right – in our example, B's prior probability is just under 1%, yet as we noted earlier, testimony for B is very nearly credible:

Report	Total	True	False	True%
B	1,970,101	970,000	1,000,101	49.24%

39

39

The Threefold Error

- To make D credible (D's prior probability being just below 0.0001%), we can calculate that the misreporting rate would have to be less than 0.0003% – again a threefold error – why?
- Because what matters is not *the probability of misreporting in general* (which can happen in three different ways), but rather, more specifically, *the probability of a misreporting of D*.
- *It all depends on whether a false D-report is more, or less likely, than a true D-report.*

40

40

A Revised Humean Maxim

- We must give up reference to any abstract "probability of the falsehood of the testimony *considered apart and in itself*": probability will always be relative to what is reported.
- So the Independence Assumption must go, but we can formulate a Revised Maxim:
 - No testimony is sufficient to establish a miracle *M*, unless the testimony is of such a kind, that the occurrence of a false *M* report of that kind (*given that M does not in fact occur*) would be even less probable than *M* itself.

41

41

Psychology of False Testimony

- The Revised Maxim says that a report of *M* is credible only if *the occurrence of such an M-report in the absence of M* would be even more miraculous than *M* itself.
 - This is correct and provable, as long as the non-reporting of miracle *M* would not itself be equally miraculous.
- This focuses attention on how likely it is that miracle reports would arise from natural causes: on human cognitive pathology.

42

42

Hume's Maxim against Miracles

Proof of the Revised Maxim

- Let $\Pr(M) = m$ $\therefore \Pr(\neg M) = 1-m$
 $\Pr(M \text{ reported} | M) = T$
 $\Pr(M \text{ reported} | \neg M) = F$
- Assume $T < (1-m)$ (i.e. non-report would
 $\therefore T \times F < (1-m) \times F$ not itself be a miracle)
- $\Pr(M \ \& \ M \text{ reported}) = m \times T$ (true positive)
 $\Pr(\neg M \ \& \ M \text{ reported}) = (1-m) \times F$ (false positive)
- $\therefore M$ report is credible iff
 $T \times F < (1-m) \times F < m \times T$
i.e. $F < m$

43

43

A Speculation

- Counterexamples to Hume's Maxim, involving lotteries, comets, and so forth, were pointed out by Campbell (1762) and Price (1767).
- Hume seems not to have appreciated the force of their objections: why not?
- I speculate that Hume mis-remembered his Maxim, thinking that it was correct and not threatened by the Campbell/Price counterexamples. Perhaps he confused it with the Revised Humean Maxim?

44

44

Towards Cognitive Psychology

- The Revised Humean Maxim focuses attention on the sort of psychological issues that Hume discusses in *Enquiry* 10 Part 2:
"The passion of *surprise* and *wonder*, arising from miracles, being an agreeable emotion, gives a sensible tendency towards the belief of those events, from which it is derived. And [people] love to partake of the satisfaction at second-hand [by reporting miracles] ... and delight in exciting the admiration of others."
Enquiry 10.16

45

45

The Doubtfulness of Religiously Motivated Testimony.

- When the sensation is *religious*:
"But if the spirit of religion join itself to the love of wonder, there is an end of common sense; and human testimony, in these circumstances, loses all pretensions to authority. A religionist may be an enthusiast, and imagine he sees what has no reality: He may know his narrative to be false, and yet persevere in it, with the best intentions in the world, for the sake of promoting so holy a cause ..."
Enquiry 10.17

46

46

The Enduring Value of "Of Miracles"

- Despite its imperfections, "Of Miracles" remains a valuable philosophical contribution, with two particular morals:
- First, that it is vital to take prior probabilities into account (as in the diagnostic example). This involves avoidance of the "base rate fallacy" made famous by Tversky and Kahneman. In short, it means we can't judge testimony independently of (the prior probability of) what is reported.

47

47

A Legacy in Cognitive Psychology

- Secondly, discussion of religious epistemology cannot be divorced from the sorts of consideration of cognitive psychology that Hume discusses in the second part of his essay.
 - It is striking that he said much more on these in *Treatise* Book 1 Part 3, which is where the discussion on miracles was originally planned to be!
- For work in this spirit, see Branden Thornhill-Miller and Peter Millican, "The Common-Core/Diversity Dilemma", *European Journal for Philosophy of Religion* 2015, pp. 1-49.

48

48

Hume's Maxim against Miracles

5. Don Garrett on Hume on Miracles



49

49

Summary: Garrett's Six Issues

- On "experience", Garrett and I are largely agreed – see my "20 Questions about Hume's 'Of Miracles'" (2011), §4.
- On "laws of nature", again we *largely* agree – see "20 Questions", §11.
- Unlike Garrett, I don't see the miraculous/marvellous distinction as crucial in Hume's argument, and am unconvinced that it is well-defined – see "20 Questions", note 19.

