

# Hume's Sceptical Doubts concerning Induction

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## 1. Introduction

Section IV of Hume's first *Enquiry*, entitled 'Sceptical Doubts concerning the Operations of the Understanding', contains the third and most extensive presentation of his massively influential argument concerning induction, the foundation stone of his philosophical system.<sup>1</sup> However despite being one of the best known and most widely read texts in the entire canon of Western philosophy, the interpretation of this argument has been much debated, and there is still no established consensus even on the question of what exactly Hume is attempting to prove with it, let alone on the philosophical merits of his attempt.

It may seem astonishing that the interpretation of an argument so familiar, and from a writer so clear and elegant, can be subject to such debate and apparent uncertainty. Some of this can be put down to the prejudices of previous generations of commentators, many of whom dismissed Hume as an extreme 'deductivist' sceptic (and hence read his argument as a dogmatic rejection of any reasoning that fails to meet deductive standards), while others claimed him as a spiritual father (and hence read his argument anachronistically as an anticipation of twentieth-century concerns).<sup>2</sup> But a deeper explanation of the extent of the interpretative controversy, even among sympathetic and historically sensitive scholars, is provided by the central place that the argument occupies within Hume's system, and the tensions within that system which it generates and reflects.<sup>3</sup> The most fundamental of these tensions is between Hume the inductive sceptic, and Hume the apostle of empirical science. For while his famous argument concludes that induction has no basis in reason (commonly interpreted as implying that induction is completely unreasonable), nevertheless Hume's other writings consistently preach the virtues of inductive science, repeatedly emphasizing its superiority over non-empirical 'divinity and school metaphysics' (*E* 165), and even advocating explicit inductive criteria of rationality (e.g. *T* 173–5, *E* 57–8, 86–7, 104–7, 110–11, 136–7).

With the development of recent Hume scholarship, and much wider appreciation of his constructive philosophical purposes, it has become increasingly fashionable to relieve this apparent tension in his philosophy by reinterpreting the aims of his argument concerning induction. For although Hume's repeated statements of his conclusion render it relatively uncontroversial that the overt purpose of his argument is to prove that induction 'is not founded on reason', nevertheless this leaves considerable scope for different views about what 'reason' means here, and whether it is a notion to which Hume himself is committed. Thus some scholars have interpreted Hume's 'reason' to mean *reasoning*, accordingly taking his conclusion to have

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<sup>1</sup> The first and most studied presentation of the argument is in the *Treatise of Human Nature* I. iii. 6, *T* 86–92, to which frequent reference will be made below, and the second in the *Abstract* of the *Treatise*, *A* 649–52.

<sup>2</sup> Notable examples of the former group are A. Flew, *Hume's Philosophy of Belief* (London: Routledge & Kegan Paul, 1961), D. C. Stove, 'Hume, Probability, and Induction', *Philosophical Review*, 74 (1965), 160–77 (repr. in V. C. Chappell (ed), *Hume* (London: Macmillan, 1968), 187–212), and D. C. Stove, *Probability and Hume's Inductive Scepticism* (Oxford: Clarendon Press, 1973), and of the latter group, A. J. Ayer, *Language, Truth and Logic* (London: Gollancz, 1936) and K. R. Popper, *Conjectures and Refutations* (London: Routledge & Kegan Paul, 1963).

<sup>3</sup> The centrality of the argument within Hume's system is evident from the logic and structure of the *Enquiry* in particular, but is made most explicit in the *Abstract*, whose title-page declares its purpose as being to illustrate and explain 'the CHIEF ARGUMENT' of the *Treatise* (*A* 641), and which then devotes more space to induction than to any other topic.

nothing to do with the rational credentials of inductive inference but rather with its *computational mechanism* or *causation* (i.e. that it does not involve, or is not brought about by, reasoning or ratiocination).<sup>4</sup> Meanwhile other scholars have continued to interpret ‘reason’ as a normative (though usually deductivist or narrowly rationalistic) notion, but have treated Hume’s argument as a *critique* of that notion, purely intended to reveal its impotence rather than to imply any genuine sceptical concerns about induction.<sup>5</sup> Both of these groups of scholars, therefore, see Hume’s argument as being almost totally non-sceptical from his own point of view.

My aim in this paper is to develop and defend an interpretation of Hume’s argument which reconciles its apparent sceptical thrust with his positive purposes, while denying neither. So on the one hand, I shall maintain (against the recent trend) that Hume’s ‘Sceptical Doubts’ are genuinely *sceptical*, while on the other hand, I shall explain (against his traditional critics) why Hume nevertheless feels able to use his argument as the basis for a constructive inductive science. My discussion will focus almost entirely on the version of the argument which appears in the *Enquiry*, partly because it represents Hume’s considered view and is greatly superior to the earlier versions,<sup>6</sup> but also because I am more confident of how it is to be interpreted. The argument in the *Treatise*, largely because of its brevity and structural defects, is open to a far wider range of relatively plausible readings. And although my own inclination is to see it as an immature expression of the argument in the *Enquiry*, it is of course conceivable that Hume’s view changed significantly between writing the two works. Hence I shall here attempt as far as possible to defend my interpretation by reference to the *Enquiry* alone, and it is fortunate that this gives an ample textual basis for constraining quite tightly the range of plausible readings. As we shall see, the detailed logic of *Enquiry* IV reveals a very great deal about Hume’s intentions — enough, I believe, to refute both the traditional ‘deductivist’ and the more recent non-sceptical interpretations. The picture of his famous argument that eventually emerges is altogether more coherent and defensible than his traditional critics have alleged, while at the same time carrying far more sceptical force than his recent defenders have acknowledged.

The remainder of this paper is structured as follows. §2 discusses what I describe as the ‘perceptual view of Reason’ (using a capital ‘R’ to signify the intellectual faculty which Hume, like many others, also calls ‘the

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<sup>4</sup> For example, D. Garrett, *Cognition and Commitment in Hume’s Philosophy* (Oxford and New York: Oxford University Press, 1997), H. W. Noonan, *Hume on Knowledge* (London and New York: Routledge, 1999), and D. Owen, *Hume’s Reason* (Oxford and New York: Oxford University Press, 1999). A similar line on the *point* of Hume’s argument is taken by R. Connon, ‘The Naturalism of Hume Revisited’, in D. F. Norton, N. Capaldi, and W. L. Robison (eds.), *McGill Hume Studies* (San Diego, Calif.: Austin Hill Press, 1979), 121–45, and by J. Broughton, ‘Hume’s Skepticism about Causal Inferences’, *Pacific Philosophical Quarterly*, 64 (1983), 3–18 (repr. in D. W. D. Owen (ed.), *Hume: General Philosophy* (Aldershot and Burlington, Vermont: Ashgate, 2000), 149–64), who however interpret ‘reason’ as a deductivist normative notion rather than as our actual faculty of reasoning.

<sup>5</sup> For example T. Beauchamp and T. Mappes, ‘Is Hume Really a Sceptic about Induction?’, *American Philosophical Quarterly*, 12 (1975), 119–29, T. Beauchamp and A. Rosenberg, *Hume and the Problem of Causation* (Oxford and New York: Oxford University Press, 1981), N. S. Arnold, ‘Hume’s Skepticism about Inductive Inference’, *Journal of the History of Philosophy*, 21 (1983), 31–55, and A. C. Baier, *A Progress of Sentiments: Reflections on Hume’s Treatise* (Cambridge, Massachusetts and London: Harvard University Press, 1991). The papers by Connon and Broughton mentioned in the previous footnote also get close to this sort of ‘anti-deductivist’ interpretation of Hume’s argument in *Treatise* I. iii. 6, though Broughton believes that in the *Enquiry* ‘Hume does treat the analogue of the I. iii. 6 argument as delivering skeptical results’ (p.15).

<sup>6</sup> For instance the *Treatise* version of the argument is mixed in rather haphazardly with Hume’s analysis of causation; has a highly psychologistic emphasis (on ‘impressions’, ‘ideas’, and mental processes instead of on inferential relations between propositions); is structurally convoluted (partly owing to its failure to connect causal with ‘probable’ reasoning from the outset); and omits a number of important stages (such as the proof that the Uniformity Principle cannot be founded on sensation or intuition).

understanding'). This conception of Reason dates back to the birth of philosophy, but my principal aim here is to show that it dominated modern thought in the century prior to Hume, and was taken for granted equally by those of both 'rationalist' and 'empiricist' inclinations. Particular attention is given to Locke, whose logical framework was largely inherited by Hume, and whose perceptual view of 'probable' reasoning provides, I believe, the principal target of Hume's 'Sceptical Doubts'. §3 begins the analysis of Section IV of the *Enquiry* by looking briefly at the distinction known as 'Hume's Fork', between what he calls 'relations of ideas' and 'matters of fact'. Then §3.1 aims to clarify what exactly Hume understands by the form of inference which he calls 'probable', 'moral' or 'reasoning concerning matter of fact', but which is now usually called 'induction'. Here I introduce some unambiguous terminology which will be presupposed in the remainder of the paper, henceforth using the phrase 'factual inference to the unobserved' to refer to this form of inference, which is the topic of Hume's famous argument. The argument itself is briefly sketched in §3.2, which most importantly introduces what I call the 'Uniformity Principle', the principle of resemblance between past and future which plays a central role in Hume's discussion. Then §4 to §9.3 work in detail through the text of his argument, establishing its logical structure by careful attention to his precise words. I believe that the interpretative structure which emerges in §10 (and is presented in detail in the appendix to the paper) can make sense of every paragraph and of every inferential step in *Enquiry* IV, something which cannot truly be said, as far as I am aware, of any alternative interpretation that has hitherto been proposed.

While working through Hume's argument, I shall address en route some major related interpretative issues, including his understanding of apriority (§4.1) and of 'demonstrative' inference (§7.1), and the evidence from Section IV regarding his alleged causal realism (§9.2). I shall also identify (§7.2) a major gap in his argument, namely, his failure to address the (admittedly highly questionable) possibility that induction might be given a rational foundation using mathematical probabilistic reasoning from a priori principles.

With all these preliminaries completed, §10 presents a detailed analysis of the logic of Hume's argument, starting with his 'founded on' relation (§10.1), then dealing with the role and nature of the Uniformity Principle (§10.2), and finally showing (§10.3) how the logic of his reasoning strongly supports the claim that his target is indeed the perceptual view of 'probable' reasoning advocated by Locke. Then §11 sketches Hume's alternative and totally non-perceptual account of inductive reasoning, explaining how, almost paradoxically, his profoundly sceptical argument about inductive inference, by highlighting the central role of 'custom' in our thinking, is able to provide the basis for his positive theory of inductive science. §12 discusses the implications of all this for Hume's own understanding of the notion of 'Reason', and stresses its revolutionary significance for scientific practice and aspiration. Rationalistic insight is shown to be an impossible dream, leaving the modest Humean search for inductive order as our only recourse.

## **2. Descartes, Locke, and the Ancient Tradition of Perceptual Reason**

People in general, but no doubt philosophers in particular, have long taken pride in their intellectual powers, which more than any other feature of humankind seem to elevate us above the beasts (and, perhaps equally attractively to some, philosophers above the common herd!). But the spectacular successes of the scientific revolution, in which metaphysicians such as Descartes and Leibniz were major participants alongside Galileo, Newton, and many other 'natural philosophers', apparently reinforced this hubris even more. The human faculty of thinking, which was proving so amazingly effective in unravelling nature's secrets, widely came to be seen as our pre-eminent and essential characteristic, a view most famously advocated by Descartes: 'thought; this alone is inseparable from me. . . . I am . . . in the strict sense only a thing that thinks; that is, I am

a mind, or intelligence, or intellect, or reason . . .'.<sup>7</sup> Descartes also influentially distinguished (in his Sixth Meditation) between the pure intellectual faculty on the one hand, and on the other hand those faculties, notably the senses and the imagination, that contribute to our thinking but are nevertheless contaminated by the body. Only pure intellect was generally supposed capable of yielding true insight and knowledge, and being so special and unique to humankind (indeed our whole essence, according to the Cartesians), was piously viewed as a manifestation of the divine image.<sup>8</sup>

Our intellectual faculty was called by a variety of names, most commonly 'the understanding' or 'reason'. The former emphasized this faculty's function of providing us with *insight* — genuine understanding of things and *perception* of their nature, rather than mere thought about them. The latter emphasized instead its function of providing *reasons* — the basis of rational inference and *reasoning*. These two aspects, though different, are closely related, since full understanding of a truth, unless it be known immediately through direct 'intuition' (as, for example, that  $1 + 1 = 2$ ), requires the apprehension of one or more inferential steps, and also of the reasons which ground them. But whatever their relation, most philosophers of the early modern period treated the two names as equivalent, and Hume appears to have followed this practice to the extent of alternating between 'reason' and 'the understanding', within the same section and sometimes even within the same sentence, for the sake of mere elegant variation.<sup>9</sup>

Philosophers of course differed in their detailed view of this faculty (which I shall henceforth usually call 'Reason'), but there was general agreement, following ancient tradition, that it was essentially a faculty of *perception*. Descartes frequently speaks of it as 'the natural light' and of 'seeing clearly and distinctly' by that light,<sup>10</sup> and perceptual language was standardly used both by his followers (notably Malebranche) and by other rationalists. Price provides a British example, writing within the decade after the first publication of the *Enquiry*:

sense and understanding are faculties of the soul totally different . . . The one not discerning, but suffering; the other not suffering, but discerning; and signifying the soul's Power of surveying and examining all things, in order to judge of them; which Power, perhaps, can hardly be better defined, than by calling it, in Plato's language, the power in the soul to which belongs . . . the apprehension of Truth.<sup>11</sup>

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<sup>7</sup> René Descartes, *Meditations on First Philosophy* (1641), included with six sets of *Objections and Replies* in *The Philosophical Writings of Descartes*, trans. J. Cottingham, R. Stoothoff, and D. Murphy, 3 vols. (Cambridge, New York and Melbourne: Cambridge University Press, 1984), ii. 18.

<sup>8</sup> E. J. Craig, *The Mind of God and the Works of Man* (Oxford and New York: Clarendon Press, 1987), chs. 1 and 2, argues that the idea of human reason as the 'image of God' within us was even the 'dominant philosophy' of the entire early modern period, and interprets this as Hume's principal target.

<sup>9</sup> For examples from the *Treatise*, see *T* 88, 92, 150, 180, 186–7, 193, 211, 218, 268, 413–17, 463–4, 468, and compare *T* 117‡n. and 371‡n. For the *Enquiry*, see *E* 25, 55, 76, and 104. L. A. Selby-Bigge, *British Moralists*, 2 vols. (Oxford: Clarendon Press, 1897) is perhaps the most widely available source for other writers of the period, amongst whom an identification of 'reason' and 'the understanding' was evidently commonplace, as illustrated in his numbered sections §48, §450, and §§590–4 (respectively Shaftesbury, *An Inquiry concerning Virtue* (1699, 1732), Hutcheson, *Illustrations upon the Moral Sense* (1728, 1742), and Price, *A Review of the Principal Questions in Morals* (1758, 1787); in each case the dates are those of the first edition and of the edition used by Selby-Bigge).

<sup>10</sup> Hobbes questioned the light metaphor in the Third Set of Objections to the *Meditations*, with Descartes replying: 'As everyone knows, a "light in the intellect" means transparent clarity of cognition' (*Philosophical Writings*, ii. 134–5). Thus his talk of the 'natural light' and of 'clear and distinct perception' come to much the same thing.

<sup>11</sup> Selby-Bigge, *British Moralists* §593.

Here the language may be non-Cartesian in flavour, but the meaning is much the same as Descartes'. Our senses, according to Price, do not so much perceive as 'suffer' sensation, while the function of our Reason is to 'survey', 'examine', 'discern', and thus to 'apprehend Truth'.<sup>12</sup>

However a perceptual view of Reason was not by any means confined to those we now class as 'rationalists', for it also dominates the thinking of the 'empiricist' Locke, whose stature in British philosophy was unrivalled throughout the period of Hume's career.<sup>13</sup> Locke's *Essay concerning Human Understanding* (hereafter simply the *Essay*) does not always follow the usual contemporary practice of treating 'reason' and 'the understanding' as equivalent, but tends to reserve the former for *reasoning* or *inference*, leaving direct 'intuition' of immediately apprehended truths (e.g. that  $1 + 1 = 2$ ) as part of 'the understanding' but not of 'reason' proper.<sup>14</sup> This might lead us to expect, in his discussion of the latter sub-faculty, that the standard perceptual metaphor would be relatively muted, but in fact it figures prominently:

*Inference* . . . consists in nothing but the Perception of the connexion there is between the *Ideas*, in each step of the deduction, whereby the Mind comes to see, either the certain Agreement or Disagreement of any two *Ideas*, as in Demonstration, in which it arrives at Knowledge; or their probable connexion, on which it gives or with-holds its Assent, as in Opinion. (*Essay* IV. xvii. 2)

Locke sees this sub-faculty of reason as yielding two main types of reasoning, 'demonstrative' and 'probable'. Both have the same general structure, typically involving one or more intermediate steps between premiss and conclusion, with these intermediate steps taking the form of 'Ideas' which may be fully-formed propositions but apparently need not be.<sup>15</sup> To avoid unnecessary complexity, however, I shall assume in what follows that

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<sup>12</sup> Hume, like Price, was echoing standard practice when in the *Treatise* he stated that 'Reason is the discovery of truth or falsehood' (T 458). But this general agreement on the function of that faculty, and the 'obvious' and equally conventional distinction between it and 'the will' (E 14; cf. Hutcheson in Selby-Bigge, *British Moralists* §§448, 450) clearly does not imply any deep agreement on its nature.

<sup>13</sup> That the perceptual metaphor was flourishing within British non-rationalist thought right up to the time of Hume's *Treatise* is illustrated by Butler's *Analogy of Religion* (1736), of which Hume thought highly (see E. C. Mossner, *The Life of David Hume*, 2nd edn. (Oxford: Clarendon Press, 1980), 111–12), and which refers to 'speculative reason' and 'moral understanding' as 'our speculative [and] practical faculties of perception' (I. vi. 19).

