

Waiting for Hume

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It was David Hume's great sceptical argument about non-demonstrative reasoning—the problem of induction—that hooked me on philosophy. I am still wriggling, but in the present essay I will not consider how the Humean challenge to justify our inductive practices might be met; rather, I ask why we had to wait until Hume for the challenge to be raised. The question is a natural one to ask, given the intense interest in scepticism before Hume for as far back as we can see in the history of philosophy, and given that Hume's sceptical argument is so simple and so fundamental. It is not so easy to answer. I am no historian of philosophy, and given the pull that the problem of induction exerts on my own philosophical thinking, I know there is a considerable risk that the historical speculations I consider here will turn out to be worthlessly anachronistic. But I hope not.

Hume's discussion is deeply attractive for a number of reasons. In part it is the scope of Hume's scepticism. Our reliance on induction is ubiquitous, and Hume's argument seems to impugn all of it. But this does not explain why Hume impressed me even more than Descartes, who in his First Meditation questions far more. (I was, however, pretty excited by Descartes too.) The contrast is explained in part by the fact that Hume's argument is in at least two senses more radical than the sceptical arguments that Descartes offers. Descartes intends to argue against the possibility of certainty; but Hume argues against the possibility of any warrant whatever. (In fact, Descartes's arguments may well also yield the stronger conclusion, a point I will return to below.) And whereas Descartes focuses on a problem of moving from one level to another, notably from inner experience to the external world, Hume showed that the most severe sceptical arguments remain even when the inference remains modestly at the same level. Put differently, Hume showed that even if one is granted the existence of whatever one seems to observe, one cannot go any further. Hume's argument is in this sense more severe, because it undermines inferences that are more modest.

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In addition to the excitement generated by the depth and breadth of Hume's attack, I was struck by the power and beauty of the central dilemma he constructs.¹ To justify induction, we need a cogent argument for the conclusion that nature is uniform, that the future will be like the past. There are only two kinds of argument: demonstrative and probable. There is no demonstrative argument for the conclusion of uniformity, since demonstrative arguments have premisses and conclusions that are necessary truths, and the claim of uniformity is clearly contingent. And there is no cogent probable argument for the uniformity of nature, because all probable arguments assume that uniformity and so would beg the question. So there is no cogent argument. In a more modern version, to justify induction, we need some reason to believe it will be reliable, and reasons are either deductive or inductive. Limiting ourselves to premisses that do not themselves rely on induction, we cannot deduce that induction will be reliable, and any inductive argument for induction would be viciously circular. The circularity of any empirical justification of induction hit me particularly hard, since induction's track record had seemed the only good reason to trust induction in future, and this reason was now taken from me.

Another impressive feature of Hume's argument was its curious independence from the details of our inductive practices. One would have thought that the question of just what kind of inferences we make would be prior to the question of how they might be justified, since until we know what our practices are, we do not know what we are being asked to justify. Or so one would have thought. Hume does of course give some description of inductive practices, in terms of habit and mundane extrapolation, but the description seems primitive: it fails to do justice to the richness and complexity of our inductive practices. Yet this weakness of description appears not to undermine Hume's sceptical argument, because the argument is independent of the details of our inductive practices: all that counts is that they are not deductive. (Another famous Humean discussion that exhibits a related independence is his treatment of causation. Hume's case against our ability to conceive of a connection between external cause and effect is developed in the context of his implausibly restrictive copy principle, according to which every idea is a copy of a preceding impression; but the case against our ability to conceive of objects connected, and not just conjoined, is strangely undiminished by the primitiveness of the principle.)

These four features of Hume's sceptical argument—its severity, its scope, the beauty and power of its destructive dilemma, and especially of the circularity argument, and its independence from the details of our inductive practices—are the main reasons why the argument so attracted me and,

¹ David Hume, *A Treatise of Human Nature*, ed. L. A. Selby-Bigge, 2nd edn., rev. P. H. Nidditch (Oxford: Clarendon Press, 1978), 88–90; and *An Enquiry Concerning Human Understanding*, ed. L. A. Selby-Bigge, 3rd edn., rev. P. H. Nidditch (Oxford: Clarendon Press, 1975), 34–6.

I suppose, so many other fledgling philosophers. As impressive as Hume's intellectual achievement here is, however, it remains remarkable that the argument did not appear much earlier in the history of philosophy. Indeed, another reason the argument is so impressive is because, from a certain point of view, it seems so obvious. Certainly none of the aspects of the argument that so impressed me seem to have been conceptually unavailable to earlier philosophers. So why did we have to wait for Hume for the problem of induction?

A FALSE PRESUPPOSITION?