50

50

- On "superior proofs", what Garrett and I say is broadly compatible – see "20 Questions", §6.
- On "absolute impossibility", Garrett puts great emphasis on the notion of "proof", whereas I interpret Hume as simply asserting *causal* impossibility – see "20 Questions", §15, especially note 34.
- On "uniformity of nature", Garrett and I agree that there is no inconsistency with Hume's view on induction, though we differ on details – see "20 Questions", §1.

51

51

Another Key Interpretative Issue

- I read Hume's argument as based on *general principles of probability*: a miracle is just an extreme case of an inductively improbable event.
- Many interpreters instead interpret Hume's argument as deriving from *principles that are quite specific to such extreme cases*.
 - Garrett thinks it relies on the special principle that "proofs entirely obviate, or 'annihilate', considerations of probability" (2002, p. 324 n. 25), so that a probability weighed against a proof will count as nothing (see "20 Questions", note 36).

52

52

Hume's Argument made Almost Trivial

- A miracle, by definition, is a "violation of a law of nature".
- Hence if *M* is an alleged miracle, the evidence from experience against *M*'s having occurred is a *proof*.
- Therefore testimonial evidence could only be sufficient to establish *M* if it itself were a proof.
- But human testimony is never that strong: we know people can lie or make mistakes etc.

53

53

Miracles and Marvels

- The final premise can be further backed up if we accept Garrett's claim that the miraculous/marvellous distinction plays a key role in Hume's position.
- Given the frequency with which humans are deceived or in error etc., the falsehood of any testimonial evidence – no matter how strong it might seem to be – is at most a "marvel", never a "miracle". QED!

54

54

Hume's Maxim against Miracles

A Principle Without an Argument

- Anyone who accepts Garrett's "*proof obviates probability*" principle (or likewise "always accept any number of marvels rather than any miracle") might indeed have to agree that human testimony can never establish a violation of a law of nature.
- But Hume has given no *argument* to support this principle (*he never even states it as such*), so his miracle-believing opponent can simply deny it!
 - And it's not obviously correct: extensive probable evidence (e.g. multiple independent witnesses) can rightly force us to accept that things we thought impossible have actually happened.

55

55

Coleman's Response to Lottery Counterexamples

"Hume's principle of relative likelihood ... is to be invoked only when evaluating reports of events that do not conform to general rules or laws ... But Smith's winning the lottery is not an exception to rules governing lotteries: although Smith's chances of winning are only one in a million, the 'laws of lottery' make it certain that some individual will win ..."

Coleman (1988, p. 334)

56

56

Begging the Question

- Coleman (and others, e.g. Owen) aim to defend Hume against lottery and other counterexamples by taking the key principle(s) as specifically restricted to *miraculous* cases.
- But this is hopeless: if Hume is ruling out miracles by appeal to special principles that don't stand up in *non-miraculous* cases, then he's clearly begging the question against miracles! The onus is on him to *show* that miracles can be specially excluded.

57

57

Opposing Proofs/Probabilities

- Hume accepts that opposed proofs weaken each other, as do opposed probabilities (and in a similar way), while the categories blur into each other.
 - It then seems odd to deny that a proof can be weakened *at all* when opposed by a strong probability.
- At *E* 10.35, where Hume says proof annihilates probabilities, he refers to "subtraction" as applying to "kinds of experience" without distinction.
- At *T* 1.3.13.4-6 and *T* 1.4.1.6, it seems that proofs can be weakened by iterated probabilities.

58

58

Other Textual Objections

- Proof/probability distinction is introduced to conform terms to common language (*E* 6.0 n.).
- Distinction between probabilities and proofs is vague and "insensible" (e.g. *T* 1.3.12.2), and seems to be more psychological than epistemic.
 - If distinction were epistemically crucial, one might expect Hume to devote more discussion to the question of how they should be discriminated.
- "Law of nature" can have "exceptions" (*NHR* 15.3) – suggests even this isn't clear-cut.

59

59

Other Philosophical Objections

- If *proof* cannot even be *weakened* by contrary *probabilities*, then our opinions about what is a law of nature become overly dogmatic.
 - The order in which instances arrive becomes crucial. If all *As* so far are *Bs*, enough to provide a proof that all *As* are *Bs*, then future apparent *As* that are not *Bs* will be rejected as "miracles".
 - This is both implausible, and contrary to Hume's own criticisms of "unphilosophical probability".
 - Garrett acknowledges the problem (2002, pp. 330-1), but still takes the argument to be "strong".

60

60