<sup>14</sup> It would be a mistake to read much into this, however, because Locke himself (*Essay* II. xxi. 17–20) forthrightly ridicules the language of 'faculties', criticizes it as a source of philosophical error, and declares himself inclined to forgo it completely were it not that faculty words are so much in fashion that 'It looks like too much affectation wholly to lay them by' (ed. P. H. Nidditch (Oxford: Clarendon Press, 1975), 243). In his view, when we refer to man's 'understanding', all we can properly mean is that man has a power to understand, and it is a serious mistake to speak of our faculties 'as so many distinct Agents' (p. 243). Accordingly he seems to care little about where faculty boundaries are drawn or how they are named: 'the understanding, or reason, whichever your lordship pleases to call it . . .' (*First Letter to Stillingfleet*, III. 70).

<sup>15</sup> See para. 6 of *Essay* IV. xvii. 4 (p. 673), in which non-propositional ideas such as 'God the punisher' and 'just Punishment' serve as intermediate steps. Locke is vague about the logical structure of inferences, for example sometimes calling a proposition an 'Idea' but most often treating a proposition as made up of two 'Ideas'. Unfortunately with Locke, as later with Hume, a dislike of Aristotelian syllogism seems to have led to a regrettable distaste for logical precision, and his account of reasoning is as a result seriously problematic. For instance it is unclear how his 'chain of ideas' model of reasoning could deal with inferences involving multiple premisses and/or quantified propositions (e.g. 'All As are Bs or Cs; All Bs are Ds; All Cs are Ds; ∴ All As are Ds' is valid, but not easily reducible to a single chain of ideas; moreover the corresponding inference with 'Some . . .' would be invalid, despite the similarity of the 'Ideas' involved). For a brief contextual overview of Locke's 'logic', see P. J. R. Millican, 'Logic', in D. Garrett and E. Barbanell (eds.), *Encyclopaedia of Empiricism* (Westport, Conn.: Greenwood Press, 1997), 215–17.

the ‘Ideas’ involved in inferences are indeed propositional, since this is logically more coherent and corresponds better with Hume’s own language in the *Enquiry*.<sup>16</sup>

Locke coins the term ‘proofs’ for the intermediate ideas that connect the premiss of any inference with its conclusion, so the structure of an argument with two such intermediate ideas would be as follows:

Premiss → Proof<sub>1</sub> → Proof<sub>2</sub> → Conclusion

Whether this counts as a piece of ‘demonstrative’ reasoning or ‘probable’ reasoning will depend entirely on the strength of the inferential connexions, the ‘links in the chain of ideas’ that are here shown as arrows. If these links are all ‘intuitive’ — providing an immediate, transparently clear, and visibly certain connexion — then the inference as a whole is demonstrative, meaning that the conclusion follows from the premiss with absolute certainty. If, on the other hand, the links (or, presumably, any subset of them) are merely ‘probable’, then the inference itself is only probable.<sup>17</sup>

It is worth re-emphasizing two key points about Locke’s account of inference. The first of these, which will prove relevant to clarifying the force of Hume’s famous argument, is that Locke’s distinction between ‘demonstrative’ and ‘probable’ reasoning has nothing to do with formal structure, but depends entirely on the strength of the relevant inferential connexions:

As Demonstration is the shewing the Agreement, or Disagreement of two *Ideas*, by the intervention of one or more Proofs, which have a constant, immutable, and visible connexion one with another: so *Probability* is nothing but the appearance of such an Agreement, or Disagreement, by the intervention of Proofs, whose connexion is not constant and immutable, or at least is not perceived to be so, but is, or appears for the most part to be so, and is enough to induce the Mind to *judge* the Proposition to be true, or false, rather than the contrary. (*Essay IV. xv. 1*)

The second key point, confirming Locke’s place within the ancient tradition which clearly dominated early modern philosophy (and much else before and since), is that in all of its operations, and hence in Lockean probable reasoning as well as demonstrative, Reason’s primary function is one of *perception*:<sup>18</sup>

In both [demonstrative and probable reasoning] the Faculty which finds out the Means, and rightly applies them to discover Certainty in the one, and Probability in the other, is that which we call Reason. For as Reason perceives the

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<sup>16</sup> Although Hume still sometimes lapses into Lockean talk of ‘interposing ideas’ (*E* 37), the core of his argument in Section IV of the *Enquiry* is expressed in the (logically far preferable) language of ‘propositions’ (e.g. *E* 34). Hence I disagree with Owen’s claim (*Hume’s Reason*, 119–20) that the Lockean ‘chain of ideas’ model of inference is essential for properly understanding Hume’s argument.

<sup>17</sup> However it does not follow that the conclusion of a ‘probable’ inference is *itself* probable (i.e. likely to be true), even if the premiss is true, for each merely probable connexion in a long chain will gradually erode the probability of the whole, and there may besides be other probable inferences that weigh on the other side. Locke is aware that judging the overall probability of a proposition will typically require the balancing of opposing considerations, as he makes clear in a passage (*Essay IV. xv. 5*) which interestingly anticipates Hume’s argument against the credibility of miracle reports in *Enquiry X*.

<sup>18</sup> This point is made in terms of Reason rather than the more narrowly inferential ‘reason proper’, to emphasize Locke’s place in the tradition. But it will be no surprise that Reason’s main non-inferential operation, that of intuition, is explained by Locke in totally perceptual terms: ‘This part of Knowledge is irresistible, and like the bright Sun-shine, forces it self immediately to be perceived, as soon as ever the Mind turns its view that way; and leaves no room for Hesitation, Doubt, or Examination, but the Mind is presently filled with the clear Light of it.’ (*IV. ii. 1*). It is interesting to note that, whether consciously or unconsciously, Hume would later use strikingly similar language to characterize the irresistibility of inductive ‘proofs’ (e.g. his reference to sunshine at *T* 183, and the phrase ‘no room for doubt’ at *E* 56¶n.), despite his total rejection of the perceptual model of inductive reasoning.

necessary, and indubitable connexion of all the *Ideas* or Proofs one to another, in each step of any Demonstration that produces Knowledge; so it likewise perceives the probable connexion of all the *Ideas* or Proofs one to another, in every step of a Discourse, to which it will think Assent due. . . . [Where] the Mind does not perceive this probable connexion; where it does not discern, whether there be any such connexion, or no, there Men's Opinions are not the product of Judgment, or the Consequence of Reason; but the effects of Chance and Hazard . . . (*Essay* IV. xvii. 2)

As his language of 'perception' and 'discovery' imply, Locke considers probability to be a thoroughly objective matter: depending on the evidence that we have for it, 'so is any Proposition in it self, more or less probable' (*Essay* IV. xv. 6; cf. IV. xx. 5). Accordingly, forming a 'right Judgment' about such propositions is 'to proportion the *Assent* to the different Evidence and Probability of the thing' (*Essay* IV. xvi. 9) and where there is mixed evidence for and against the proposition in question, to 'take a true estimate of the force and weight of each Probability; and then casting them up all right together, chuse that side, which has the over-balance' (IV. xvii. 16).

The extent to which Locke's thinking is infused with the perceptual view of Reason is illustrated by how he takes pains to address, and then deals with, a problem which arises precisely because he holds that view: if probable reasoning involves the *perception* of probabilities, then how is it that people ever disagree regarding what is, and is not, probable? Locke devotes an entire chapter (nearly four times the length of the earlier one on probability!) to this artificial problem of 'Wrong Assent, or Error', just as Descartes had devoted his entire Fourth Meditation, and their solutions to it have significant similarities.<sup>19</sup> Neither takes seriously the possibility of falsehood or illusion in the basic perceptual deliverances of Reason, and both instead attribute error mainly to ill-informed, dogmatic, or precipitate judgement. Even though Locke, unlike Descartes at this point, explicitly recognizes that some people have a weaker intellectual faculty than others, this turns out not to be due to any failure to perceive correctly the appropriate component probabilities, but rather, an inability to 'carry a train of Consequences in their Heads, nor weigh exactly the preponderancy of contrary Proofs and Testimonies, making every circumstance its due allowance' (*Essay* IV. xx. 5). It is in memory, attentiveness, concentration, and thoroughness that weak reasoners fall short, rather than in the rational perception of individual probabilities.

Locke's treatment of error might well seem to be straining the perceptual view of Reason potentially to breaking-point. In deductive disciplines such as mathematics and logic, and even calculable games such as chess, talk of 'seeing' truths and inferential connexions may indeed come naturally, almost irresistibly.<sup>20</sup> But the same is not true in non-deductive areas, where truth and evidential relationships are less clear-cut and often controversial, so that visual metaphors seem far less appropriate — here the language of 'opinion' and

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<sup>19</sup> Though they importantly disagree on a related matter, namely the ethics of belief. Descartes maintains that we are free to withhold assent to any judgement except when we have clear and distinct perception of its truth (e.g. *Philosophical Writings*, ii. 25, 41), whereas Locke, like Hume after him, acknowledges that belief is involuntary even in many cases of merely probable evidence: 'we cannot hinder . . . our Assent, where the Probability manifestly appears upon due Consideration of all the Measures of it . . . a Man can no more avoid assenting, or taking it to be true, where he perceives the greater Probability' (IV. xx. 16) — note yet again the perceptual metaphor.

<sup>20</sup> In an early draft of the *Essay*, Locke even went so far as to identify demonstration with intuition on the basis of its visual nature: 'we . . . looke for noe greater certainty then what our eyes can afford us, the whole evidence of this assurance being noe more then what the word *Demonstration* doth naturally import; which is to shew any thing as it is & make it be perceived soe that in truth what we come to know this way is not by prooffe but intuition, all the prooffe that is used in this way of knowledg being noe thing else but shewing men how they shall see right . . . without using arguments to perswade them that they are soe' (John Locke, *Draft B of the Essay Concerning Human Understanding*, in *Drafts for the Essay Concerning Human Understanding, and Other Philosophical Writings*, ed. P. H. Nidditch and G. A. J. Rogers (Oxford: Clarendon Press, 1990), i. 153).

‘estimation’ is likely to be preferred, with disagreements being ascribed to differences in personal judgement rather than ‘error’. It is interesting to speculate whether this might in part explain the reluctance of earlier philosophers, held captive by the perceptual ideal, to accommodate probability within their theories. Descartes, for example, attempts rather unconvincingly to force the scientific practice with which he is familiar into a broadly deductive pattern, rejecting the notion of ‘mere’ probability and instead characterizing differences between acceptable levels of theory confirmation only in terms of varying degrees of ‘certainty’ (so that a theory which is actually at best highly probable might be described by him as ‘morally certain’).<sup>21</sup> It is hard to say whether this reluctance to recognize the notion of probability was indeed significantly conditioned by the perceptual metaphor. But if it was, then some of the differences between the ‘rationalist’ Descartes and the ‘empiricist’ Locke may be less to do with a contrast in ‘rationalistic’ outlook than with their relative willingness to acknowledge the messy truth about scientific and everyday inferential practice at the price of accepting tensions within their theory of Reason. Locke, at any rate, was prepared to pay that price, and it was his explicit recognition of probable reasoning, and his incorporation of it within the domain of perceptual Reason, that set the scene for Hume’s sceptical attack.<sup>22</sup>

### 3. The Topic and Overall Structure of Hume’s Argument

Hume begins Section IV of the *Enquiry* by distinguishing between two kinds of proposition, which he calls ‘relations of ideas’ and ‘matters of fact’. The former comprise ‘the sciences of Geometry, Algebra, and Arithmetic; and in short, every affirmation, which is either intuitively or demonstratively certain’. These are discoverable ‘by the mere operation of thought’, without consulting experience, because as the classification implies, they concern only the internal relations between our ideas themselves, and therefore have no ‘dependence on what is any where existent in the universe’ (E 25). Knowledge of relations of ideas thus fits comfortably within the perceptual model of Reason, and Hume accordingly here sees no need to dispute or modify the conventional Lockean picture. Indeed he is essentially in broad agreement with Locke to this point: knowledge of relations of ideas is to be had either directly through immediate intuition, or indirectly through demonstrative reasoning, which itself consists of chains of intuitive links.

#### 3.1 Hume’s Quarry: The Basis of Factual Inference to the Unobserved

It is the basis of our assurance of ‘matters of fact’ which Hume wishes to explore further, since this is of a fundamentally different character and far less transparent than our knowledge of ‘relations of ideas’:

Matters of fact . . . are not ascertained in the same manner; nor is our evidence of their truth, however great, of a like nature with the foregoing. The contrary of every matter of fact is still possible; because it can never imply a contradiction, and is conceived by the mind with the same facility and distinctness, as if ever so conformable to reality. *That the sun will not rise to-morrow* is no less intelligible a proposition, and implies no more contradiction, than the affirmation, *that it will rise*. We should in vain, therefore, attempt to demonstrate its falsehood. Were it demonstratively false, it would imply a contradiction, and could never be distinctly conceived by the mind.

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<sup>21</sup> See D. M. Clarke, *Descartes’ Philosophy of Science* (Manchester: Manchester University Press, 1982), 134–59, especially 137–8 and 158–9, for a useful account of Descartes’ treatment of theory confirmation and the relative certainty of theories, and references to his negative comments on probability.

<sup>22</sup> It is perhaps significant that Hume’s two most extensive discussions of inductive inference in the *Enquiry* (Sections IV and X) deal respectively with what Locke states to be the two ‘grounds of Probability’, namely, ‘conformity with our own Experience’ and ‘the Testimony of others Experience’ (*Essay* IV. xv. 4, section heading). Locke’s discussion of these two ‘grounds’ is extremely cursory, and he never spells out how they are supposed to condition the perception of probable connexions.

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. (E 25–6)

So the aim of Hume's investigation in the remainder of Section IV will be to examine the foundation of our beliefs about matters of fact which are *absent*: those that are not immediately 'present' to our senses or memory.<sup>23</sup> Hume will argue that the only possible foundation for such beliefs is provided by extrapolative inferences from things that we have observed to those that we have not, these inferences operating on the assumption that the unobserved will resemble the observed.<sup>24</sup> In the *Treatise* and *Abstract* Hume usually follows Locke in calling these 'probable' reasonings or arguments, whereas in the *Enquiry* he tends to prefer the expression 'reasonings concerning matter of fact' (though he still uses the term 'probable', and sometimes 'moral'). However since they are now generally termed 'inductive' inferences, Hume's argument is most commonly referred to as his argument concerning *induction*.

Unfortunately the terms 'probable', 'moral', 'inductive', and even 'reasoning concerning matter of fact' all carry some risk of misunderstanding, so it is important to keep in mind that Hume is here discussing everyday factual inferences, of the kind that we use whenever we draw a conclusion about any empirical state of affairs which is neither directly observed nor remembered. Scientific inferences fall into the same category, because although these may be distinguished by the care and precision that are exercised in making them (their 'exacter and more scrupulous method of proceeding'; D 134), nevertheless Hume maintains that they are essentially 'nothing but the reflections of common life, methodized and corrected' (E 162). So taken as a class, the inferences that Hume is concerned with are not in any way unusual: they are neither particularly technical, nor involve any distinctive subject-matter, nor have any specific grammatical form. When he calls them 'probable', he is using this term in its Lockean sense of being less than certain, which does not imply that they need be *probabilistic* in any mathematical sense. When he calls them 'moral', he is using this term in the eighteenth-century sense in which 'moral evidence' means 'evidence which is merely probable and not demonstrative' (*Oxford English Dictionary*), and this does not imply that they need have anything to do with *morality* or *ethics* or even with the 'moral sciences' (such as economics, politics, etc.). And when we today call these inferences 'inductive', all we should mean is that they involve extrapolation from what has been experienced to something which has not been experienced, not that they need be 'inductive' in the Aristotelian sense of involving an inference to *universal* laws.<sup>25</sup>

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<sup>23</sup> Hume sometimes speaks simply of 'matters of fact', but he is clearly not concerned here with those that are immediately available to us through sensation or memory, since he raises no sceptical doubts about these faculties at this point. It has been suggested (by J. Bennett, *Locke, Berkeley, Hume: Central Themes* (Oxford: Clarendon Press, 1971), 245) that Hume tends to count something as a 'matter of fact' only if it is 'absent'. But this seems too strong a conclusion to draw from Hume's admittedly sometimes careless omission of the restriction (e.g. T 92, E 75), given that such a usage would make its common inclusion (e.g. E 26, 45, 159) pleonastic; would not conform to his principal criterion for 'matter of factness' (conceivability of the contrary); and would conflict outright with some of his explicit uses of the phrase (e.g. T 143: 'any matter of fact we remember'; T 469: 'Here is a matter of fact; but 'tis the object of feeling, not of reason.').

<sup>24</sup> However not all factual beliefs have any such foundation, notably those based on indoctrination or 'education' (T116–7).

<sup>25</sup> Some Hume interpreters have apparently been misled by the Aristotelian sense of 'induction', which is ironic given that Hume himself never uses the term in this context. Flew, for example, clearly takes the Aristotelian sense as primary, defining induction as 'A method of reasoning by which a general law or principle is inferred from observed particular instances' (A. Flew, *A Dictionary of Philosophy* (London: Pan, 1979), 159); and in his *Hume's Philosophy of Belief*, 71–2, and *David Hume* (Oxford: Blackwell, 1986), 53, he interprets Hume's argument as applying only to 'inductive' arguments thus understood.

The potential misunderstanding that arises from Hume’s use of the term ‘reasoning concerning matter of fact’ (sometimes ‘matter of fact and existence’) is best explained by example. Consider any deductively valid inference that has an experiential conclusion, such as the following:<sup>26</sup>

Mars is red and round    *therefore*    Some round thing is coloured

Does this count as ‘reasoning concerning matter of fact’? It might at first glance seem to do so, for it is surely a piece of reasoning, while both its premiss and its conclusion assert straightforward ‘matters of fact’ (i.e. contingent propositions knowable only through experience). But such an inference cannot possibly count as ‘reasoning concerning matter of fact’ as *Hume* understands that phrase, because here the link between premiss and conclusion is deductively certain rather than merely ‘probable’, is clearly explicable in terms of ‘relations of ideas’, and hence (a point whose significance will become clear later) requires no appeal to experience and no dependence on supposed causal relations. In Hume’s terms, therefore, this inference is certainly not an instance of ‘reasoning concerning matter of fact’, and hence falls outside the scope of his main discussion.