Maybe the answer is simple: we didn't. Certainly there are philosophical discussions of induction before Hume, to which Sextus Empiricus and Francis Bacon were particularly conspicuous contributors.² It was widely appreciated that since inductive reasoning is non-demonstrative, it always remains possible that the premisses are true yet the conclusion false. Thus Sextus wrote that 'some of the particulars omitted in the induction may contravene the universal'.³ Indeed, more than the mere possibility of error was acknowledged for at least some forms of induction, with Bacon calling enumerative induction 'utterly vicious and incompetent', 'gross and stupid', and 'childish'.⁴

To appreciate the range of pre-Humean concern with inductive inference, we must not limit ourselves to enumerative induction, but consider non-demonstrative argument generally. (I use the unqualified term 'induction' in that broader sense.) In particular, we must consider discussions of 'vertical' induction, where the conclusion employs a different vocabulary from that used to describe the evidential premisses, and especially when the inference is from the observed to the unobservable, not just to the unobserved. There is a rich pre-Humean history of discussion, both of the importance of such inductive inferences and of the sceptical threat they raise, especially because of the underdetermination of theory by evidence.⁵ The worries often focus on astronomical hypotheses, though the point is general. Thus in the ancient period Epicurus suggests in his 'Letter to Pythocles' that we embrace all the possible explanations of celestial phenomena, since choice between them would be capricious:

In the case of celestial events . . . both the causes of their coming to be and the accounts of their essence are multiple . . . Now in respect of all things which have

² John R. Milton, 'Induction before Hume', *British Journal for the Philosophy of Science*, 38 (1987): 49–74, provides a particularly helpful account of induction before Hume, on which I have relied for much of my information on the subject.

³ *Ibid.* 56.

⁴ *Ibid.* 57. ⁵ Larry Laudan, *Science and Hypothesis* (Dordrecht: Reidel, 1981), ch. 6.

a multiplicity of explanations consistent with things evident, complete freedom from trepidation results when someone in the proper way lets stand whatever is plausibly suggested about them. But when someone allows one explanation while rejecting another equally consistent with what is evident, he is clearly abandoning natural philosophy altogether and descending into myth.⁶

In the Middle Ages, Thomas Aquinas expresses a very similar concern:

... the assumptions of the astronomers are not necessarily true. Although these hypotheses appear to save the phenomena, one ought not affirm that they are true, for one might be able to explain the apparent motions of the stars in some other way.⁷

Having been sensitized to the breadth of non-demonstrative argument, one can find sceptical worries about induction throughout the history of philosophy. For example, it is natural to gloss the many sceptical arguments about the senses and about belief based on testimony as problems of induction. Neither what we see nor what we hear entails the diverse beliefs we form on these bases, and this has given sceptics the ammunition to raise doubts based on underdetermination considerations. Perhaps the most famous example of this is Descartes's dream argument.⁸ As he put it in the Sixth Meditation:

... every sensory experience I have ever thought I was having while awake I can also think of myself as sometimes having while asleep; and since I do not believe that what I seem to perceive in sleep comes from things located outside me, I did not see why I should be any more inclined to believe this of what I think I perceive while awake.⁹

This is tantamount to a sceptical argument about inductive inference from the testimony of the senses to claims about the external world. Descartes's doubt about the senses is also a doubt about belief based literally on testimony: that is, doubt about inductive inferences from the fact that someone tells you something to the fact you are told. In his *Conversation with Burman*, Descartes glosses 'from the senses':

i.e. from sight, by which I have perceived colours, shapes, and such like. Leaving aside sight, however, I have acquired, everything else *through the senses*, i.e. through hearing; for this is how I acquired and gleaned what I know from my parents, teachers, and others.¹⁰

⁶ A. A. Long, and D. N. Sedley, *The Hellenistic Philosophers*, i (Cambridge: Cambridge University Press, 1987), 91–2.

⁷ Quoted in Laudan, *Science and Hypothesis*, 81.

⁸ René Descartes, *Meditations on First Philosophy*, in *The Philosophical Writings of Descartes*, ed. and trans. J. Cottingham, R. Stoothoff, and D. Murdoch, ii (Cambridge: Cambridge University Press, 1984), 1–62, at p. 13.

⁹ *Ibid.* 53.

¹⁰ René Descartes, *Descartes' Conversation with Burman*, trans. J. Cottingham (Oxford: Oxford University Press, 1976), 3 (italics in original).

Descartes's sceptical arguments about the senses are sceptical arguments about induction, and they were recognized at the time as already having a long pedigree in the history of philosophy. Thus, in his objections to the *Meditations*, Thomas Hobbes remarks:

But since Plato and other ancient philosophers discussed this uncertainty in the objects of the senses, and since the difficulty of distinguishing the waking state from dreams is commonly pointed out, I am sorry that the author, who is so outstanding in the field of original speculations, should be publishing this ancient material.¹¹

Hume was certainly not the first to raise sceptical doubts about induction.

HUME'S CONTRIBUTION

Is there, then, anything left to our question? Does Hume bring anything new to scepticism about induction, anything both striking and obvious enough to make us seriously wonder why nobody thought of it before? As we have seen, there is in particular a long history of sceptical argument based on underdetermination. This is particularly natural in the case of vertical inferences, but it applies also to the most mundane enumerative induction: the observed cases underdetermine the next case. To take a Humean example, in the past bread has nourished me, but that is compatible both with future nourishment and future poisoning. But what does this kind of underdetermination that both Hume and his predecessors discuss actually show? In the first instance, only that the inference in question is not deductive, because all it shows is that it is possible for the premisses to be true yet the conclusion false. In other words, underdetermination initially shows only that the inference in question is indeed inductive. But this is enough to show that inductive conclusions are invariably uncertain, which gets us to a form of inductive scepticism, whether in Epicurus, Aquinas, Descartes, or Hume.

Nevertheless, there is something new in Hume. Unlike underdetermination arguments, which do their work by highlighting the possibility of alternative conclusions for inductive arguments, Hume's argument focuses on the method of inference itself and the principle of the uniformity of nature that it is supposed to presuppose. As we know, Hume argues that it is impossible to justify this principle, because demonstration cannot establish a contingent claim of this sort, and any non-demonstrative argument would need to assume the principle it was supposed to justify, and so 'must be evidently going in a circle, and taking that for granted, which is the very point in

¹¹ Thomas Hobbes, 'Third set of objections' in Descartes, *Meditations*, 121.

question' (*Enquiry*, 36). Hume constructs an impossibility proof, and it is this argument, and especially the circularity point it contains, that marks Hume's distinctive and seminal contribution to the induction debate. When we now attempt to answer our original question as to why we had to wait for Hume for the problem of induction, what we ought to be asking primarily is why we had to wait for Hume for this particular dilemma.

Before we begin to consider answers to this question, however, let us consider briefly how much of a sceptical advance the dilemma makes. As I mentioned at the start of this essay, one of the things that particularly impressed me about Hume's argument is that it attacked inferences that are so mundane and modest. In particular, his dilemma shows that scepticism about induction does not depend on supposing that what is inferred is unobservable: presently unobserved is enough. This makes Hume's argument more radical than at least many of the problems of induction that preceded it. Thus, while Descartes certainly worried about the inference from experience to external object, he does not seem much concerned about inference from present to past or future experience. And although his scepticism about the senses includes scepticism about the reliability of testimony, which seems a mundane case, here too the inference is vertical as Descartes conceives it, an inference from the *experience* of testimony to the truth of the claim made, a claim not about experience.

A second respect in which Hume's argument is more radical than what preceded him is that it secured the amplification of sceptical arguments about induction from doubts about certainty to doubts about any warrant whatever. The significance of this amplification is clear. Arguments for doubting the certainty of inductive conclusions can be shrugged off: this is a liveable form of scepticism, since probability is enough for rational choice. But this is not what Hume showed.¹² The dilemma shows that we have no reason at all for preferring one inductive conclusion over any other, no reason for preferring science over animal entrails, so far as reliability of prediction goes. The defect of circular arguments is not that they provide less than conclusive reasons to believe their conclusions, but that they provide no reason whatever. As Hume recognized, his dilemma yields an unliveable scepticism and an incredible position. Underdetermination arguments by themselves show only that the inferences in question are not deductive; Hume's dilemma shows that they are indefensible.

Underdetermination arguments seem capable of supporting these more radical sceptical claims too, however, even if their pre-Humean proponents

¹² When my students write 'Hume showed that we can never be absolutely certain about the future', I rebuke them for describing 'Hume the plumber', not Hume the great philosopher. But my students are not alone: for a discussion of non-sceptical readings of Hume on induction, see Don Garrett, *Cognition and Commitment in Hume's Philosophy* (Oxford: Oxford University Press, 1997), ch. 4.

did not exploit the fact. For, as we have seen, it is easy enough to present the most modest enumerative inductions as inferences where the premisses underdetermine the conclusions. Moreover, underdetermination arguments also seem to support the radical claim that the conclusions of inductive arguments are not just uncertain but completely unwarranted, since the observation that all the competing hypotheses or predictions are consistent with the data suggests that any preference among them would be arbitrary. But suggesting is not the same as arguing, and the mere fact of consistency with the data does not rule out the possibility that one hypothesis may be much more likely than another. Indeed, many of us who have realist inclinations in the philosophy of science have tried more or less desperately to describe the ‘super-empirical virtues’—simplicity, projectibility, prior probability, explanatory power, etc.—that break the tie between empirically equivalent hypotheses. That we actually rely on some such devices seems clear, given that we do make determinate inferences. But what the dilemma shows is that all of these devices are in effect inductive assumptions, and that none of them can be defended without ultimate circularity. This is a distinctive philosophical achievement that easily supports our original question.