To sum up, Hume’s interest in *Enquiry* IV is in the type of inference whereby we acquire belief in matters of fact ‘*beyond* what is immediately present to the memory and senses’ (*E* 45, my emphasis), and *beyond* what can be inferred from that basis by purely deductive methods (i.e. ‘demonstrative’ reasoning; see §7.1 below). In other words, he is concerned with *ampliative* reasoning, whereby we draw conclusions about *new* matters of fact which are not deductively implied by those from which we start. Following Locke, Hume recognizes that such reasoning will generally yield merely ‘probable’ conclusions, and at best ‘moral’ certainty, so he accordingly calls it ‘probable’ or ‘moral’ reasoning. As we shall see, he takes all such reasoning to be based on an extrapolation from observed to unobserved, presupposing a resemblance between the two — extrapolative inference of this sort is now almost universally called *induction*. To clarify the presentation of Hume’s argument, and my discussion of it, some simple and unambiguous terminology will prove helpful:

Factual Inference	Inference that draws a conclusion about matter(s) of fact, beyond what is deductively (‘demonstratively’) implied by the premisses (whatever those facts might be, and however that inference might operate).
Factual Inference to the Unobserved	<i>Factual inference</i> that moves from premisses about what has been observed, to a conclusion about something which has not been observed (however that inference might operate).
Inductive Inference	<i>Factual inference to the unobserved</i> that operates by extrapolation on the basis that the unobserved will resemble the observed.

### 3.2 A Preliminary Sketch of Hume’s Argument, and his Uniformity Principle

The argument of *Enquiry* IV aims to prove that factual inference to the unobserved is not ‘founded on’ the faculty of Reason (what exactly Hume means by all this will be the topic of §10 below). This proof falls

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<sup>26</sup> Note that here and elsewhere I use the term ‘deductive’ in its *informal* sense, according to which an inference is deductively valid if and only if the truth of its premisses logically guarantees the truth of its conclusion (I shall argue in §7.1 below that this is essentially what Hume means by ‘demonstrative’). There is no requirement that the inference should be ‘valid in virtue of its form’, nor that it should be reducible through substitution to a formal tautology. Hence my choice of this example, whose validity derives in part from the meanings of ‘red’ and ‘coloured’ rather than from any formal inference schema.

broadly into two halves, pivoting around a principle of resemblance between observed and unobserved which I shall call the Uniformity Principle. In the first half Hume begins by arguing that all factual inference to the unobserved must be founded on experience, since only experience can tell us anything about causal relations, and causation provides our only basis for drawing inferences about things that we have not perceived. He then goes on to conclude that since all inference from experience is founded on the supposition that what we find in experience can be extrapolated beyond it (i.e. the Uniformity Principle), it follows that all factual inference to the unobserved must itself be founded on that Uniformity Principle. Hume expresses our reliance on this principle in a number of ways, sometimes in general terms but sometimes more specifically in terms of the expected uniformity of cause and effect relations:

we always presume, when we see like sensible qualities, that they have like secret powers, and expect, that effects, similar to those which we have experienced, will follow from them. (*E* 33)

. . . we . . . put trust in past experience, and make it the standard of our future judgment . . . (*E* 35)

. . . all our experimental conclusions proceed upon the supposition, that the future will be conformable to the past. (*E* 35)

. . . all inferences from experience suppose, as their foundation, that the future will resemble the past, and that similar powers will be conjoined with similar sensible qualities. (*E* 37)

The second half of Hume's argument is devoted to showing that this Uniformity Principle has no adequate foundation in Reason, since it cannot be established a priori from anything that we discover through immediate sensation; it does not follow immediately (i.e. by 'intuition') from the uniformity that we have observed within our experience; and nor can it be proved from that experience either demonstratively or by factual reasoning. Having exhausted, as he believes, all possible sources of rational foundation, Hume eventually concludes that the Uniformity Principle cannot be founded on Reason. And given the result from the first half of his argument, that all factual inference to the unobserved is founded on the Uniformity Principle, he therefore takes it to follow that no factual inference to the unobserved is founded on Reason.

Let us now explore the stages of this argument in detail, working in turn through the main propositions that Hume is concerned to establish (and which provide the main headings for §§4 to 8 below).

## **4. All Factual Inferences to the Unobserved are Founded on Experience**

Part i of Section IV of the *Enquiry* is devoted to establishing one fundamental result, that all factual inferences to the unobserved must, if they are to have any force, be based on experience. So part of the answer to Hume's original query: 'what is the nature of that evidence, which assures us of any [absent] matter of fact' (*E* 26) is that such evidence cannot be purely a priori.

### **4.1 What does Hume Mean by 'A Priori'?**

Before examining Hume's argument for this important result, however, it will be helpful to clarify what he understands by aprioricity. For when he denies that some kind of knowledge or inference is a priori, he usually means not simply *that it requires experience*, but *that it requires experience beyond mere perception of the objects concerned*. The contrast between the more familiar 'absolute' notion of aprioricity and this Humean notion is brought out by a passage in his *Dialogues concerning Natural Religion* (henceforth the *Dialogues*) which nicely summarizes the Section IV Part i argument that we are shortly to examine:

Were a man to abstract from every thing which he knows or has seen, he would be altogether incapable, merely from his own ideas, to determine what kind of scene the universe must be, or to give the preference to one state or situation of things above another. For as nothing, which he clearly conceives, could be esteemed impossible or implying a contradiction, every chimera of his fancy would be upon an equal footing; nor could he assign any just reason, why he adheres to one idea or system, and rejects the others, which are equally possible.

Again; after he opens his eyes, and contemplates the world, as it really is, it would be impossible for him, at first, to assign the cause of any one event; much less, of the whole of things or of the universe. He might set his fancy a rambling; and she might bring him in an infinite variety of reports and representations. These would all be possible; but being all equally possible, he would never, of himself, give a satisfactory account for his preferring one of them to the rest. Experience alone can point out to him the true cause of any phenomenon. (*D* 145–6)

In this passage the first paragraph illustrates the absolute notion of aprioricity, according to which a proposition counts as a priori only if someone could know it while ‘abstracting from every thing which he knows or has seen’ — that is, *without appeal to any experience whatever*. The second paragraph illustrates the more relaxed Humean notion, according to which a proposition counts as a priori if it can be known *without appeal to any experience beyond what is currently being perceived* (and hence without any appeal to memory as opposed to sensation).

It would take us too far afield to discuss the broader logical issues and difficulties associated with this Humean notion of aprioricity, but it is worth considering why Hume adopts it. In the context of his discussion of factual inference *to the unobserved* he is obviously prepared to take for granted what *is* observed (i.e. the immediate deliverances of our senses).<sup>27</sup> His question at this point in his discussion is what *else* can be inferred from our sensory perceptions, and his answer is that if we exclude all experience other than those perceptions themselves (and therefore exclude for the present even the evidence of memory), then *no further ‘object’ whatever* can be inferred: ‘There is no object, which implies the existence of any other if we consider these objects in themselves, and never look beyond the ideas which we form of them’ (*T* 86–7). Hume treats present perceptual ‘ideas’ as a priori in order to express this point, but his doing so also seems to be part of a broader tendency to incorporate such ideas within the domain of Reason, presumably again because of their epistemological immediacy and security. At one point in the *Abstract* he even appears to suggest that Reason itself is capable of sensory perception: ‘It is not any thing that *reason sees in the cause*, which make us infer the effect. Such an inference, were it possible, would amount to a demonstration, as being founded merely on the comparison of ideas.’ (*A* 650, my emphasis). The *Enquiry* is less explicit, but comes close to the same suggestion: ‘When we reason à priori, and consider merely any object or cause, *as it appears to the mind*, independent of all observation, it never could suggest to us the notion of any distinct object, such as its effect’ (*E* 31, my emphasis). Here again we have the usual contrast between, on the one hand, what is *immediately* perceived and is thus available a priori to ‘the mind’, and on the other hand, what has been *previously* perceived (and is now merely remembered) and is thus counted as a posteriori ‘experience’ or ‘observation’.

There are many other echoes, throughout this section of the *Enquiry*, of the perceptual view of Reason, and indeed the entire argument of Part i can be understood as the start of a systematic assault on that view. This, I would suggest, explains why Hume expounds at such length what is logically a relatively small part of his overall argument, providing numerous examples to illustrate his central thesis that the causal powers of

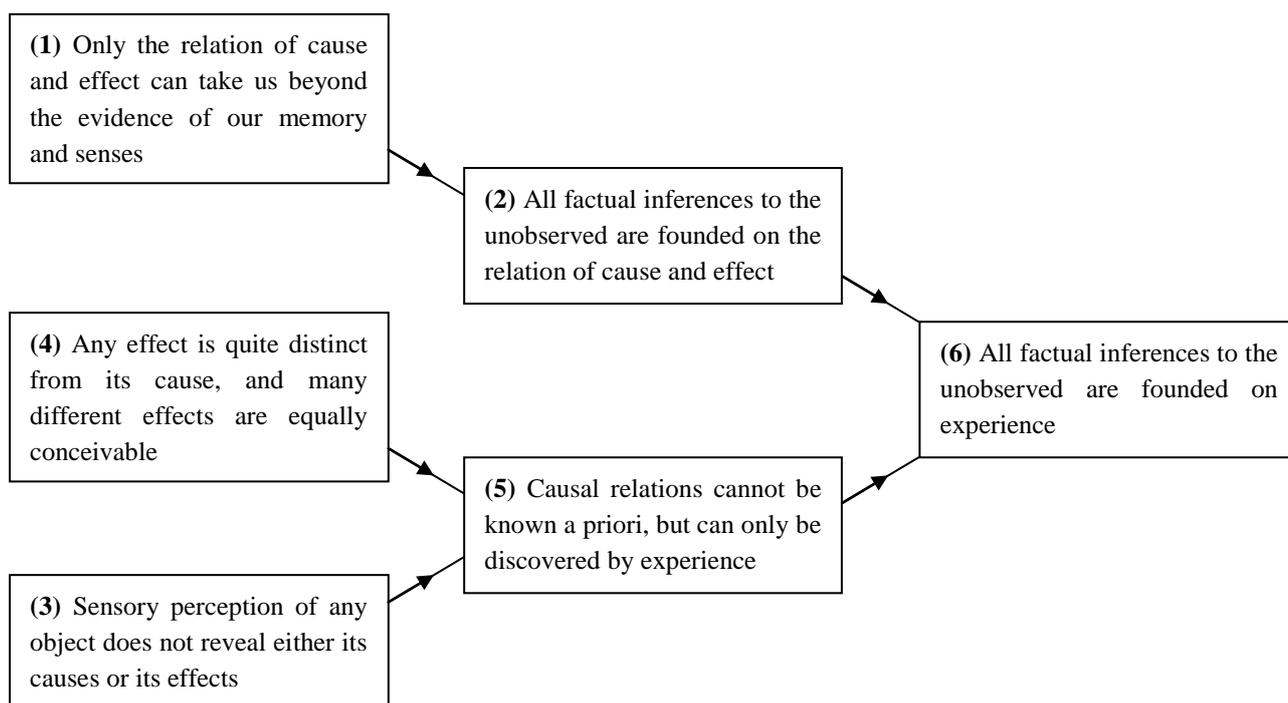
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<sup>27</sup> This does not mean, however, that he is prepared to take for granted our *interpretation* of our sensory impressions. For example, when we have an experience like that of seeing, smelling, handling, and tasting bread, it is only the immediate impressions that carry the sanction of sensation. Whether those impressions are genuinely caused by a nourishing food is another matter entirely, and one that can perfectly well be subject to sceptical doubt (*E* 33–4, 37). Thus the immediate deliverances of our senses include our perception of breadlike ‘sensible [i.e. sensory] qualities’, but not that we are genuinely perceiving *bread*.

objects are not ‘perceivable’ in any way. As he repeatedly emphasizes, all that we perceive of objects comes through the senses, and Reason is quite unable to discover, within the ‘sensible qualities’ of objects or the ideas that they produce in us, anything that carries any direct implication regarding those objects’ future behaviour.

## 4.2 The Argument of Section IV Part i

The structure of Hume’s argument in Part i of Section IV can be represented as follows, with each major stage represented by a numbered proposition, and the set of arrows to any particular proposition indicating Hume’s grounds for inferring that proposition (whether or not those grounds are, in fact, adequate — the aim here is to show the structure of Hume’s reasoning, not necessarily to endorse it).



This diagram provides, of course, no more than an idealized outline, since Hume himself does not present his arguments as having any such explicit structure. Indeed it is not easy in Part i to find even a straightforward statement of its conclusion, though proposition (6) is evidently implicit both in Hume’s argumentative procedure and in the summing-up which he gives in the first paragraph of Part ii (*E* 32).<sup>28</sup> Moreover his oft-repeated explicit statements of (2) and (5) are clearly intended to be read together, and Hume apparently sees (6) as such an obvious consequence of these that it does not even need to be stated, except perhaps in passing: ‘nor can our reason, unassisted by experience, ever draw any inference concerning real existence and matter of fact’ (*E* 27); ‘In vain, therefore, should we pretend to determine any single event . . . without the assistance of observation and experience.’ (*E* 30).

Hume’s argument from (1) to (2) is presented very briefly at *E* 26: ‘All reasonings concerning matter of fact seem to be founded on the relation of *Cause and Effect*. By means of that relation alone we can go beyond the evidence of our memory and senses.’ He then proceeds to give some illustrations to substantiate this claim

<sup>28</sup> For the summing up, see the beginning of §5 below. Hume’s procedure of arguing for (6) via (2) and (5) is also made clear at *E* 27: ‘If we would satisfy ourselves, therefore, concerning the nature of that evidence, which assures us of matters of fact, we must enquire how we arrive at the knowledge of cause and effect.’

that a ‘just inference from [facts about] one object to [facts about] another’ (*T* 89) can only be based on causation: this relation alone can provide the requisite ‘connexion between the present fact and that which is inferred from it’, without which any such inference ‘would be entirely precarious’ (*E* 27).

Having concluded that all factual reasoning is causal, Hume now sets himself to prove that all knowledge of causal relations is a posteriori: ‘I shall venture to affirm, as a general proposition, which admits of no exception, that the knowledge of this relation is not, in any instance, attained by reasonings *à priori*; but arises entirely from experience’ (*E* 27). The argument for this proposition, (5) in the structure diagram, occupies the remainder of Part i. Hume provides two lines of argument for it, the first of which is initially presented using a thought experiment. Suppose that the first man, Adam, just after his creation by God, and with no previous experience to call on, had been confronted with water and fire. Simply from examining their ‘sensible qualities’, Adam could not possibly have inferred what effects they would have. This illustrates the general proposition (3): ‘No object ever discovers, by the qualities which appear to the senses, either the causes which produced it, or the effects which will arise from it’ (*E* 27). Hume thinks that this proposition, and what he takes to be its immediate consequence (5), appear unsurprising ‘with regard to such objects, as we remember to have once been altogether unknown to us’, but when an object has been very familiar to us since our birth, ‘We are apt to imagine, that we could discover [its] effects by the mere operation of our reason, without experience.’ (*E* 28).

To show that this natural assumption is mistaken, Hume employs a second line of argument, summarized in the diagram as proposition (4), which starts with a characteristically Humean challenge: ‘Were any object presented to us, and were we required to pronounce concerning the effect, which will result from it, without consulting past observation; after what manner, I beseech you, must the mind proceed in this operation?’ (*E* 29). He then goes on to claim that the challenge cannot be met: that there is no way in which pure Reason alone can discover causal connexions. For any cause and its effect are logically quite distinct; a priori there is nothing in the one to suggest the idea of the other; so in advance of experience any imagined pairing between causes and effects will appear entirely arbitrary. And even if by luck we happen to guess the correct pairing, so that we succeed in ascribing to some particular cause its actual future effect, nevertheless the conjunction of the two will still appear arbitrary from an a priori point of view, ‘since there are always many other effects, which, to reason, must seem fully as consistent and natural’ (*E* 30).

It is important to notice that this second line of argument is significantly different from that with which Hume is commonly attributed, most notably by Stove.<sup>29</sup> For Hume is not stating merely that cause and effect are logically distinct — that the one is conceivable without the other — and concluding that for this reason alone there cannot be a legitimate inference from one to the other. He is starting from a much stronger premiss, namely, that a priori there is *no discernible connexion whatever* between cause and supposed effect: in advance of experience the conjunction of the two appears ‘entirely arbitrary’, and the supposed effect is therefore no more ‘consistent and natural’ than any number of alternatives.<sup>30</sup> So Hume’s argument here need not rely, as Stove supposes, on the deductivist assumption that an inference from cause to effect is unreasonable unless the occurrence of the cause without the effect is logically inconceivable. It requires only the far more modest

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<sup>29</sup> ‘Hume, Probability, and Induction’, 194; *Probability and Hume’s Inductive Scepticism*, 31.

<sup>30</sup> There is an interesting progression in Hume’s thought here. In the *Treatise* his argument does turn largely on mere conceivability, and the suggestion of arbitrariness is relatively muted: ‘we might . . . have substituted any other idea’ (*T* 87; cf. *T* 111–12). In the *Abstract* this suggestion is expanded: ‘The mind can always *conceive* any effect to follow from any cause, and indeed any event to follow upon another’ (*A* 650). By the time of the *Enquiry* arbitrariness has clearly become Hume’s principal emphasis, as it remains when he repeats the argument in the *Dialogues* (*D* 145–6, quoted earlier).

principle that if the inference from cause to effect is to be justifiable a priori, then the connection between cause and effect must be at least to some extent non-arbitrary, and an examination of the cause must be able to yield some ground, however slight, for expecting that particular effect in preference to others. In adopting this compelling principle, Hume is not in any way committing himself to the deductivist view, that the only arguments of any kind which have any force are those that are logically conclusive.<sup>31</sup>

Having completed the principal arguments of Part I, Hume briefly states its conclusion: ‘In vain, therefore, should we pretend to determine any single event, or infer any cause or effect, without the assistance of observation and experience.’ (E 30). He then adds two paragraphs which give valuable insight into his conception of science, spelling out some implications for scientific theorising in general and for applied mathematics in particular. First, science has absolute limits, in that it cannot possibly uncover the ‘ultimate springs and principles’ of nature: in other words it cannot provide pure rational insight into why things behave as they do. Such insight would require an a priori grasp of causal relations, which Hume’s arguments have ruled out, so the most we can hope for is ‘to reduce the principles, productive of natural phaenomena, to a greater simplicity, and to resolve the many particular effects into a few general causes’ (E 30). Scientists can continue to search for systematic order in the operations of nature, but they cannot aspire to an ultimate explanation of why things are ordered in the way that they are.