HUME’S EXPLANATIONS

Having made my pitch for the claim that Hume’s sceptical argument really does take inductive scepticism to new heights (or depths), and having suggested what that new contribution amounts to, I turn now to answering the original question: why did we have to wait until Hume for this? By trying to get into focus just where Hume goes beyond his predecessors, we have sharpened up our original question, but have also made it harder to answer. For while underdetermination by itself is not, I have argued, the same as the problem of induction, underdetermination seems to provide almost all the necessary ingredients. Indeed, it is not at all obvious what the extra ingredients are that Hume had and his predecessors lacked. What was different before Hume that might explain the wait? In this section I consider two answers that are not only natural, but also ones that have in effect been offered by a most eminent authority on these matters: Hume himself. Each appeals to a pre-Humean commitment that Hume was able to abandon: an epistemic commitment to *demonstration* and a metaphysical commitment to causal *connection*. I will argue that both answers are part of the story, but also that they both leave something out.

The first answer is that philosophers before Hume did not care much about induction, in which case it is not so surprising that they did not come up with its problem. And the reason they did not care much about

induction, to go one more click down the chain of explanations, is that before Hume the only knowledge thought by philosophers worth having was demonstrative knowledge.¹³ And Hume is eager to distinguish himself from his predecessors precisely on the grounds that he, unlike them, does not neglect probabilities. In the anonymously published *Abstract* to the *Treatise*, he writes:

The celebrated *Monsieur Leibnitz* has observed it to be a defect in the common systems of logic, that they are very copious when they explain the operations of the understanding in the forming of demonstrations, but are too concise when they treat of probabilities, and those other measures of evidence on which life and action entirely depend, and which are our guides even in most of our philosophical speculations. In this censure, he comprehends *The Essay Concerning Human Understanding*, *Le Recherche de la verité*, and *L'Art de penser*. The author of the *Treatise of Human Nature* seems to have been sensible of this defect in these philosophers, and has endeavoured, as much as he can, to supply it.¹⁴

Or, as he puts it without naming names in the *Enquiry*,

It may, therefore, be a subject worthy of curiosity, to enquire what is the nature of that evidence, which assures us of any real existence and matter of fact, beyond the present testimony of our senses, or the records of our memory. This part of philosophy, it is observable, has been little cultivated, either by the ancients or moderns . . . (p. 26)

Demonstration does appear to have been the pre-eminent model for knowledge for virtually all of the pre-Humean history of philosophy, and the view that non-demonstrative reasoning is too feeble and unimportant to be worth arguing over would certainly help to explain why philosophers did not work on induction before Hume.

A pre-Humean obsession with demonstration may be part of the answer to our question, but it cannot be the whole story. First of all, a desire to privilege demonstration, or rationalism more generally, provides a powerful motive precisely to generate sceptical arguments about induction. And of course this is exactly what we see in Descartes. The celebrated Leibniz provides another example of inductive scepticism prompted by rationalist commitments:

. . . the senses never give anything except examples, that is to say, particular or individual truths. Now all the examples which confirm a general truth, however numerous they be, do not suffice to establish the universal necessity of this

¹³ Cf. Ian Hacking, *The Emergence of Probability* (Cambridge: Cambridge University Press, 1975), ch. 19; Edward J. Craig, *The Mind of God and the Works of Man* (Oxford: Clarendon Press, 1987), ch. 2.

¹⁴ David Hume, *An Abstract of a Book Lately Published Entitled A Treatise of Human Nature*, in *A Treatise of Human Nature*, 646–7.

same truth; for it does not follow that what has happened will happen in the same way.¹⁵

Yet, neither Descartes nor Leibniz came up with Hume's distinctive sceptical argument against induction. More generally, the demonstration answer runs the risk of explaining too much, since, as we have seen, plenty of philosophers before Hume did worry about induction. What the demonstration answer does not explain is why *they* did not come up with the dilemma. As is often the case, we can clarify the explanatory situation by bringing contrasts into the question. The neglect or disdain of non-demonstrative reasoning will at best explain why Hume, rather than Plato, discovered the problem of induction in all its glory, but it will not explain why the discovery was made by Hume rather than by Sextus, Epicurus, Aquinas, Bacon, Descartes, or any of the other pre-Humeans who did worry about induction. (The range of contrasts we must address to give a full answer to our original question should make us suspicious that there is any single factor that will explain them all.) It is the latter set of contrasts that particularly interests me here. What did Hume have that others who thought about induction lacked, that brought him to construct his novel dilemma?

The second natural answer to our question, closely related to the demonstration answer, appeals to the metaphysics of causation. If one believes that there is some metaphysical connection between cause and effect, one may hold out the hope that it is possible to deduce effect from cause if only one is clever enough. Hume famously argued that we have no conception of necessary connections between external cause and effect: all we can conceive of out there is a pattern of events or objects (*Enquiry*, sect. 7). According to the connection answer to our question, we had to wait for Hume for the problem of induction because we had to wait for Hume for a decisive denial of any conception of connection between cause and effect. As Ian Hacking puts it,

There is a sceptical problem of induction not because . . . we may be in doubt as to whether we have located the necessary connections that will guide our predictions about the future, but because we now think there are no necessary connections, not even unknown ones.¹⁶

The denial of necessary connections makes radical scepticism about induction possible, on this view, because it leaves a metaphysical atomism, such that events or objects are all entirely 'loose and separate' from each other, so that information about some is no guide to the others. (Since Hacking wrote, it has become increasingly popular to interpret Hume as denying the conceivability rather than the existence of causal connections

¹⁵ Gottfried W. F. Leibniz, *New Essays on the Understanding*, Preface, in P. P. Wiener (ed.), *Leibniz Selections* (New York: Charles Scribner's Sons, 1951), 369–70.

¹⁶ Hacking, *Emergence of Probability*, 116.

between objects. My comments in what follows are intended to go through on either reading.) As in the case of the appeal to demonstration, the connection answer to our question enjoys a kind of endorsement from Hume himself. In both the *Treatise* (pp. 90–1) and the *Enquiry* (p. 33) Hume writes that the case for inductive scepticism is easier to make in the context of his analysis of causation, because the absence of conceivable necessary connections makes it manifest that the problem of induction cannot be avoided by appeal to objects' 'natural powers'.

Like the demonstration answer, the connection answer is clearly relevant, but it is not the full story either. Hume certainly thinks that inductive inference has a great deal to do with causation. As he puts it in the *Enquiry*, 'When it is asked, *What is the nature of all our reasonings concerning matter of fact?* the proper answer seems to be, that they are founded on the relation of cause and effect.' (p. 32). And had Hume not taken causal inferences to be empirical and inductive, I venture to say that the problem of induction would probably not have arisen for him. Certainly the claim that inferences about unobserved matters of fact rely on experience is a prerequisite for the problem. The connection answer also has an edge over the demonstration answer in that, whereas many pre-Humeans considered non-demonstrative argument, relatively few held Hume's view that we can conceive of no external connection whatever between cause and effect. I would also say that the atomistic picture that Hume's account of causation encourages does at least serve to make the epistemological problem vivid.

Now for the limitations of the connection answer. First of all, it is worth emphasizing that there were some pre-Humeans who denied causal connection between objects (though perhaps affirming it between God and objects). George Berkeley is one such, since for him objects are made up of ideas, and ideas are inert:

... the connexion of ideas does not imply the relation of *cause* and *effect*, but only of a mark or *sign* with the thing *signified*. The fire which I see is not the cause of the pain I suffer upon my approaching it, but the mark that forewarns me of it. In like manner, the noise that I hear is not the effect of this or that motion or collision of the ambient bodies, but the sign thereof.¹⁷

Occasionalists provide further examples of pre-Humean philosophers who deny that objects are connected. According to Nicolas Malebranche,

We should say that the air dries the earth because it stirs and raises with it the water that soaks the earth, and that the air or subtle matter freezes the river because in this season it ceases to communicate enough motion to the parts of which the water is composed to make it fluid. In a word, we must give, if we can, the natural and particular cause of the effects in question. But since the action of

¹⁷ George Berkeley, *A Treatise Concerning the Principles of Human Knowledge*, in *Philosophical Works*, ed. M. R. Ayers (London: Dent, 1975), 61–127, para. 65 (italics in original).

these causes consists only in the motor force activating them, and since this motor force is but the will of God, they must not be said to have in themselves any force or power to produce any effects.¹⁸

The religious commitment of Berkeley and Malebranche may have rendered them sceptic-proof, but they show that a denial of conceivable connections between natural objects or properties is not sufficient to generate the problem of induction.