Applied (‘mixed’) mathematics might seem to provide an exception to this rule, since it appears to consist of rational deductions from the a priori principles of geometry and arithmetic. But Hume points out that any piece of applied mathematics also presupposes certain physical laws, for example the conservation of momentum, and any such law is incurably a posteriori. So although a priori mathematical reasoning certainly has a part to play in the application of such laws, ‘to determine their influence in particular instances’, it remains true that ‘the discovery of the law itself is owing merely to experience, and all the abstract reasonings in the world could never lead us one step towards the knowledge of it’ (E 31).

## 5. All Factual Inferences to the Unobserved are Founded on the Uniformity Principle

The first paragraph of Part ii provides a summary of what Hume takes his argument to have established so far, and the second announces his intentions for what follows:

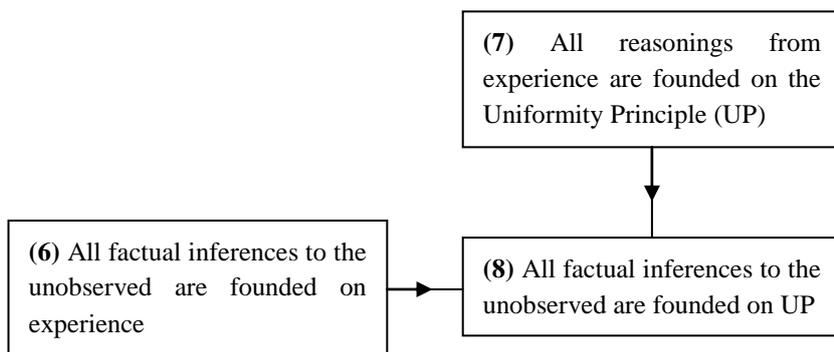
When it is asked, *What is the nature of all our reasonings concerning matter of fact?* the proper answer seems to be, that they are founded on the relation of cause and effect. When again it is asked, *What is the foundation of all our reasonings and conclusions concerning that relation?* it may be replied in one word, EXPERIENCE. But if we still carry on our sifting humour, and ask, *What is the foundation of all conclusions from experience?* this implies a new question . . .

I shall content myself, in this section, with an easy task, and shall pretend [i.e. claim or aspire] only to give a negative answer to the question here proposed. I say then, that, even after we have experience of the operations of cause and effect, our conclusions from that experience are *not* founded on reasoning, or any process of the understanding. (E 32)

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<sup>31</sup> A suspicion might remain that the argument of *Treatise* I. iii. 6, where Hume does seem content to argue from mere conceivability, is based on a general deductivist assumption. However a more plausible explanation is that he is here taking for granted a principle made explicit in the *Abstract* (A 650, quoted in §4.1 above), that a priori evidence must yield demonstrative certainty. We shall see in §7.2 that this assumption plays a role later in the *Enquiry* version of the argument (when Hume denies the possibility of a priori non-demonstrative reasoning), but it clearly does not imply any corresponding deductivism about a posteriori evidence.

Hume then embarks, in the very long third paragraph, on a slightly unfocused discussion combining two distinguishable lines of thought, the first of which can be represented as follows:



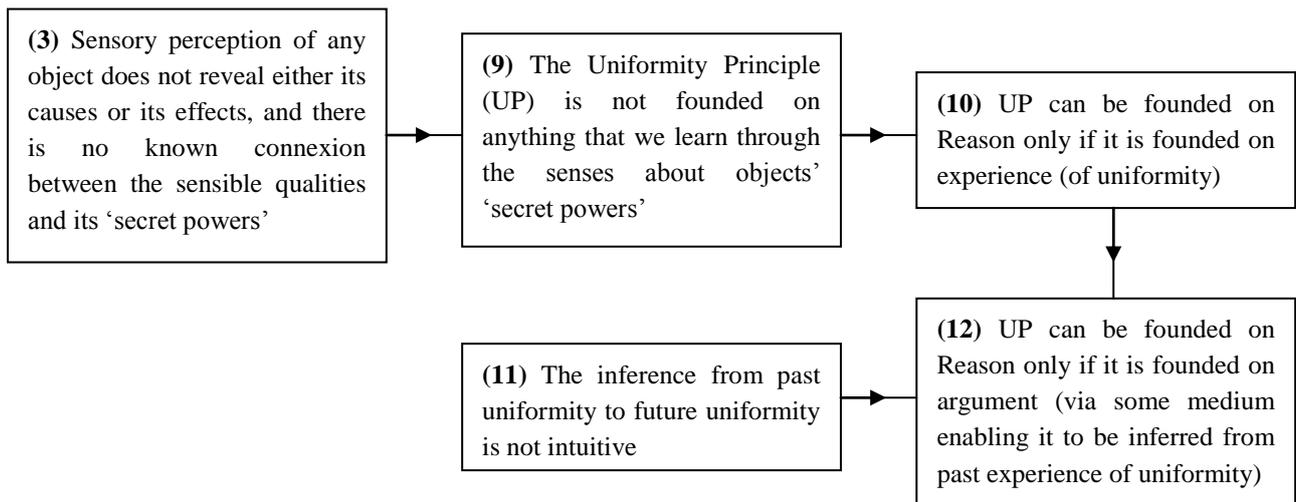
This part of Hume’s argument is perhaps the least explicit of any, but as we shall see, it can nevertheless be spelt out with reasonable confidence on the basis of what he says both before and after it.

The quotation above from the first paragraph of Part ii makes clear that Hume’s motive for investigating arguments from experience is to shed light on the general nature of factual inferences to the unobserved — this will explain the inference from (6) and (7) to (8) in the structure diagram. His investigation begins negatively, with a reminder that our experiential reasonings cannot possibly be based on any perceptual knowledge of objects’ ‘secret powers’. But the positive account soon follows: ‘notwithstanding this ignorance of natural powers and principles, we always presume, when we see like sensible qualities, that they have like secret powers, and expect, that effects, similar to those which we have experienced, will follow from them’ (E 33). That this is indeed Hume’s positive account is made clear by an otherwise puzzling back-reference two pages later, which he makes while summarizing this part of his argument, and which cannot plausibly be interpreted as referring to anything else: ‘We have said . . . that all our experimental conclusions proceed upon the supposition, that the future will be conformable to the past’ (E 35). So Hume clearly takes himself to have stated that (7) all arguments from experience, and hence (8) all factual inferences to the unobserved (since these are all founded on experience), ‘proceed upon the supposition’ that nature is uniform: that similar causes will, in the future, have similar effects to those which they have had in the past. For convenient reference I am calling this supposition the Uniformity Principle.

We have here reached the pivot of Hume’s argument. For most of what he has said so far has been devoted to establishing proposition (8) — that all factual inferences to the unobserved are founded on, or ‘proceed upon the supposition’ of, the Uniformity Principle — while most of what follows will be devoted to showing that the Uniformity Principle has no possible foundation in Reason (‘the understanding’). And it is from these two results that Hume draws his famous conclusion that our beliefs in [absent] matter of fact and real existence are ‘not founded on reasoning, or any process of the understanding’ (E 32).

## 6. The Uniformity Principle is Not Founded on Either Sensory or Intuitive Evidence

The previous section examined the first distinguishable line of thought in the long third paragraph of Section IV Part ii. It is now time to move on to the second line of thought, which can be represented as follows:



As in Part i Hume emphasizes our inability to discern an object's causes or effects by mere observation of its 'sensible qualities', but here the point of doing so is made clear only after he has sketched his positive account of experiential reasoning based on the Uniformity Principle: 'there is no known connexion between the sensible qualities and the secret powers; and consequently . . . the mind is not led to form such a conclusion concerning their constant and regular conjunction, by any thing which it knows of their nature' (E 33). This passage straightforwardly expresses the implication from (3) to (9) as represented in the structure diagram above (though (9) as stated in the diagram makes explicit the contrast which Hume apparently intends, between direct *perceptual* knowledge of object's secret powers, which he here denies, and indirect *inferential* knowledge based on past experience, which he has not yet ruled out).

Having rejected the possibility of establishing the Uniformity Principle on the basis of direct perception (i.e. grounds that are 'a priori' in the sense that was explained earlier), Hume goes on to examine whether past experience can provide any foundation for the principle. He is willing to allow that '*Experience . . . can . . . give direct and certain information of those precise objects . . . and that precise period of time, which fell under its cognizance.*' But his question is whether this gives any basis for extrapolating that experience 'to future times, and other objects, which for aught we know, may be only in appearance similar' (E 33–4). He spells out this logical issue very explicitly (in a passage which is here asterisked for future reference):

(\* ) These two propositions are far from being the same, *I have found that such an object has always been attended with such an effect, and I foresee, that other objects, which are, in appearance, similar, will be attended with similar effects.* I shall allow, if you please, that the one proposition may justly be inferred from the other . . . But if you insist, that the inference is made by a chain of reasoning, I desire you to produce that reasoning. The connexion between these propositions is not intuitive. There is required a medium, which may enable the mind to draw such an inference, if indeed it be drawn by reasoning and argument. (E 34)

Past experience of uniformity might perhaps provide grounds for the Uniformity Principle, but if so, since these grounds are not intuitive, they would have to be mediated by 'reasoning and argument'. Here we seem to have a fairly clear statement of the inference from (11) to (12) in the structure diagram above.

As I have interpreted him here, Hume quickly dismisses any a priori foundation for the Uniformity Principle, and does so on the basis of propositions (3) and (9) alone. Hence after this he does not further consider the possibility of there being some a priori argument that would provide a link between observed and

unobserved (i.e. an argument concluding that *whatever* has happened in the past, however irregular and chaotic that might have been, can be expected to continue into the future). Instead, he turns his attention (as proposition (10) indicates) to the possibility of an a posteriori argument for the Uniformity Principle, one based on the *actual* evidence of experience, which would appeal to the *character* of what has happened in the past (presumably its uniformity) in attempting to show that the past remains a reliable guide to the future. On this interpretation, therefore, the passage (\*) quoted above makes perfect sense: Hume is challenging the reader to provide an inferential link from experienced uniformity to a prediction-warranting Uniformity Principle, and is pointing out that since this inference is not sanctioned by direct intuition, it must be mediated by reasoning involving intermediate steps if it is to provide an adequate foundation for that principle.

There is, however, a subtly different way of viewing Hume's argument which can also claim some support from the text, though it treats it less as a continuous train of thought. On this alternative view, Hume's explicit questioning of whether experience can provide a foundation for the Uniformity Principle does not signal a complete shift of interest from a priori to a posteriori reasoning; rather, he is simply raising a number of sceptical queries in no particular order, in turn highlighting difficulties in the attempt to found the principle on sensation, on experience, on intuition, and finally, on argument *of any kind*. This interpretation might seem to be favoured by one particular sentence in the text: 'The bread, which I formerly eat ['ate'], nourished me; that is, a body of such sensible qualities, was, at that time, endued 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?' (E 34). On my preferred interpretation, Hume is focusing at this point on attempts to infer the Uniformity Principle from *the past experience of uniformity*, whereas at first sight this sentence gives the impression of appealing to *one particular past experience* rather than to a pattern of uniform experiences. However this impression is not decisive ('that time' can perfectly well refer to a period rather than to one occasion, as indeed would be suggested by the immediately preceding sentence) and it is strongly counterbalanced by the otherwise smooth flow of Hume's logic, and the structural similarities with his reasoning in Part i (where the discounting of sensation as an a priori source of causal knowledge signals a complete shift of attention towards reasoning from experience). Moreover the alternative interpretation requires a somewhat artificial construal of the long passage (\*) quoted earlier,<sup>32</sup> and fails to account for the strong emphasis on past uniformity which dominates most of the remainder of the section (E 36–8).

## 7. The Uniformity Principle is Not Founded on Argument

The stage is now set for the climax of Hume's argument concerning induction, in which he denies the possibility of any good reasoning at all which could provide a foundation in Reason for the Uniformity Principle and thus for factual inference. Many commentators have treated this part as though it were virtually the whole of Hume's argument (Fogelin,<sup>33</sup> for example, calls the entire argument concerning induction Hume's

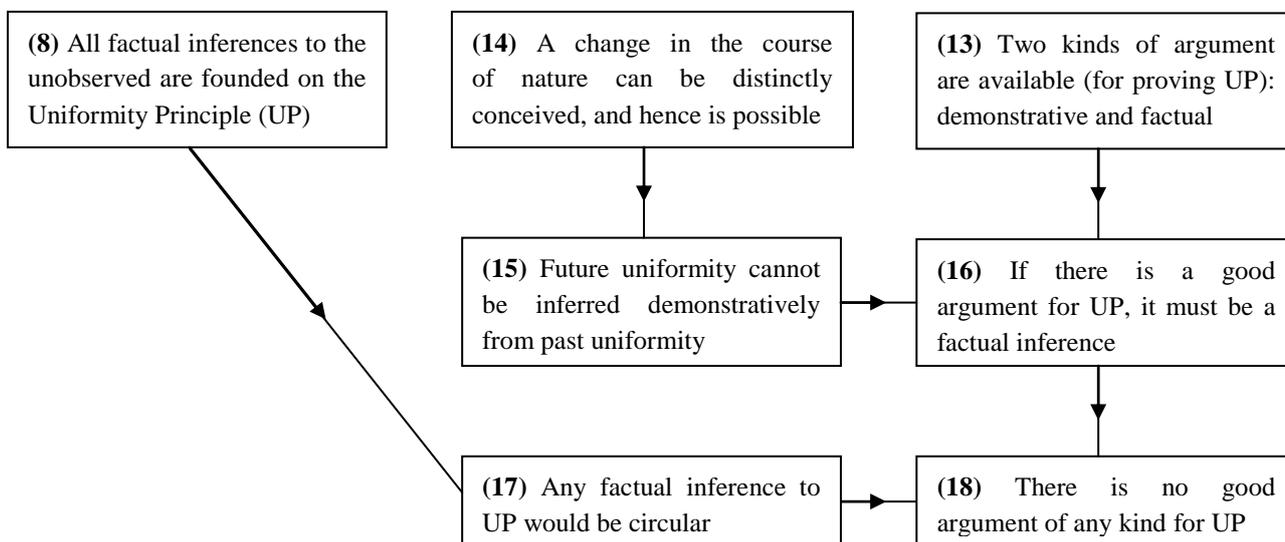
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<sup>32</sup> See P. J. R. Millican, 'Hume's Argument concerning Induction: Structure and Interpretation', in S. Tweyman (ed.), *David Hume: Critical Assessments*, 6 vols. (London and New York: Routledge, 1995), ii. 91–144 (repr. in D. W. D. Owen (ed.), *Hume: General Philosophy* (Aldershot and Burlington, Vermont: Ashgate, 2000), 165–218), esp. 109–10, which presents this alternative view, and which interprets the passage in question as treating the Uniformity Principle as a rule of inference rather than as a proposition. When writing that earlier paper, I had not fully appreciated the relevance here of Hume's notion of aprioricity, and hence overlooked the structural parallel with his reasoning in Part i. Further evidence for my new interpretation comes from the *Treatise*, which explicitly focuses on arguments 'founded on past *experience*, and on our remembrance of . . . constant conjunction' (T 88; cf. T 87, 163‡n.).

<sup>33</sup> R. Fogelin, *Hume's Skepticism in the Treatise of Human Nature* (London, Boston and Melbourne: Routledge & Kegan Paul, 1985), 46.

‘no-argument argument’) so it is worth recalling that in the *Enquiry* it is not only preceded by Part i, but is also introduced by the line of thought outlined in §6 above, in which Hume takes the trouble to argue that some reasoning is necessary if the Uniformity Principle is to be founded on Reason, a point which he apparently takes more or less for granted in the *Treatise* and *Abstract*.

The structure of this most famous part of Hume’s argument is admirably clear:



It starts with the general claim (13) that ‘All reasonings may be divided into two kinds, namely demonstrative reasoning . . . and moral reasoning, or that concerning matter of fact and existence [i.e. factual reasoning]’ (*E* 35). The inference from (14) to (15) is then quickly drawn: ‘That there are no demonstrative arguments in the case, seems evident; since it implies no contradiction, that the course of nature may change . . . Now whatever is intelligible, and can be distinctly conceived, implies no contradiction, and can never be proved false by any demonstrative argument or abstract reasoning *à priori*.’ Propositions (13) and (15) together imply (16): ‘If we be, therefore, engaged by arguments to put trust in past experience, and make it the standard of our future judgment, these arguments must be probable [i.e. factual] only’. But now the previous conclusion (8) can be appealed to in order to show (17) ‘that there is no argument of this kind’ (*E* 35). For (8) states that all factual inferences to the unobserved are founded on the Uniformity Principle. ‘To endeavour, therefore the proof of [the Uniformity Principle] by probable [i.e. factual] arguments . . . must be evidently going in a circle, and taking that for granted, which is the very point in question.’ (*E* 35–6).

Though superficially very straightforward, there is a lot going on here beneath the surface. For example, Hume is certainly not being entirely explicit when he states that ‘all reasonings’ are either demonstrative or factual and goes on to rule out the possibility of either type of argument for the Uniformity Principle. For he was surely well aware that philosophers could, and would, concoct various *defective* arguments to support this principle — indeed he considers such an argument himself, at *E* 36–8. What he is denying, therefore, is that any *good* argument is available for the purpose, on the grounds: first, that all *good* arguments are either demonstrative or factual; secondly, that there cannot be a *good* demonstrative proof of the falsity of what is

distinctly conceivable; and thirdly, that a *good* factual argument cannot be circular.<sup>34</sup> This passage is, in fact, an illustration of a general rule of Hume interpretation, that when he speaks of ‘all [or no] arguments [reasonings, inferences]’, the qualification ‘good’ is usually implied.<sup>35</sup>

## 7.1 What does Hume Mean by ‘Demonstrative’?

Hume’s grounds for ruling out the possibility of a good argument for the Uniformity Principle also merit some discussion, not least because they have been thought by previous commentators to have significant interpretative implications. First, let us consider Hume’s argument from distinct conceivability, which he uses to prove that matters of fact in general, and the Uniformity Principle in particular, cannot be established by any demonstrative reasoning:

The contrary of every matter of fact is still possible; because it can never imply a contradiction, and is [distinctly] conceived by the mind . . . We should in vain, therefore, attempt to demonstrate its falsehood. Were it demonstratively false, it would imply a contradiction, and could never be distinctly conceived by the mind. (*E* 25–6)

. . . it implies no contradiction, that the course of nature may change . . . Now whatever is intelligible, and can be distinctly conceived, implies no contradiction, and can never be proved false by any demonstrative argument or abstract reasoning *à priori*. (*E* 35)

These passages (and others like them such as *T* 89, 95, *A* 650, 651, *E* 163–4) have been taken by many as decisive evidence that Hume holds the view (in Stove’s words) ‘that there can be no demonstrative arguments for any conclusion concerning matter of fact’. This being so, it seems to follow that Hume must mean by a ‘demonstrative argument’ a ‘(valid) argument *from necessarily true premisses*’, since obviously a valid argument from mere matter-of-fact premisses might well have a matter-of-fact conclusion (whose falsehood would imply no contradiction and would be distinctly conceivable).<sup>36</sup> Against this popular interpretation, however, I shall now claim that Hume means by ‘demonstrative’ much the same as we today mean by ‘deductive’, in the informal sense according to which an argument is deductive (or ‘deductively valid’) if and only if the truth of its premisses guarantees the truth of its conclusion.<sup>37</sup>

The argument sketched below is deductively valid in the modern informal sense, and would I believe undoubtedly be classed by Hume as ‘demonstrative’:

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<sup>34</sup> The first of these three points will suffice if the terms ‘demonstrative’ and ‘probable’ are themselves interpreted normatively, so that an argument only *counts as* being of the appropriate type if it is a *good* instance. But Hume himself does not consistently interpret them in this way, and in the *Treatise* especially seems perfectly content to talk of ‘fallacious’ demonstrations (e.g. *T* 53, 80) or ‘unphilosophical’ probable reasonings (i. iii. 13).

<sup>35</sup> A related instance is at *E* 88: ‘it is from past experience, that we draw all inferences concerning the future, and . . . conclude, that objects will always be conjoined together, which we find to have always been conjoined’. Hume would surely not consider this statement refuted by the irrational inferential practices of soothsayers (which may bear no relation to past experience) or by the popular ‘gambler’s fallacy’ (which may bear a contrary relation — ‘I’ve lost every game so far, so I’m bound to win the next!’). Some other examples of Hume’s presupposing a restriction to *good* inferences are at *T* 81, 163, *E* 78†n., 150, 159, *D* 205, 227.

<sup>36</sup> The quotations from Stove are from *Probability and Hume’s Inductive Scepticism*, 35. Similar views have been expressed by a wide range of highly respected authors, including Beauchamp and Rosenberg, *Hume and the Problem of Causation*, 43; Garrett, *Cognition and Commitment in Hume’s Philosophy*, 87; J. C. A. Gaskin, *Hume’s Philosophy of Religion*, 2nd edn. (Basingstoke and London: Macmillan, 1988), 77; and J. A. Passmore, *Hume’s Intentions*, 3rd edn. (London: Duckworth, 1980), 20.

<sup>37</sup> I say ‘much the same’ to avoid commitment on fine details, for example whether an argument whose premisses are inconsistent, or irrelevant to a necessarily true conclusion, could nevertheless count as ‘demonstrative’.

1. The momentum of a body is equal to its mass multiplied by its velocity.
  2. In any collision the total momentum of the colliding bodies (in any given direction) is conserved.
- ∴ If a spherical rigid body of mass 2 kg moving directly eastward at 25,000 m/s collides head-on and instantly sticks fast to a second spherical rigid body of mass 10,000 kg which is moving directly westward at 4 m/s (without any breakage, any simultaneous interaction with other bodies, any change of mass, etc.), then the second body will no longer be moving westward immediately after the collision.

This is precisely the kind of applied mathematics which Hume discusses at *E* 31 (in a paragraph which was mentioned in §4.2 above), and it is in fact a version of his own, rather imprecisely expressed, example:<sup>38</sup>

it is a law of motion, discovered by experience, that the moment or force of any body in motion is in the compound ratio or proportion of its solid contents and its velocity; and consequently, that a small force may remove the greatest obstacle . . . if, by any contrivance . . . we can encrease the velocity of that force, so as to make it an overmatch for its antagonist.

At this point Hume calls such reasonings ‘abstract’ rather than ‘demonstrative’, but the ancestor of this passage in the *Treatise* makes the equation between the two explicit:

Mathematics, indeed, are useful in all mechanical operations . . . But ’tis not of themselves they have any influence. . . . Abstract or demonstrative reasoning . . . never influences any of our actions, but only as it directs our judgment concerning causes and effects. (*T* 413–14)

Hume is totally clear that the premisses of the argument above are contingent and known only a posteriori:<sup>39</sup>

Geometry assists us in the application of this law . . . but still the discovery of the law itself is owing merely to experience, and all the abstract reasonings in the world could never lead us one step towards the knowledge of it. (*E* 31)

So unless Hume is seriously inconsistent, it cannot be a defining condition of what he calls ‘abstract’ or ‘demonstrative’ reasoning that it must have necessarily true or a priori premisses.

Quite apart from his discussion of applied mathematics, there is in *Enquiry* IV another place where Hume makes clear that he is prepared to countenance the possibility of a ‘demonstrative’ inference from a contingent premiss (ironically, immediately before the very application of the argument from distinct conceivability which is supposed by Stove and others to require a contrary interpretation). For when at *E* 35 Hume canvasses the possibility of a demonstrative inference to the Uniformity Principle, he certainly appears to have in mind an argument premissed on contingent past uniformity, as expressed in the passage (\*) quoted earlier. Indeed if my interpretation in §6 above is correct, then the whole point of Hume’s ‘no-argument argument’ is precisely to consider such *experiential* arguments for the Uniformity Principle.

If Hume is prepared to accept that a demonstrative inference can have premisses that are not necessary truths,<sup>40</sup> then what are we to make of his argument from distinct conceivability which is so often adduced for the opposite conclusion? I suggest that we simply need to distinguish between the plausible claim

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<sup>38</sup> Here the 10,000 kg body exemplifies a ‘great obstacle’, the 2 kg body a ‘small force’, and change of direction counts as ‘removal’.

<sup>39</sup> I here gloss over the fact that the first premiss can plausibly be seen as a *definition* of ‘momentum’, a subtlety that Hume overlooks. The important point for present purposes is simply that the argument indeed has at least one contingent premiss.

*that no contingent proposition can be proved demonstratively, or is demonstrable, or can be demonstrated*

and the much stronger, but highly dubious claim

*that no contingent proposition can be the conclusion of any demonstrative inference.*

The former is both genuinely Humean and arguably true;<sup>41</sup> the latter is neither, and Hume nowhere asserts it, despite the frequency with which Stove and others attribute it to him. There is absolutely no difficulty, in Hume's system, with a demonstration that one matter of fact (e.g. 'Mars is red and round') implies another (e.g. 'Some round thing is coloured'), nor — which is inferentially equivalent — with an argument which starts from the one matter of fact as a known or believed premiss, and concludes demonstratively that the other is therefore also true. All such arguments may be called 'demonstrations' and described as 'demonstrative', but they are not 'demonstrations of' or 'demonstrative proofs of' any matter of fact; all they can be said to *demonstrate* is the deductive *implication* between the matters of fact concerned.<sup>42</sup> Hume's argument from distinct conceivability can accordingly be invoked whenever he wishes to deny such a deductive relationship, as for example when he remembers 'that such an object has always been attended with such an effect', but is denying the deducibility from it of the conclusion 'that other objects, which are, in appearance, similar, will be attended with similar effects' (*E* 34). Here the co-conceivability of the premiss and the negation of the conclusion is, as Hume points out, quite enough to wreck any such supposed deductive implication, and this fully accounts for the use of his argument from distinct conceivability.

The argument from distinct conceivability aside, I believe the only other texts that in any way support the common misinterpretation I have been criticizing are Hume's comments about the limited province of demonstration, most explicitly: 'It seems to me, that the only objects of the abstract sciences or of demonstration are quantity and number, and that all attempts to extend this more perfect species of knowledge beyond these bounds are mere sophistry and illusion.' (*E* 163). But as he goes on to explain immediately following this sentence, Hume is pessimistic about the extent to which demonstration can be of significant use in the 'moral sciences' not because demonstrative inferences from contingent premisses are by definition impossible, but rather because most of our ideas in 'moral subjects' lack the precise and intricate relationships which enable lengthy demonstrations to be both reliable and fruitful in more quantitative disciplines (*E* 163; cf. *E* 60–1, *T* 71).<sup>43</sup> This explanation implies that the best potential source of useful demonstrative reasonings from contingent premisses will be in applied mathematics, nicely corroborating our earlier example involving the conservation of momentum. It is evidently no coincidence that Hume's discussion of 'mixed mathematics' provides the crucial test case by which this interpretative dispute can be decisively settled.

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<sup>40</sup> He is presumably even prepared to accept that a demonstration can be premissed on a necessary falsehood, since he often argues by *reductio ad absurdum* (e.g. *T* 43: 'we may produce demonstrations from these very ideas to prove, that they are impossible').

<sup>41</sup> 'Arguably', because the details will depend on whether a 'demonstrative proof' is understood to exclude a posteriori premisses, and on the interpretation of 'contingent' in the light of issues in the theory of reference associated with the work of Saul Kripke (issues very distant from any of Hume's concerns). Clearly the point will be incontrovertible if 'contingent' is equated with a posteriori, and 'prove demonstratively' (etc.) is interpreted as meaning deductive proof from a priori principles.

<sup>42</sup> Though it is logically rather imprecise to describe a demonstrative argument from *P* to *Q* as being a demonstration that *P* implies *Q*, the inferential equivalence between the two makes it unsurprising if Hume sometimes conflates them.

<sup>43</sup> This does not imply that demonstrative arguments are excluded from non-quantitative disciplines, just that these 'pretended syllogistical reasonings' are likely to be rather trivial, in some cases reducing to a mere 'imperfect definition' (*E* 163). But even such trivial arguments can sometimes play a useful role, as in the 'syllogism' which Philo advances in the *Dialogues* at *D* 142–3.

## 7.2 The Gap in Hume's Argument

It is just as well for the cogency of Hume's argument that his category of 'demonstrative' reasonings is not confined to those that are a priori, for if it were so confined, then his insistence that the only available kinds of inference are 'demonstrative' and factual-inductive would be *manifestly* incorrect: he would quite gratuitously have left out of account any arguments that start from a posteriori premisses but then proceed deductively rather than by appeal to causation and uniformity ('Mars is red and round, therefore some round thing is coloured' being a simple example). Given Hume's generally good logical instincts and philosophical competence, this provides additional corroboration of the interpretation of 'demonstrative' advanced above. Nevertheless I believe that there is a different and genuine gap in Hume's argument at this point, not because he overlooks the possibility of a posteriori deductive inferences, but on the contrary because he overlooks the possibility of a priori non-deductive inferences — that is, inferences which are less than deductively certain, but which are 'founded on' considerations of a priori probability rather than on experience.

To see how this gap emerges, consider again Hume's grounds for ruling out the possibility of either a demonstrative or a 'probable' foundation for the Uniformity Principle. The reason he is confident that no demonstrative argument can do the job is that such an argument always yields absolute certainty relative to its premisses, so that the mere distinct conceivability of a change in the course of nature (14) is sufficient to show that the Uniformity Principle cannot be established by demonstration (15) no matter what our premisses about the past might be. By contrast, Hume's reason for ruling out the possibility of a 'probable' foundation for the Uniformity Principle is his claim that the only good form of such reasoning potentially available for this purpose is inductive inference, which is itself founded on experience (7) and hence on the Uniformity Principle (8) — thus any inductive argument which purports to provide a foundation for the Uniformity Principle will be viciously circular, since it must be founded on the very principle for which it is attempting to provide a foundation.<sup>44</sup> Putting all this together, it follows that if there were a third form of reasoning which yielded merely probable inferences (rather than certainties), but did so on a priori grounds (rather than by extrapolation from past experience), then this form of reasoning would be completely immune to Hume's objections: he could not rule out the possibility of such reasoning's providing a foundation for the Uniformity Principle either on the basis of his argument from distinct conceivability or on the ground of circularity.

It is highly debatable whether a priori probabilistic reasoning (based, for example, on the Principle of Indifference, 'logical probability' measures, considerations of invariance, or other supposedly non-empirical principles) is a genuine possibility or, if it is, whether such reasoning could conceivably provide a justification for the Uniformity Principle. But those (such as Popper) who claim that Hume himself showed this particular route to be a dead end are certainly mistaken,<sup>45</sup> for as we have seen, when he denies that 'probable' reasoning could perform such a role, Hume has in mind only inductive reasoning from experience, not mathematical probabilistic reasoning that is a priori.<sup>46</sup> There is, then, a definite gap in Hume's argument. Whether this gap

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<sup>44</sup> Note that this 'foundational circularity' differs from the more familiar 'deductive circularity' of an argument whose conclusion is also one of its premisses. In this sense, *contra* Stove ('Hume, Probability, and Induction', 205), a circular argument need not be deductively valid.

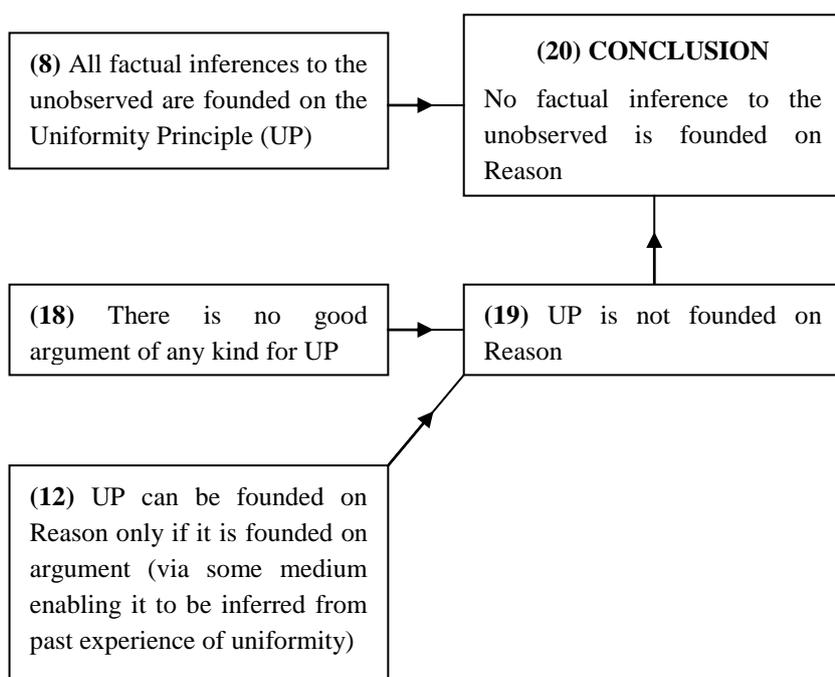
<sup>45</sup> A point made strongly against Popper and others by Stove, 'Hume, Probability, and Induction', 189–90.

<sup>46</sup> Hume apparently tries to keep an open mind about the existence of other 'species' of reasoning ('I cannot find, I cannot imagine any such reasoning. But I keep my mind still open to instruction'; *E* 36), and may be aware that this is a weak point in his argument ('there may still remain a suspicion, that the enumeration is not compleat'; *E* 39). However he is so far from conceiving of the possibility of a priori probabilistic reasoning that he virtually defines 'demonstrative' reasoning as that whose inferential steps are a priori, in calling it 'reasoning concerning relations of ideas' (*E* 35; cf. *T* 124, *A* 650).

can be exploited by his opponents is an interesting and important question, and one that I have explored at length elsewhere, but there is insufficient space to address it here.<sup>47</sup>

## 8. Hume's Conclusion: No Factual Inference to the Unobserved is Founded on Reason

Having finished his 'no-argument argument', the pieces of Hume's jigsaw are all complete. In typical fashion he leaves it to his reader to slot them into place, but if the account given above is correct, the way in which they are intended to fit together is evident from the structure and flow of his argument:



The precise nature of Hume's conclusion may seem unclear from his own words. We have already seen that he anticipates it when stating his intentions at *E* 32: 'I say then, that, even after we have experience of the operations of cause and effect, our conclusions from that experience are *not* founded on reasoning, or any process of the understanding.' But when later summing up the section at *E* 39, he expresses his conclusion somewhat differently: 'it is not reasoning which engages us to suppose the past resembling the future, and to expect similar effects from causes, which are, to appearance, similar. This is the proposition which I intended to enforce in the present section.' There is a subtle difference here: at *E* 32 he is saying that *our particular experiential conclusions* are not 'founded on reasoning, or any process of the understanding', whereas at *E* 39 he seems to be saying that our supposition of *the Uniformity Principle* is not so founded. If we move forward to the beginning of Section V, however, we can find at *E* 41 a passage which helps to reconcile these two readings: 'we . . . conclude . . . in the foregoing section, that, in all reasonings from experience, there is a step taken by the mind, which is not supported by any argument or process of the understanding'. So all reasonings from experience involve a step, namely the assumption of uniformity, which is not supported by 'any process of the understanding' — which, indeed, *cannot* be so supported if Hume's argument is correct. And Hume

<sup>47</sup> This question is the principal focus of the second part of my doctoral dissertation (*Hume, Induction, and Probability*, University of Leeds, Ph.D. thesis, 1996, 101–237), which is in preparation as a book under the same title. Although the idea of a priori probability is often dismissed out of hand, the list of those who have attempted to provide such a foundation for induction is quite substantial, including Laplace, De Finetti, Harrod, D. C. Williams, Stove, Mackie, and Blackburn.

goes on in Section V to provide an alternative explanation of why we make this step: it is entirely non-rational, and is the product not of Reason but merely of a particular one of our brute ‘natural instincts, which no reasoning or process of the thought and understanding is able, either to produce, or to prevent’ (E 46–7). This instinct is what ‘makes us expect, for the future, a similar train of events with those which have appeared in the past’ (E 44), and Hume accordingly calls it ‘custom’, or ‘habit’. Here, then, is the answer to his original enquiry at E 26 regarding ‘the nature of that evidence, which assures us of any [absent] matter of fact’: ‘All inferences from experience, therefore, are effects of custom, not of reasoning. . . . Without the influence of custom, we should be entirely ignorant of every matter of fact, beyond what is immediately present to our memory and senses.’ (E 43–5).