Nor is it necessary. Hume was far from the first philosopher to acknowledge a role for experience in causal inference. Even Descartes, the exemplary rationalist, allowed in his *Discourse on the Method* that:

The power of nature is so ample and so vast, and my principles so simple and so general, that I notice hardly any particular effect of which I do not know at once that it can be deduced from my principles in many different ways, and my greatest difficulty is usually to discover in which of these ways it depends on them. I know of no other way to discover this than by seeking further observations whose outcomes vary according to which of them provides the correct explanation.¹⁹

Indeed, all those of Hume's predecessors who acknowledged inductive inference also acknowledged the need for experience to make the inferences. And this is all the problem of induction requires. Denying the conceivability of causal connection may make the problem a bit easier to see, but the problem does not depend on this. Like the demonstration answer, the connection answer does not explain why those before Hume who considered induction did not come up with the dilemma.

Hume himself clearly recognizes that he does not need his own anti-metaphysics of causation to run his sceptical argument. We have indirect evidence for this: Hume's presentation, in both in the *Treatise* and in the *Enquiry*, places the discussion of the idea of necessary connection only after the sceptical argument has already been given in full. But there is also direct evidence, in the passages already cited, where Hume suggests that his case is easier to make in light of his analysis of causation, since the point of these remarks in context is precisely that the assistance is not required. What counts is that we need experience to work out that bread nourishes us, and that the observation that it has nourished us in the past does not entail that it will nourish us in future. And this is compatible with the existence and even the conceivability of strong causal connection. As Hume puts it in the *Enquiry*:

But notwithstanding this ignorance of natural powers and principles, we always presume, when we see like sensible qualities, that they have like secret powers, and

¹⁸ Nicolas Malebranche, *The Search after Truth*, ed. and trans. T. M. Lennon and P. J. Olscamp, 6th edn. (Cambridge: Cambridge University Press, 1997), 662.

¹⁹ René Descartes, *Discourse on the Method*, in *The Philosophical Writings of Descartes*, ed. and trans. J. Cottingham, R. Stoothoff, and D. Murdoch, i (Cambridge: Cambridge University Press, 1985), 111-49, at p. 144.

expect that effects, similar to those which we have experienced, will follow from them . . . The bread, which I formerly eat, nourished me; that is, a body of such sensible qualities, was, at that time, endowed with such secret powers: But does it follow, that other bread must also nourish me at another time, and that like sensible qualities must always be attended with like secret powers? (p. 33)

Hume here recognizes that even if every cause has a necessary effect, the same effect type may have different causes on different occasions, and this is enough to support the sceptical argument. Hume held that the problem of induction is neither solved nor avoided by adopting a non-Humean account of causation. I think he is right, so we have more work to do to explain why we had to wait until Hume for the problem of induction.

MOTIVE AND OPPORTUNITY

What can we add to the demonstration and connection answers, to improve the explanation? I think that we can make some advance by thinking as detectives are supposed to think when they solve murder mysteries. We need to consider motive and opportunity. One of the reasons why Hume found an argument for radical inductive scepticism whereas others who considered induction did not may be that he wanted such an argument more than they did. Such an argument would provide powerful support for one of his central philosophical projects: namely, the naturalist programme of showing that our thought is governed by principles of custom or natural instinct rather than by principles of reasoning. As he makes clear in the *Abstract*, what he aims to establish is that ‘Tis not, therefore, reason, which is the guide to life, but custom.’ (p. 652). Hume’s aim is to reduce as much mental activity as possible to instinctual principles governing the evolution of ideas, and his preferred means is to show that a cognitive transition cannot be governed by reason:

We have already taken notice of certain relations, which make us pass from one object to another, even tho’ there be no reason to determine us to that transition; and this we may establish for a general rule, that wherever the mind constantly and uniformly makes a transition without any reason, it is influenc’d by these relations. (*Treatise*, 92)

We can see Hume as advancing his naturalistic programme by adopting a ‘method of doubt’. That is an expression we associate with Descartes, but whereas Descartes’s method of doubt was designed to wean us from the senses and attach us to reason, Hume’s method is designed to wean us from reason and attach us to custom. Actually, Descartes thinks that we were already using some reason without realizing it (this is the point of the wax argument in the Second Meditation), and Hume is not here aiming

primarily to change our cognitive practice; but the method of doubt is meant to get us to see more clearly what our practice really is. So my suggestion is that Hume especially wants a sceptical argument about induction, because he wants to end up with the position that inferences about matters of fact cannot be a matter of reason.