## 9. Coda: ‘Secret Powers’, Causal Realism, and a Parting Shot

In both the *Treatise* and the *Enquiry* Hume’s main argument finishes with his circularity charge against any would-be ‘probable’ justification of the Uniformity Principle. But in both he goes on to refute one natural attempt that might be made to justify induction by appeal to objects’ ‘powers’.<sup>48</sup> In the *Treatise* the way in which Hume introduces this discussion makes very clear its status as a rounding-off illustration of the impact of his argument, rather than as an essential component (and accordingly I call it the argument’s ‘coda’):

Shou’d any one think to elude this argument; and without determining whether our reasoning on this subject be deriv’d from demonstration or probability, pretend that all conclusions from causes and effects are built on solid reasoning: I can only desire, that this reasoning may be produc’d, in order to be expos’d to our examination. It may, perhaps, be said, that after experience of the constant conjunction of certain objects, we reason in the following manner. Such an object is always found to produce another. ’Tis impossible it cou’d have this effect, if it was not endow’d with a power of production. The power necessarily implies the effect; and therefore there is a just foundation for drawing a conclusion from the existence of one object to that of its usual attendant. The past production implies a power: The power implies a new production: And the new production is what we infer from the power and the past production. (T 90)

The *Enquiry* version of this attempt to provide a foundation for induction is subtly different, in that instead of apparently using the existence of a cause and effect relationship to infer the existence of a power, it takes for granted from the start that objects have powers and appeals to the *constancy* of causal relations to infer a continuing ‘connexion between the sensible qualities and the secret powers’ (E 36).<sup>49</sup> But the forceful refutation that follows is equally decisive against either version:

When a man says, *I have found, in all past instances, such sensible qualities conjoined with such secret powers*: And when he says, *similar sensible qualities will always be conjoined with similar secret powers*; he is not guilty of a tautology, nor are these propositions in any respect the same. You say that the one proposition is an inference from the other. But you must confess that the inference is not intuitive; neither is it demonstrative: Of what nature is it

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<sup>48</sup> In the *Enquiry* Hume first presents an additional new argument (but one reminiscent of T 88 and 163–5) designed to strengthen his claim that the continuing uniformity of causal relations cannot be established a posteriori by Reason, on the ground that if it could be so established it would be knowable ‘upon one instance’ and not (as we find) only ‘after a long course of uniform experiments’ (E 36; cf. E 43). This argument may indeed be quite effective against the perceptual view of Reason (since *perceived* connexions can reasonably be expected to be unaffected by mere repetition), but Hume’s inability to imagine any kind of reasoning to which numbers of instances would be relevant suggests a (historically unsurprising) poor grasp of statistical inference.

<sup>49</sup> This is only to be expected, given the discussion in §6 above. Hume also considers a similar move later in the *Treatise* version at T 91 (‘Shou’d it be said, that we have experience, that the same power continues united with the same object . . .’).

then? To say it is experimental, is begging the question. For all inferences from experience suppose, as their foundation, that the future will resemble the past, and that similar powers will be conjoined with similar sensible qualities. . . . It is impossible, therefore, that any arguments from experience can prove this resemblance of the past to the future; since all these arguments are founded on the supposition of that resemblance. (*E* 37–8; cf. *T* 91)

Here we clearly have a straightforward application of Hume’s central argument, rather than a significant independent addition to it. This elegant refutation does, however, help to settle an important issue concerning the relationship between Hume’s reasoning about induction and his theory of causation.

### 9.1 The Place of Causation in Hume’s Argument

In the *Treatise* Hume’s argument concerning induction is presented in the context of his analysis of causation. This can give the impression that the one relies heavily on the other, and many books on Hume have tended to confirm this impression by treating the two together, often within the confines of a single chapter. But the quotation above from *E* 37–8 shows clearly that Hume’s case against the rational foundation of induction is quite independent of his ‘regularity’ analysis of causation, for even if causation is instead a matter of ‘secret powers’, and even if all observed *As* have in fact been endowed with the secret power to produce *B*, this in itself can give us no reason for supposing that some hitherto *unobserved A* has been or will be similarly endowed. The point is that because the connection between *A* and that power is not a priori, we can only justifiably infer a continued conjunction between them if we already have some justification for extrapolating from observed to unobserved. So an analysis of causation in terms of ‘secret powers’ (or ‘natural necessities’, as they might now be called) provides no answer whatever to the inductive sceptic.

Since Hume’s views about induction do not depend on his own analysis of the notion of causation, this naturally raises the question of why that notion should nevertheless feature so prominently in his famous argument, and whether it plays any essential role there. Appealing to the structural analysis developed above, we can see that causation features importantly in Hume’s argument at only two points: first, in Part i, where he uses it as a ‘middle term’ for deducing that all factual reasoning to the unobserved is based on experience (propositions (1) to (6)‡); and secondly, at the beginning of Part ii (*E* 33), where he appeals again to his earlier claim about our inability to perceive any connexion between objects’ powers and their sensible qualities (proposition (3)‡), and goes on to draw the corollary that the Uniformity Principle cannot be justified on the basis of such perception (proposition (9)‡). Taking these two together, it seems that causation plays a role in Hume’s argument only to the extent of enabling him to conclude *that inferences beyond the present testimony of our memory and senses (including inferences about the Uniformity Principle) cannot be drawn a priori from our immediate perceptions and hence must be based on past experience*. However this proposition seems just as plausible in its own right without any mention of causation, and it can moreover be supported directly by most of the examples, and much of the argumentation, that he provides in Part i.

Hume’s argument, therefore, can apparently be reconstructed without any essential mention of causation (a point of which I shall take advantage in §10 below, when presenting a simplified version). And Hume himself might have welcomed such a reconstruction, for it would rid him of any dependence on his initial premiss (1), about which he seems to have some doubts later in the *Enquiry* when in Section X he turns his attention to inferences based on human testimony. When these doubts arise, it is interesting and perhaps significant that he deals with them in exactly the way that would be required to permit such a reconstruction of his Section IV argument, for he makes no attempt to defend this premiss, but instead simply remarks that it can be bypassed for his current purposes, on the grounds that any testimonial inference to the unobserved, even if it is admitted to be non-causal, must nevertheless be based on experience:

This species of reasoning, perhaps, one may deny to be founded on the relation of cause and effect. I shall not dispute about a word. 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. (*E* 111)

This remark is tantalizing, but unfortunately we shall probably never know whether Hume ever noticed its relevance to his argument concerning induction.

## 9.2 Induction and Hume's Alleged Causal Realism

Hume's 'coda' can also shed light on an issue of considerable recent scholarly debate — namely, whether he was a believer in genuinely mind-independent necessities underlying the observed regularities that lead us to interpret our experience causally and to draw inductive inferences accordingly. The issue is too complex to explore in any detail here, so I shall confine myself to three points regarding the relevance of *Enquiry* IV to this debate. The first concerns the language of 'secret powers' which Hume uses throughout Part ii (especially in the coda), and which has been thought by some to show that he firmly accepts a notion of mind-independent powers in objects, quite different from any 'idea' that would be sanctioned by his empiricist 'regularity' analysis in *Enquiry* VII (*E* 62–3, 75–7).<sup>50</sup> For example:

no philosopher, who is rational and modest, has ever pretended to . . . show distinctly the action of that power, which produces any single effect . . . (*E* 30)

. . . nature . . . conceals from us those powers and principles, on which the influence of . . . objects entirely depends. . . . but as to that wonderful force or power . . . of this we cannot form the most distant conception. But notwithstanding this ignorance of natural powers and principles, we always presume, when we see like sensible qualities, that they have like secret powers . . . (*E* 32–33)

. . . experience . . . teaches us, that those . . . objects . . . were endowed with such powers and forces. (*E* 37)

But these quotations show nothing of the kind, as is made clear by a footnote which Hume inserted into the 1750 edition, directly after the words 'natural powers' in the second quotation above:

The word, Power, is here used in a loose and popular sense. The more accurate explication of it would give additional evidence to this argument. See Sect. 7. (*E* 33‡n.)

I believe Hume added this footnote in direct response to criticisms from his longtime friend Henry Home, Lord Kames, who in 1751 brought to publication his *Essays on the Principles of Morality and Natural Religion*,<sup>51</sup> including an essay 'Of our Idea of Power' which attacks what he takes to be Hume's official view, that we have no idea of causation in objects beyond mere regularity. Kames presents the 'secret power' language of Section IV as evidence that Hume himself cannot consistently accept this 'violent paradox',<sup>52</sup> so Hume's insertion of this footnote — apparently *expressly* to make clear that such language is to be interpreted in the light of his Section VII analysis and hence cannot conflict with it — seems strongly to suggest that Kames'

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<sup>50</sup> See D. W. Livingston, *Hume's Philosophy of Common Life* (Chicago and London: University of Chicago Press, 1984), 154–6 and G. Strawson, *The Secret Connexion* (Oxford and New York: Clarendon Press, 1989), ch. 16. Both Livingston and Strawson acknowledge the *E* 33 footnote quoted below, but seem unaware of its possible context in the debate between Hume and Kames, which I believe greatly clarifies its significance.

<sup>51</sup> Henry Home, *Essays on the Principles of Morality and Natural Religion* (Edinburgh, 1751), published anonymously.

<sup>52</sup> See pp. 290–2 for the allegation of inconsistency, and p. 283 for the description of Hume's position as a 'violent paradox' (an allusion to *T* 166).

interpretation of Hume's position was correct (as indeed might be expected given their intimacy and mutual philosophical interests).<sup>53</sup> Thus Hume's use of the language of 'powers' in Sections IV and V cannot now be brought as evidence for any departure from his Section VII view. If anything quite the reverse, because the footnote seems to confirm that he sees Section VII as revealing the 'precise meaning' (E 62; cf. E 67‡n., 82) behind our causal notions even when those are used in a 'loose and popular' manner.

My second point arises from the result of Hume's coda (summarized in §9 and briefly discussed in §9.1). There he argues that the notion of an objective causal power, even if it is supposed to be coherent, can provide no escape from his sceptical conclusions, because extrapolation into the future of a past constant conjunction between (for example) *A* and *the secret power to produce B* has no more basis in Reason than extrapolation of the constant conjunction between *A* and *B* which it is invoked to explain. Hence *in so far as the supposition of secret powers is intended to provide an explanation of the consistency of objects' behaviour over time* — to remove what can otherwise seem the outrageous coincidence that the world should continue to operate according to the same laws, microsecond after microsecond, for billions of years — *that supposition is entirely useless*. If Hume is right, there is no way that the uniformity of the laws of nature over time can be accounted for, whether in terms of underlying metaphysical 'necessities' or anything else, and if this implies that we have no option but to accept an outrageous coincidence as fact, then so be it. At any rate, Hume's forceful reasoning clearly indicates that he himself would be quite unmoved by any argument for the existence of objective powers based on the avoidance of inductive coincidence.<sup>54</sup>

My final point contrasts somewhat with the first two, and suggests a possible resolution of the causal realist debate by identifying a sense in which Hume is indeed committed to accepting the ascription of powers to objects, while neither denying the subjective origin of our corresponding idea, nor appealing to any underlying metaphysical necessity of the type that we have just seen rejected. Consider three passages, the first of which is from his important paragraph on 'mixed mathematics' discussed above in §7.1:

it is a law of motion, discovered by experience, that the moment or force of any body in motion is in the compound ratio or proportion of its solid contents and its velocity . . . (E 31)

We find by experience, that a body at rest or in motion continues for ever in its present state, till put from it by some new cause; and that a body impelled takes as much motion from the impelling body as it acquires itself. These are facts. When we call this a *vis inertiae*, we only mark these facts, without pretending to have any idea of the inert power; in the same manner as, when we talk of gravity, we mean certain effects, without comprehending that active power. It was never the meaning of Sir ISAAC NEWTON to rob second causes of all force or energy . . . (E 73‡n.)

the idea of *power* is relative as much as that of *cause*; and both have a reference to an effect, or some other event constantly conjoined with the former. When we consider the *unknown* circumstance of an object, by which the degree or quantity of its effect is fixed and determined, we call that its power: And accordingly, it is allowed by all philosophers, that the effect is the measure of the power. But if they had any idea of power, as it is in itself, why

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<sup>53</sup> See Mossner, *The Life of David Hume*, 119 for Kames' description (to Boswell) of how he had invited Hume to 'try to beat your Book [i.e. the *Treatise*] into my head'. Evidently he made considerable efforts to understand Hume, exchanged manuscripts with him prior to publication (notably that of the *Enquiry or Philosophical Essays*, see HL i 111), and particularly discussed the issue of causation with him over many years. For background on Hume's relationship with Kames, see also Mossner, pp. 58–62, 410–12.

<sup>54</sup> Such an argument seems to be the main theme of Strawson, *The Secret Connexion*, ch. 5, though Strawson here does not entirely distinguish between invoking causal powers to explain uniformity *over time* (which I am here denying that Hume would accept) and invoking causal powers to explain regular patterns of behaviour *at a time* (which, in the sense discussed below, Hume might accept).

could not they measure it in itself? The dispute whether the force of a body in motion be as its velocity, or the square of its velocity . . . needed not be decided by comparing its effects in equal or unequal times; but by a direct mensuration and comparison. (*E* 77‡n.)

Expressed using a variety of notions — *moment, force, power, energy* — which Hume sees as being ‘all nearly synonymous’ with *necessity* (*T* 157),<sup>55</sup> these passages strongly suggest that he recognizes the *legitimacy* of such notions if properly understood. The only content that we can give to any notion of force, power, or necessity (i.e. our only *idea* of it) is in terms of the observable regular behaviour of objects and our tendency to draw inferences accordingly, but nevertheless once we have such an idea it can quite *properly* be ascribed to objects themselves, since only thus can it feature in quantitative scientific explanations. Such explanations form the heart of Newtonian science, serving ‘to reduce the principles, productive of natural phaenomena, to a greater simplicity, and to resolve the many particular effects into a few general causes’ (*E* 30). So the ascription of powers to objects has considerable instrumental value, even if it sits rather uneasily with Hume’s insistence that the corresponding idea has a subjective source. Indeed his own ultimate position remains philosophically rather elusive, appearing to be more than mere instrumentalism — else why insist on finding an impression to clarify the idea? — but at the same time seeming to deny the literal meaningfulness of ascribing that clarified idea to objects (e.g. *T* 164–8, 266–7, *E* 77, 93). Whether there is coherent position here is certainly debatable, for literal ascription to objects appears to be required in order to reap the scientific rewards (a disanalogy with the easier cases of secondary and moral qualities, where objective ascription plays no such instrumental role). All this perhaps explains why the exegetical debate has proved so intractable: Hume’s position combines elements that seem to imply literal ascription of powers to objects, with other elements that seem to contradict it.

### 9.3 The Reasoning of Peasants, Infants, and Brute Beasts

Having completed his abstract philosophical arguments for the thesis that factual inferences are not founded on Reason, Hume ends Section IV with a relatively down-to-earth parting shot:

It is certain, that the most ignorant and stupid peasants, nay infants, nay even brute beasts, improve by experience, and learn the qualities of natural objects, by observing the effects, which result from them. . . . If you assert, therefore, that the understanding of [a] child is led [to draw inferences about the future] by any process of argument or ratiocination, I may justly require you to produce that argument . . . You cannot say, that the argument is abstruse, and may possibly escape your enquiry; since you confess, that it is obvious to the capacity of a mere infant. If you hesitate, therefore . . . or . . . produce any intricate or profound argument, you . . . give up the question, and confess, that it is not reasoning which engages us to suppose the past resembling the future, and to expect similar effects from causes, which are, to appearance, similar. This is the proposition which I intended to enforce in the present section. (*E* 39)

This is effective rhetoric, but its philosophical significance is less clear, for of course the inductive rationalist is unlikely to claim that infants base their expectations on Reason. Rather, he will concede that infants are supplied (by God, perhaps) with appropriate instincts which initially govern their thinking, but he will maintain that these instincts are, or can be, supplanted by Reason as that faculty develops. Hume’s parting shot, then, has little force unless it is supplemented by other considerations such as the desirability of a simple and uniform theory of all human and animal reasoning. It is therefore worth noting that precisely this point is

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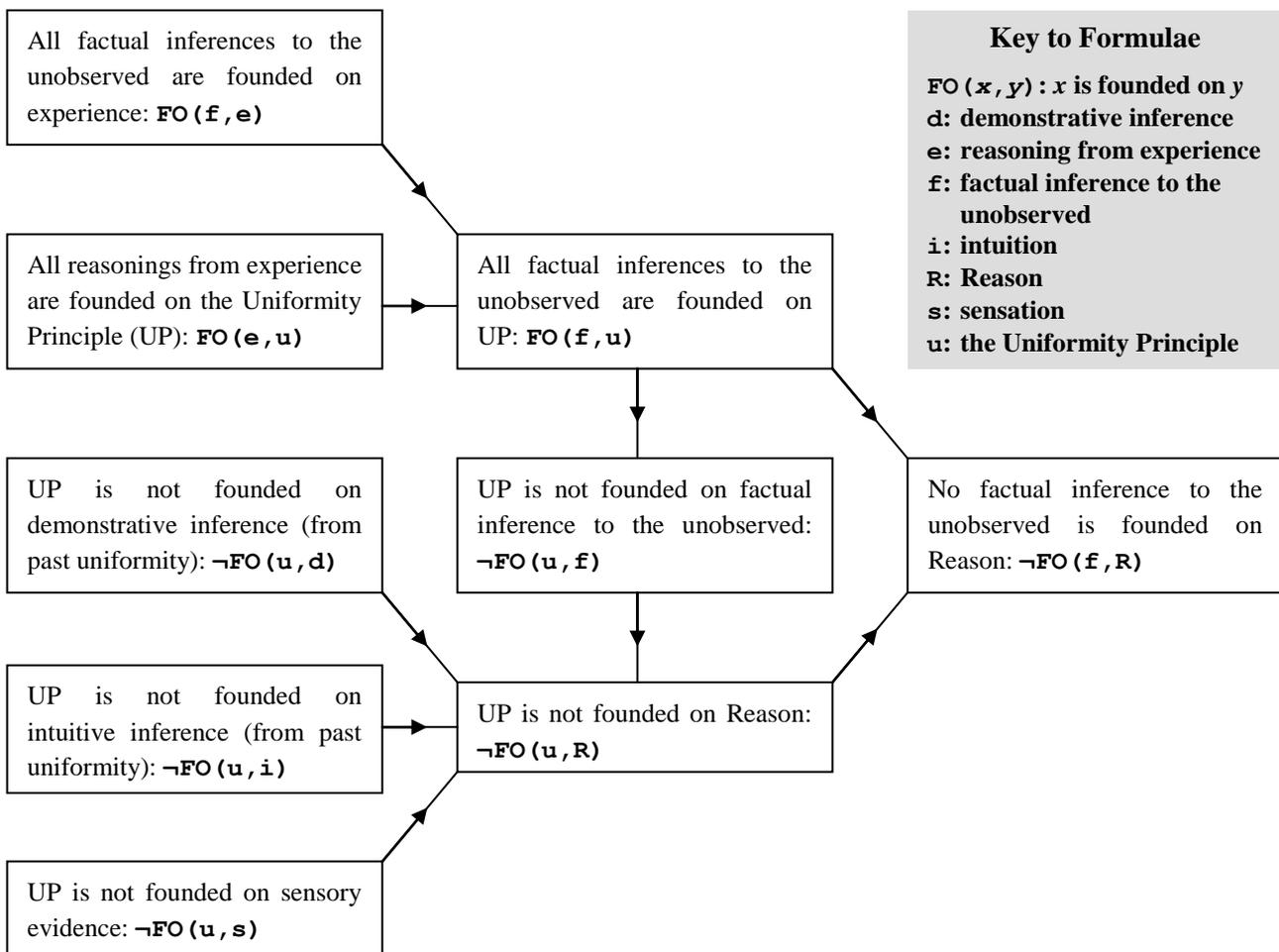
<sup>55</sup> Cf. *A* 656 and *E* 62, 77‡n. The synonymy of ‘power’ and ‘necessary connexion’ is made particularly explicit in the original title of *Enquiry* VII: ‘Of the Idea of Power, or Necessary Connexion’.

emphasized by Hume later in the *Enquiry*, in the important but relatively neglected Section IX, ‘Of the Reason of Animals’ (itself a descendant of the similarly titled Section I. iii. 16 of the *Treatise*).

## 10. The Logic of Hume’s Argument

We can now at last put together a complete detailed structure diagram of Hume’s argument in Section IV of the *Enquiry*, which is shown in the appendix to this paper followed by a table setting out, for each numbered proposition in the structure diagram, those precise passages of the *Enquiry* text that I have interpreted as stating (or in two cases merely implying) that very proposition. The diagram and table together prove clearly, I hope, that the interpretation I am advancing is based squarely on Hume’s text.<sup>56</sup>

The purpose of the present section, however, is to analyse the underlying logic of Hume’s argument, and for this it will be more fruitful to consider a simplified version of its structure (albeit one that is straightforwardly derived from the detailed diagram), in which all of the principal stages are expressed in terms of Hume’s ‘founded on’ relation. This also facilitates easy reference to these stages through semi-formal abbreviation, using symbols which will I hope will be fairly self-explanatory:



<sup>56</sup> For a detailed comparison with Stove’s well-known (but seriously deficient) structure diagram, see Millican, ‘Hume’s Argument Concerning Induction’, 118–24. The same article goes on (pp. 124–6) to discuss and criticize Stove’s formal interpretation of Hume’s conclusion.

## A logical sketch of Hume's argument in *Enquiry IV*

This diagram shows how Hume's argument pivots around the Uniformity Principle, and also reveals clearly its fundamental dependence on the logic of the 'founded on' relation, which underlies all of its major stages. This logic is manifested in the following four conditional formulae, which together fully account for the inferential structure represented in the diagram:

$$(f1) \quad FO(f, e) \ \& \ FO(e, u) \ \rightarrow \ FO(f, u)$$

$$(f2) \quad FO(f, u) \ \rightarrow \ \neg FO(u, f)$$

$$(f3) \quad \neg FO(u, s) \ \& \ \neg FO(u, i) \ \& \ \neg FO(u, d) \ \& \ \neg FO(u, f) \ \rightarrow \ \neg FO(u, R)$$

$$(f4) \quad FO(f, u) \ \& \ \neg FO(u, R) \ \rightarrow \ \neg FO(f, R)$$

The third of these carries obvious implications for Hume's notion of Reason, which will be discussed later (in §10.3). But the other three formulae seem to exemplify more general logical properties of the 'founded on' relation, providing important constraints on its interpretation. Let us take these in turn, before going on to discuss what that relation might mean in the light of these constraints.

### 10.1 The Logic of Hume's 'Founded On' Relation

(f1), the first formula listed above, appears to be a straightforward instance of *transitivity*, indicating that Hume takes 'founded on' to be in general a transitive relation,<sup>57</sup> just as we might expect given the nature of the foundational metaphor. Moreover this transitivity is clearly the key inferential mechanism in the first half of Hume's argument, which instantiates a typical transitive chain: factual inference is founded on causal reasoning, which is founded on reasoning from experience, which is founded on the Uniformity Principle, and from this Hume takes it to follow that factual inference is founded on the Uniformity Principle.

(f2) is equally straightforward and unsurprising, indicating that Hume takes the 'founded on' relation to be *asymmetric*,<sup>58</sup> which again is just what would be expected from the foundational metaphor. Indeed given the transitivity of the 'founded on' relation, its asymmetry follows immediately from the fact that nothing can be founded on itself (i.e. the 'founded on' relation is *irreflexive*).<sup>59</sup> This evidently provides the logical basis for Hume's denial that the Uniformity Principle can be founded on factual inference, for it explains why such a breach of asymmetry would imply a breach of irreflexivity, and hence would be 'going in a circle, and taking that for granted, which is the very point in question' (E 36).

Formula (f4), however, is altogether more perplexing, since although it may appear at first glance to have a broadly transitive character, in fact the pattern of inference that it instantiates seriously conflicts with

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<sup>57</sup> A relation is *transitive* if whenever  $x$  bears the relation to  $y$ , and  $y$  to  $z$ , it follows that  $x$  bears the relation to  $z$ . Examples of transitive relations include equivalence relations (e.g. 'equal in height to'), weak ordering relations (e.g. 'no greater than', 'at least as tall as'), and strict ordering relations (e.g. 'less than', 'heavier than', 'descended from').

<sup>58</sup> A relation is *asymmetric* if whenever  $x$  bears the relation to  $y$ , it follows that  $y$  *does not* bear the relation to  $x$ . Examples of asymmetric relations include those in which the two relata fall into different categories (e.g. 'husband of') and strict ordering relations. Transitivity and asymmetry together imply that 'founded on' is itself a strict ordering relation.

<sup>59</sup> If a relation is not asymmetric, then there is at least one pair  $x$  and  $y$  such that  $x$  bears the relation to  $y$  and also  $y$  bears the relation to  $x$ . But if this is so, then the transitivity of the relation would immediately imply that  $x$  bears the relation to  $x$ , and  $y$  to  $y$ , which would mean that the relation could not be irreflexive.

transitivity and asymmetry,<sup>60</sup> and is anyway not one that Hume accepts in general. To see this, consider a similar formula but with reasoning from experience (e) substituted in place of Reason (R):

$$FO(f, u) \ \& \ \neg FO(u, e) \ \rightarrow \ \neg FO(f, e)$$

Hume would certainly accept the antecedent of this conditional, that factual inference is founded on the Uniformity Principle and that the Uniformity Principle is not founded on reasoning from experience.<sup>61</sup> But he would equally certainly deny its consequent, which contradicts his frequent claim that all factual inference is founded on (reasoning from) experience. So unlike the relatively straightforward (f1) and (f2), formula (f4) leaves us with a genuine puzzle about what is going on in the logic of Hume's argument. It might seem that he must be guilty of an error here, perhaps mistaking the logic of his 'founded on' relation or failing to apply it consistently, or perhaps equivocating on the relation's meaning, in which case presumably his argument might be vitiated by this ambiguity in its central notion. Fortunately, however, the puzzle can be resolved by investigating just what Hume means by the relation, and this resolution will turn out to be more subtle and far less damaging than these unpalatable alternatives would suggest.

Hume talks of the 'founded on' relation as connecting a wide range of different types of thing — beliefs, conclusions, principles, relations, inferences, types of inference, faculties, even 'experience' — and he himself provides a variety of different paraphrases for it. He repeatedly states, for example, that:

- (a) All factual inferences 'are founded on the relation of cause and effect' (E 27, 32; cf. E 35). This is paraphrased in terms of such reasoning requiring 'knowledge of cause and effect' (E 27; cf. E 35).
- (b) All our reasonings and conclusions concerning cause and effect 'are founded entirely on experience' (E 164; cf. E 32). This is paraphrased as 'our knowledge of [cause and effect] is derived entirely from experience' (E 35).
- (c) All inferences from experience 'are founded on the supposition of [the] resemblance of the past to the future' (E 38; cf. E 104). This is paraphrased as 'all our experimental conclusions proceed upon the supposition, that the future will be conformable to the past' (E 35).
- (d) Factual inferences 'are *not* founded on reasoning, or any process of the understanding' (E 32). This is paraphrased by saying that in all such inferences, 'there is a step taken by the mind, which is not supported by any argument or process of the understanding' (E 41).

What seems to be in common to all of these is the issue of the *source of authority* for the beliefs, theories, inferences, and inferential methods whose foundation is in question. Accordingly, when Hume states that one thing 'is founded on' another, I suggest he means that it *derives its authority* from that other. This suggestion is corroborated by his sometimes using precisely this sort of language to express his familiar claim that all factual inferences are 'founded on' experience:

None of [the sciences or arts] can go beyond experience, or establish any principles which are not founded on that authority. (T xviii)

It is experience only, which gives authority to human testimony; and it is the same experience, which assures us of the laws of nature. (E 127)

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<sup>60</sup> Even if the three substituted terms are required to be distinct, it generates an inconsistency with asymmetry whenever one term is founded on two others or (given transitivity) whenever one term is founded on a second which is in turn founded on a third.

<sup>61</sup> That the Uniformity Principle is not founded on reasoning from experience follows immediately from the asymmetry of the 'founded on' relation, given that reasoning from experience is founded on the Uniformity Principle.

Moreover if this is indeed what Hume means by ‘founded on’, then it explains why he should take for granted that it is a transitive relation, because if *X* derives its authority from *Y*, and *Y* derives its authority from *Z*, then it will indeed be true that *X* derives its authority, albeit indirectly, from *Z* — authority is (so to speak) passed down the chain, a metaphor which Hume himself uses in a related context:

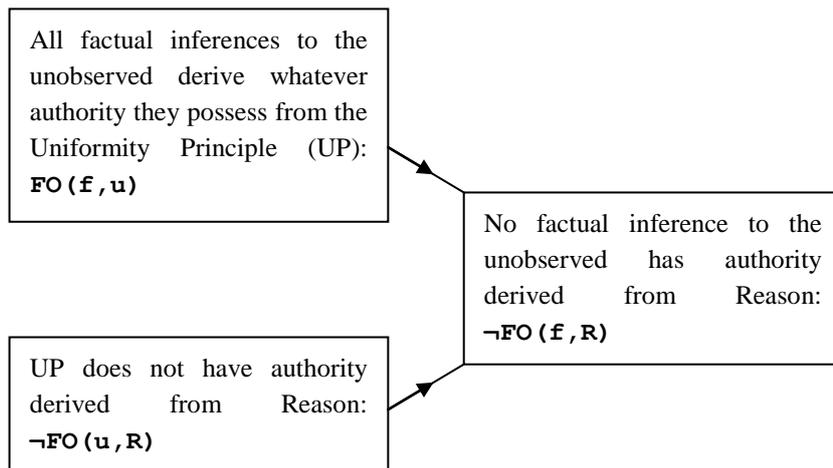
’Tis obvious all this chain of argument or connexion of causes and effects, is at first founded on those characters or letters, which are seen or remember’d, and that without the authority either of the memory or senses our whole reasoning wou’d be chimerical and without foundation. Every link of the chain wou’d in that case hang upon another; but there wou’d not be any thing fix’d to one end of it, capable of sustaining the whole; and consequently there wou’d be no belief nor evidence. (*T* 83; cf. *E* 46)

This, then, accounts for the ‘transitive’ part of Hume’s reasoning: if factual inference derives its authority from reasoning concerning cause and effect, and that derives its authority from experiential reasoning, and that derives its authority from the Uniformity Principle, then it will indeed be true that factual inference derives its authority (albeit indirectly) from the Uniformity Principle.

It is equally easy, on these terms, to explain the ‘asymmetric’ part of Hume’s reasoning represented by formula (ƒ2), for clearly two things cannot each derive their authority from the other. But as we have seen, this straightforward logic changes when Hume comes to consider, later in the argument, the question of whether the Uniformity Principle (and hence factual inference) is founded on, or derives its authority from, Reason. This happens, I suggest, because Reason is here the *ultimate source* of the relevant authority, so that an assertion or denial of its sanction is very naturally understood as implying more than a mere assertion or denial of possible derivative authority. The subtle shift of meaning can be illustrated by spelling out examples of the two types of assertion side by side:

- |                    |   |
|--------------------|---|
| (1)                | Factual reasoning is founded on the Uniformity Principle  |
| <i>means</i>       | Factual reasoning derives its authority from the Uniformity Principle                           |
| <i>which means</i> | Factual reasoning derives <i>whatever authority it possesses</i> from the Uniformity Principle. |
|                    |   |
| (2)                | The Uniformity Principle is founded on Reason   |
| <i>means</i>       | The Uniformity Principle derives its authority from Reason                                      |
| <i>which means</i> | The Uniformity Principle <i>has authority</i> derived from Reason.                              |

This fundamental but subtle difference fully legitimates Hume’s reasoning, and without supposing him to be guilty of any crude equivocation in his use of the ‘founded on’ relation. For thus interpreted the step in his argument represented by formula (ƒ4) turns out to be clearly valid:



Interpreting Hume’s ‘founded on’ relation in terms of the derivation of rational authority — a manifestly normative notion — thus fully explains the logic of his argument, which as we shall see (in §10.3) provides strong grounds for preferring an unambiguously normative interpretation of that argument to the recently fashionable causal and computational alternatives.

## 10.2 The Role and Nature of the Uniformity Principle

Before moving on to this larger topic, however, let us consider the role of the Uniformity Principle within the argument, a question which has been debated by commentators in terms of what kind of ‘presupposition’ for induction Hume takes the principle to provide. The discussion above provides a clear, though partial, answer: induction ‘presupposes’ the Uniformity Principle in the sense that any rational authority which inductive inferences have must be derived from that principle — in other words, *inductive inferences can be rationally founded only if the Uniformity Principle is itself rationally founded*. This answer, however, leaves undetermined both what Hume understands by rational foundedness, and also what account he might give of the supposed dependence of induction on the Uniformity Principle.

Historically by far the most popular account of these matters is that Hume operates with a deductivist conception of Reason, and accordingly takes the Uniformity Principle to be presupposed by inductive inferences in the sense of its being an implicit premiss which is required to transform them into deductions. As Stove puts it: ‘Inductive arguments are all invalid as they stand, and it would be necessary, in order to turn them into valid arguments, to add to their premisses a proposition which asserts that unobserved instances resemble observed ones.’<sup>62</sup> The central thrust of Hume’s argument, on this account, is that the non-provability of the Uniformity Principle — and hence the non-availability of this essential implicit premiss — exposes any inductive inference as ‘a broken-backed syllogism, crippled for lack of a suitable middle term’.<sup>63</sup>

Despite its popularity with commentators, however, this account has little to recommend it. First, it is questionable whether Hume sees the Uniformity Principle as functioning as a missing *premiss* of inductive reasoning — in the *Treatise*, not only does he deny that it typically plays any relevant psychological role:

the understanding or imagination can draw inferences from past experience, without reflecting on [the Uniformity Principle]; much more without forming any principle concerning it, or reasoning upon that principle (*T* 104)

<sup>62</sup> Stove, *Probability and Hume’s Inductive Scepticism*, 43.

<sup>63</sup> Flew, *Hume’s Philosophy of Belief*, 81.

but also, he seems to deny that this lack is inferentially problematic:

we may exert our reason without employing more than two ideas, and without having recourse to a third to serve as a medium betwixt them. We infer a cause immediately from its effect; and this inference is not only a true species of reasoning, but the strongest of all others, and more convincing than when we interpose another idea to connect the two extremes. (*T* 96†n.)

Secondly, even if Hume does indeed see the Uniformity Principle as an implicit ‘medium’ connecting the observational premiss of an inductive inference with its conclusion,<sup>64</sup> this does not in the least imply that the resulting connection must be *deductive*, for as we saw in §2 above, the Lockean ‘logic’ that Hume inherited employed the notion of a ‘medium’ or ‘proof’ as much within ‘probable’ as within ‘demonstrative’ reasoning.<sup>65</sup> Thirdly, the Uniformity Principle as Hume presents it in the *Enquiry* (quoted in §3.2 above) is anyway far too vague to serve as a plausible *deductive* link between the premisses and conclusion of an inductive inference.<sup>66</sup> Fourthly, it seems extremely unlikely that Hume intended the principle to provide any such deductive (and hence infallible) connexion, for he clearly recognizes that inductions are incurably fallible *even on the supposition that nature is uniform*, since we can never be certain that we have taken all relevant causal factors into account (e.g. *T* 175, *E* 86–7). Finally, as we shall see below (in §10.3), there are strong independent grounds for denying that Hume employs a deductivist concept of Reason within his famous argument, since in one of its main stages (propositions (13) and (16) in the structure diagram) he explicitly canvasses the possibility of a ‘probable’ argument for the Uniformity Principle.