This is a motive to construct a sceptical argument. Moreover, it seems to me that it is a motive to construct an argument that goes beyond the pre-Humean underdetermination considerations, to the great dilemma Hume invents. Merely to observe that observations themselves do not entail predictions will not effectively undermine the thought that induction is a matter of reason. For the possibility remains open that the argument proceeds by means of additional premisses that secure its validity. If these additional premisses are themselves governed by reason, then so can the entire inference be. This is of course precisely the possibility that Hume proceeds to scotch in his discussion of the principle of the uniformity of nature.

Given that Hume seeks to convince us that induction is not a matter of reason, it is, I think, natural that he should wish to show that inductive inferences are completely unjustifiable, not just uncertain. For if they are merely uncertain, then it remains possible that the inferences proceed by reasonable argument, whereas if the argument would be entirely worthless, this would strengthen the case for saying that the cognitive mechanism is not one of argument at all. Moreover, Hume's desire to show this may even favour the specific appeal to circularity that lies at the heart of his argument. For, as he observes, there is a sense in which a circular argument is not just a bad argument, it is no argument at all:

. . . probability is founded on the presumption of a resemblance betwixt those objects, of which we have had experience, and those, of which we have had none; and therefore 'tis impossible this presumption can arise from probability. The same principle cannot be both the cause and effect of another . . . (*Treatise*, 90)

Hume wants to show not just that the presumption of resemblance (a.k.a. the uniformity of nature) is unwarranted, but that it is not part of the inferential mechanism; and the circularity argument is a particularly efficacious way of getting to this conclusion. The only possible source of the presumption required by reason would be itself; but this is impossible, so reason is not the mechanism of inductive inference. Hume's method of doubt clears away the false image of reason, so that the real mechanisms of custom and habit can be exposed.

So Hume has a motive to come up with a certain kind of sceptical argument, in order to wean us from the image of reason. But, as I have already suggested, some pre-Humeans also had a motive to derogate induction, in the cause of demonstration or rationalism. Descartes is the obvious case in point,

as he uses his method of doubt to wean us from the senses. Descartes did not, however, need radical inductive scepticism for his purposes, since he had convinced himself that his programme required only that he show that an inference from the senses is non-demonstrative and hence uncertain. And, as we will see, there are other reasons why he might not have seen the radical dilemma, whereas Hume did. But it remains possible that there were pre-Humeans who wished to argue against induction by showing that non-demonstrative arguments are completely indefensible, not just uncertain. If there were such figures, the appeal to motivation will not by itself explain why they did not discover the Humean argument. We need also to say something about opportunity.

Hume had an exceptional opportunity to come up with the problem of induction, because his brand of empiricism left him with an epistemology in which induction is *ubiquitous*, the only route to any beliefs about unobserved matters of fact. Unlike Berkeley and Malebranche, for example, Hume could allow God no epistemic role in induction. And it is the ubiquity of induction that makes the circularity argument so natural. If you think that there are other matters of fact that can be known without induction, including the existence of a benevolent deity, then the circularity need not arise. If induction is required for all unobserved matters of fact, however, there is nothing outside induction to justify it. Ubiquity creates circularity. This ubiquity that Hume perceived also helps to explain why his argument is so maddeningly independent of the description of our inductive practices. As I remarked near the beginning of this essay, Hume's description of these practices seems primitive, yet this does not seem to affect the power of his sceptical argument. In the end, what matters to the argument is not that induction takes a particular form, but simply that it be non-demonstrative and ubiquitous. That is enough to get the circularity going. And while those of Hume's predecessors who considered induction recognized that it is non-demonstrative, they did not appreciate its ubiquity. This, I suggest, is a central reason why they did not come up with the problem of induction.

The ubiquity of induction is the source of the circularity problem that is central to Hume's dilemma, and my proposal is that Hume's appreciation of this ubiquity enabled him to see the circle that others had missed. It seems to me that this appreciation also helped Hume in another way. As we have seen, much of the pre-Humean interest in induction focused on vertical inferences and the underdetermination from which they suffer. But the specific circularity that Hume spots is considerably more transparent in mundane cases of horizontal enumerative induction, cases that Hume's awareness of the ubiquity of induction, along with his interest in everyday inference, naturally lead him to consider. (Indeed, strictly speaking one should probably say that for Hume all induction is inferences are from and to observables, since for him only what is observable is conceivable.)

One reason why it is easier to see the circularity in the case of horizontal induction is that it is only in the case of inferences to observables that our inductive practices have an observable track record. We have seen that our past predictions about the sun rising were correct; but we never get to see the unobservable entities and processes postulated by our theories. It is this observed track record in the horizontal cases that most of us believe in our hearts supplies a reason to trust induction: we have seen that induction has worked in the past, and that is the reason we give for saying that it will work in future. But it is also this mundane situation that makes the threat of circularity particularly vivid, because here it is obvious that we are trying to use induction to justify induction. For vertical induction, by contrast, there is a sense in which we may not even get as far as seeing the circularity problem, because we do not have the track record to tempt us into it. This is not to say that vertical inferences are not also ultimately susceptible to the Humean argument—they are—but the problem is more immediate in the horizontal case, so a great philosopher who is considering the horizontal case is more likely to discover the problem than one who is considering only our more ambitious vertical inferences.

This way of thinking about the inductive justification of induction—induction has worked in the past, so it is likely to work in future—is perhaps mildly post-Humean, but Hume's own way of seeing the problem makes the same point, I think. As we know, he finds the circularity in 'the presumption of a resemblance betwixt those objects, of which we have had experience, and those, of which we have had none' *Treatise*, 90. And this is a presumption that applies directly only to horizontal inferences. Not only is this presumption not applicable to vertical inferences, but, as the work on non-demonstrative inference and confirmation of the last century has shown, it is extraordinarily difficult to specify what those presumptions that govern vertical inference actually are. Strangely perhaps, the threat of radical inductive scepticism is easier to see for the more mundane and intuitively more secure inductive inferences. So Hume's awareness of the ubiquity of induction helped him to get to his argument by focusing his attention on mundane horizontal inference, as well as by seeing that there is no way out by appeal to matters of fact that do not themselves depend upon induction.

CONCLUSION

The problem of induction is one of that handful of great sceptical arguments that combine stunning power with striking simplicity. This is what makes the question why it had to wait for Hume both natural to ask and difficult to answer. In my view there are many factors involved: different philosophers failed to see the problem for different reasons. You are unlikely to

see the problem of induction if you are interested only in demonstrative argument, and you may find it harder to see if you think that cause and effect have some kind of quasi-logical connection. But I have suggested that there is more to it than that. Hume's strong naturalistic motivations made an argument for radical inductive scepticism particularly desirable, as a way of making the case for a model of cognition that appeals to instinct rather than reason. And his appreciation of the ubiquity of induction enabled him to see the circularity upon which his sceptical argument depends, by helping to focus his attention on horizontal inductions where the circle is most visible, and by revealing the absence of any independent route to matters of fact that would make it possible to break out of the circle. This helps to explain why even those pre-Humeans who took an interest in non-demonstrative reasoning failed to find Hume's dilemma.

How does my appeal to naturalism and ubiquity compare with the answers that appeal to demonstration and to causal connection? Unlike the appeal to demonstration, my answer explains not just why many pre-Humeans did not consider induction at all, but also why those who did still did not discover the sceptical argument. At the same time, the demonstration answer complements my own, since the obsession with demonstration helps to explain why pre-Humeans did not appreciate the ubiquity of induction. What about the connection answer? I have observed, and have observed Hume observing, that the atomistic picture that the denial of a concept of necessary connection leaves does make it easier to see the sceptical problem. Similarly, I have suggested that a focus on simple enumerative induction makes the circularity problem easier to see, and so may have helped Hume to see it. Both factors were heuristic aids, helping to make the problem visible, though ultimately not necessary for the argument. What is essential to the argument is the absence of autonomous matters of fact that might justify inductive inference, and this is what is assured by the ubiquity of induction. Moreover, unlike the connection answer, my appeal to naturalism and ubiquity helps to explain the genesis of the fine structure of Hume's argument. The denial of necessary connection does not take us beyond underdetermination, which we had anyway before Hume; the appeal of naturalism and ubiquity takes us further, helping to explain why it was Hume who found the devastating and original point about circularity.

As Hume describes the course of the *Abstract*, 'Almost all reasoning is there reduced to experience; and the belief, which attends experience, is explained to be nothing but a peculiar sentiment, or lively conception produced by habit (p. 657). I have suggested that an important part of the explanation of why we had to wait for Hume for the problem of induction is that none of his predecessors both appreciated the ubiquity of induction and wanted as much as he did to reduce reason to natural instinct. By appreciating the ubiquity of induction, Hume was able to see a circularity

problem that is especially vivid for the mundane inferences that even many of his predecessors who did worry about induction did not focus upon, and that is unanswerable because of the absence of autonomous knowledge of unobserved matters of fact. And Hume had a particularly strong motive for finding this argument, because of the support it would give to one of his main philosophical projects: the replacement of a model of human cognition as the exercise of reason with one that portrays us as animals whose thought is governed by natural instincts.

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