Perhaps the best way to approach an alternative account of the role of the Uniformity Principle is to ask ourselves the very question to which Hume takes that principle to be the answer: what exactly *is* being ‘presupposed’ by someone who performs a factual inference from observed to unobserved? One modest and presumably fairly uncontroversial answer to this question is as follows: when we inductively extrapolate from observed to unobserved (for brevity, from ‘past’ to ‘future’), we are presupposing that past instances are *evidentially relevant* to future instances, or in other words, that the nature of past instances gives some evidence concerning the nature of future instances. This is not all, however, for we also suppose that the evidence provided by past instances is *positively* relevant, in that future instances are likely to *resemble* past instances rather than, for example, contrasting with them. Hence any inductive inference takes for granted that past instances have a *positive evidential relevance* to future instances. This presupposition can very naturally, though loosely, be expressed by saying that *future instances can be expected to resemble past instances* (cf. *T* 89), that *the future will be conformable to the past* (*E* 35), that *the past is a rule for the future* (cf. *E* 38), and so on. I suggest, therefore, the following interpretation: when Hume claims that inductive inferences are founded on the Uniformity Principle, he is simply making the straightforward point that any inductive argument, *by its very nature*, treats past instances as *positively evidentially relevant* to future instances. This

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<sup>64</sup> Although Flew (ibid. 70–1) takes Hume to be speaking of the Uniformity Principle as providing such a ‘medium’, in fact Hume uses the term only in the context of demanding an argument *for* the Uniformity Principle based on past experience (*E* 34, 37).

<sup>65</sup> As further corroboration, Locke uses the term ‘probable *Mediums*’ at Essay IV. xvii. 16, and at *D* 143 Hume speaks of ‘mediums’ that ‘reach no farther . . . than experience [revised at one stage to “moral evidence”] and probability’. The tendency of commentators to jump to a deductivist interpretation of Hume’s argument simply because they take the Uniformity Principle to be functioning as an unavailable ‘medium’ is thus seriously anachronistic given the 18th-century background of Lockean ‘logic’ — if anything it reveals their own deductivist prejudices (presumably inherited from Aristotle via Frege) rather than Hume’s.

<sup>66</sup> The more explicit principle of the *Treatise* (quoted in the next footnote) might seem to be capable of providing such a link, but only if it were so specific as to be clearly false in general, given that (as Hume recognized) inductions are incurably fallible.

interpretation makes good sense of Hume's claim and the various ways in which he expresses it, explains why he thought it too obvious to require further elaboration, and also neatly reconciles his denial of the Uniformity Principle's conscious psychological role (*T* 104, quoted above) with his claim that it nevertheless represents 'a step taken by the mind . . . in all reasonings from experience' (*E* 41).<sup>67</sup> The Uniformity Principle functions within inductive inference not so much as a propositional premiss (whether implicit or explicit), but rather as the underlying rationale of any such inference, a principle whose adoption we *manifest* every time we treat the past as positive evidence regarding the future.<sup>68</sup>

### 10.3 The Logic of 'Reason' in Hume's Argument

We are now at last in a position to address and, I hope, to settle conclusively what is perhaps the most important interpretative controversy surrounding Hume's argument concerning induction: what does Hume mean by 'reason' within that argument, and in particular within its celebrated conclusion that induction 'is not founded on reason'? It will come as no surprise that I take Hume to be employing here the traditional perceptual notion of Reason, and accordingly interpret his conclusion as essentially a denial that induction is based on any form of *rational perception*, whether direct or mediated by inference. The most obvious evidence in favour of this interpretation is simply the contemporary dominance of this perceptual notion (as sketched in §2 above) together with the appropriateness of Hume's argument as a means of undermining it — for example his emphasis on the impossibility of 'seeing' the effect within the cause (§4.1), and his conclusion that induction is founded on the instinctive operation of custom rather than on any perceptible rational connexion (§8). Another significant virtue of this interpretation is to explain why Hume should have singled out *induction* in particular for this type of sceptical treatment. He was well aware that a Cartesian challenge could be mounted against intuition, demonstration, and sensation (*E* 149–50, 152–4), and that the impossibility of a non-circular justification of our faculties is by no means peculiar to induction. His special interest in induction, I suggest, is accounted for by his feeling able to prove conclusively of it alone — and without recourse to any

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<sup>67</sup> The *Treatise* is less committal about whether the Uniformity Principle is typically involved at all in inductive inference, stating only that 'If reason determin'd us' to make such inferences, *then* 'it wou'd proceed upon that principle' (*T* 89, my emphasis). I suggest that this is because Hume here views the principle as being an explicit proposition 'that instances, of which we have had no experience, must resemble those, of which we have had experience, and that the course of nature continues always uniformly the same' (*T* 89) — a proposition which he rightly takes to play no conscious role within most inductive inference. His more subtle approach in the *Enquiry*, which treats the presumption of uniformity as a relatively vague evidential principle whose adoption is *manifested* in our inferential practice (rather than as an explicit proposition which may or may not be consciously contemplated) fits nicely with his discussion of the idea of necessity, which even in the *Treatise* he had accounted for in an almost exactly corresponding way (as presaged by his suggestion at *T* 88 that 'the necessary connexion depends on the inference').

<sup>68</sup> This interpretation also removes what can seem an inconsistency in Hume's thought, by distinguishing between the Uniformity Principle (which *cannot* itself be founded on experience, on pain of circularity) and the superficially similar principle that 'the same cause always produces the same effect', which Hume says 'we derive from experience' and can then use as a basis for drawing a general conclusion even from a single, carefully controlled experiment (*T* 173–4; cf. *T* 104–5, 131, *E* 107‡n.). The latter principle is concerned with the *consistency* of events within our experience rather than the *evidential relevance* of observed to unobserved. But without the presupposition of evidential relevance, such consistency could not of course be extrapolated from past to future.

extreme Cartesian scepticism about our faculties in general — that it is utterly beyond the reach of any form of *perceptual* justification.<sup>69</sup>

Although these considerations show that Hume’s argument makes good sense interpreted as an assault on the Lockean perceptual view of ‘probable’ Reason, they do not by themselves rule out alternative interpretations. What I now intend to show is that the structure and logic of Hume’s argument, as examined above, are seriously inconsistent with the various alternative interpretations that have hitherto been proposed. The most prominent of these alternatives are: (a) the ‘deductivist’ interpretation most strongly advocated by Flew and Stove, according to which Hume’s argument is intended to show that induction cannot yield the absolute certainty characteristic of deductive Reason; (b) the ‘anti-deductivist’ account of Beauchamp *et al.*, Arnold, and Baier, which sees the argument as following a similar logic but with the intention of undermining that deductivist concept of Reason rather than endorsing it; and (c) the ‘no argument’ interpretation of Garrett and Noonan, which takes the argument to be denying that our use of the method of inductive inference is caused by any higher-level *reasoning* (i.e. argument or ratiocination) about that method.<sup>70</sup> All of these imply that Hume’s denial of a rational foundation for induction is in some way limited — in the case of (a) and (b), by restricting attention to forms of evidence that yield absolute certainty, and in the case of (c), by focusing only on forms of evidence that involve inference. Hence all of them fail to provide a full account of the structure of that part of Hume’s argument which was explored in §§6 and 7 above, and represented in §10 by the formula:

$$(f3) \quad \neg FO(u, s) \ \& \ \neg FO(u, i) \ \& \ \neg FO(u, d) \ \& \ \neg FO(u, f) \ \rightarrow \ \neg FO(u, R)$$

As this formula indicates and as we saw in detail earlier, when Hume discusses the rational credentials of the Uniformity Principle he in turn rules out *four* potential sources of evidence: sensation, intuition, demonstration, and factual inference. The first two of these are directly perceptual rather than inferential (and should therefore be irrelevant to his purposes if the ‘no argument’ interpretation were correct), while the last of them cannot yield absolute certainty (and should therefore be irrelevant if either the ‘deductivist’ or the ‘anti-deductivist’ interpretation were correct). Defenders of these interpretations might be tempted to dismiss this sort of objection by alleging carelessness or superfluity in Hume’s discussion, but a significant passage from *A Letter from a Gentleman to his Friend in Edinburgh*, written by Hume in exactly the period when he was working on the *Enquiry*, strongly indicates that on the contrary, his selection of these four potential sources of evidence is entirely deliberate: ‘It is common for Philosophers to distinguish the Kinds of Evidence into *intuitive*,

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<sup>69</sup> In the *Treatise* (IV. i. 1 and IV. i. 2 respectively) Hume does apply a somewhat similar sceptical treatment to demonstration and sensation, and draws a similar moral, that these are based on the instinctive idea-enlivening operations of the imagination rather than on rational perception (a point emphasised at *T* 265). It is an interesting question whether the moderation of such scepticism in the *Enquiry* is philosophically or merely strategically motivated, but certainly his inductive scepticism in the *Enquiry* has proved to be far more pointed and effective for being dissociated from scepticism about these other, more perceptual, cognitive operations.

<sup>70</sup> As well as the ‘causal’ variant of this interpretation, emphasized here, there is a ‘computational’ variant which takes Hume to be arguing that our induction inferences are typically immediate and unreflective rather than involving intermediate steps or significant ratiocination. Garrett (*Cognition and Commitment in Hume’s Philosophy*) and Noonan (*Hume on Knowledge*) favour the causal variant, Connon (‘The Naturalism of Hume Revisited’), Broughton (‘Hume’s Scepticism about Causal Inferences’), and Owen (*Hume’s Reason*) the computational. ‘No argument’ is potentially a misleading nickname for the interpretation, given that in Hume’s day ‘argument’ could mean not only ‘process of reasoning’ but also ‘proof’, ‘evidence’, or ‘reason’ (*Oxford English Dictionary*), so when he writes that induction is not founded on ‘argument’, we cannot take for granted that he is using the word in its primary modern sense. ‘No ratiocination’ would be a more precise nickname for what is intended by the interpretation’s proponents.

*demonstrative, sensible, and moral*' (L 22). Hume's argument is carefully designed to rule out every potential 'kind of evidence' for the Uniformity Principle that might be thought to be available on the conventional, perceptual view of Reason. And so the kinds of evidence that he considers are not restricted either to those that yield absolute certainty, or to those that are inferential.<sup>71</sup> For convenient reference, we might therefore appropriately call this the 'no reason whatever' interpretation.

So far I have made the case in favour of this interpretation on the basis of what Hume *does* say in his argument, but it can also be pressed strongly on the basis of what he *does not* say. To take the 'deductivist' and 'anti-deductivist' interpretations first, *if* (as these interpretations would imply) Hume's concern in *Enquiry* IV were simply to deny that induction can yield absolute deductive certainty, *then* it would be astonishing that he should have overlooked the possibility of proving this concisely and elegantly in almost a single step, using his argument from distinct conceivability. For given any factual inference to the unobserved, no matter what its observational premisses might be, we can always distinctly conceive a change in the course of nature which would result in the falsehood of its hitherto unobserved conclusion; and this conceivability is by itself more than sufficient on Humean principles to rule out immediately any prospect of finding a deductive guarantee for such an inference. This simple proof is so characteristically Humean in structure, style, and content (cf. *E* 35, 164, *D* 189) that it surely could not have escaped the great sceptic's notice had it been sufficient for his purposes. So the fact that he instead develops an argument of considerable sophistication, in which he takes such pains to explore and dismiss in turn a variety of possible sources of inductive warrant including at least one (namely 'probable' reasoning) which on deductivist principles is patently worthless, provides compelling evidence that the conclusion which he seeks goes well beyond the reach of this crude deductivist 'hole in one'.<sup>72</sup>

Turning now to the 'no argument' interpretation, on this account the most surprising omission from Hume's discussion is any serious consideration of *faulty* (e.g. incomplete, question-begging, or simply fallacious) arguments on which the Uniformity Principle, and hence our use of induction, might be founded. For if, as this interpretation maintains, Hume's purpose is purely to deny that we are *caused* to reason inductively through the influence of some higher-level argument or ratiocination, then to restrict his attention here to *good* arguments, as though only these could possibly have any causal influence upon us, would seem to manifest a most un-Humean rationalist prejudice.<sup>73</sup> And indeed it is hard to see why he should presume that this causal impact of our belief in the Uniformity Principle (whether mediated by means of a good or a bad

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<sup>71</sup> Moreover the context of the *Letter* does make clear that Hume uses 'evidence' here in its modern sense, as referring to a source of epistemic support, for on the same page he talks of an opinion's being 'supported by *moral Evidence*'. Hence I disagree with Garrett's claim (*Cognition and Commitment in Hume's Philosophy*, 228) that 'Hume . . . consistently uses ["evidence"] to mean "evidentness" — that is, as equivalent to "belief", "assurance", or "vivacity", construed as properties of ideas.' This is arguable as an interpretation of that term in the *Treatise*, but seems quite wrong in relation to the *Enquiry*, for example Hume's use of the term at *E* 26–7 and throughout Section X.

<sup>72</sup> In addition to the criticisms presented in this section, I have already extensively attacked (in §10.2) the 'unavailable deductive medium' view of the Uniformity Principle which constitutes a central plank of both the 'deductivist' and 'anti-deductivist' interpretations as these are usually presented. Hence I shall devote most attention here to the 'no argument' interpretation.

<sup>73</sup> Likewise, on what I have called the 'computational' variant of the 'no argument' interpretation, it is hard to understand why Hume should restrict his attention to 'intermediate ideas' that are well-founded. The Uniformity Principle can potentially play such a role in ratiocination however it may have come into our minds, so if Hume's primary concern in his argument is to deny that it (or any other intermediate idea) does so, then his discussion of the possible sources of evidence for it is largely irrelevant except on the extremely un-Humean assumption that we are incapable of having irrational or inferentially unfounded beliefs.

argument) should in any way imply that it itself is founded on some *further* argument.<sup>74</sup> To illustrate these points, here are a few higher-level reasonings that might, for all that is said in Hume's famous argument, *cause* us either to reason inductively or to accept the Uniformity Principle:

- (1) (I just happen to find myself believing that) the future will resemble the past. But if the future resembles the past, then induction can be relied on. Therefore induction can indeed be relied on.
- (2) God has implanted in me a tendency to believe that the future will resemble the past. God is no deceiver. Therefore the future will resemble the past.
- (3) In the past, it has always turned out that hitherto unobserved objects tended to resemble previously observed objects. Hence in the future it can be expected that unobserved objects will resemble observed objects.
- (4) The observed regular behaviour of objects indicates that they have intrinsic essences which necessitate them to behave and to appear as they do. Given that such essences exist, it follows that there must be a consistent relationship between objects' appearances and their behaviour. Hence the relationships observed in the past will continue into the future.

Hume's reaction to all of these is entirely predictable, and he would, of course, be quite unimpressed. In the first case he would refuse to accept our belief in uniformity as a bare fact, and would express his 'sifting humour' by questioning its foundation (*E* 32–3). In the second, he would no doubt criticize the 'unexpected circuit' of our reliance on God's veracity, perhaps on the grounds that if induction 'be once called in question, we shall be at a loss to find arguments, by which we may prove the existence of that Being or any of his attributes.' (*E* 153). In the third case, he would certainly object to the argument's circularity (*E* 35–6). In the fourth, he would reject our talk of intrinsic necessitating 'essences' as incomprehensible (*A* 649, *E* 73–7) and would go on to point out that the extrapolation of objects' causal powers into the future, in the context of an argument for induction, then becomes question-begging (*E* 36–8). But on the 'no argument' interpretation, all of these predictable responses would be completely beside the point, for although they indeed identify logical inadequacies in the proffered arguments,<sup>75</sup> they do nothing whatever to prove that such arguments can play no *causal* role in the explanation of (some, if not all, of) our inductive behaviour. Moreover the author of *Treatise* I. iii. 13 and of *Enquiry* VII could hardly fail to appreciate this, for he, of all people, could never suppose it to be an a priori truth that only good arguments can motivate us (cf. *T* 143–7), nor could he consider it

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<sup>74</sup> Noonan (*Hume on Knowledge*) tries to fill the resulting hole in what he takes to be Hume's argument as follows: 'We could not be caused to engage in the practice of inductive inference by our acceptance of an argument, a premiss of which was the Uniformity Principle, unless we also had available an argument *for* the Uniformity Principle (for we could not believe in the Uniformity Principle, antecedently to acquiring a disposition to engage in inductive inference, except on the basis of argument).' (pp. 119–20). Suffice it to say that on Humean principles, both of Noonan's 'could not' claims seem to be entirely gratuitous.

<sup>75</sup> That Hume has his eye set firmly on questions of rational warrant rather than causal explanation, even in the *Treatise*, is particularly clear in his response to (4) above, in what I have called (in §9) the 'coda' to his argument. There, at *T* 90–1, he speaks for example of 'solid' and 'weak' reasoning, discusses whether one proposition 'can' (or 'can never') 'prove' another, and gives the fact that 'the foregoing reasoning had no just foundation' as a decisive ground for concluding that the reasoning in question cannot constitute a basis in Reason for our inductive inferences.

appropriate to investigate any issue of psychological causation through abstract discussion of arguments' merits rather than concrete empirical observation (cf. *E* 67–9).<sup>76</sup>

A related objection to the logic of the 'no argument' interpretation can be developed by reference to the discussion of Hume's 'founded on' relation in §10.1 above. Here the two most relevant formulae are these:

$$(f1) \quad FO(f, e) \ \& \ FO(e, u) \ \rightarrow \ FO(f, u)$$

$$(f4) \quad FO(f, u) \ \& \ \neg FO(u, R) \ \rightarrow \ \neg FO(f, R)$$

On the 'no argument' interpretation, the 'founded on' relation is supposed to involve causation rather than the derivation of rational authority, so 'FO(f, e)' is presumably to be read as 'Factual inference to the unobserved is caused by reasoning from experience'.<sup>77</sup> However an abstraction such as the Uniformity Principle is not the sort of thing that can have direct causal influence, so if 'founded on' is to be understood in this way, it follows that 'u' cannot be taken as standing for the Uniformity Principle itself, but must instead mean something like *reasoning that invokes the Uniformity Principle*. Translating accordingly, the causal variant of formula (f1) turns out like this:

(f1c) If factual inference to the unobserved is caused by reasoning from experience, and reasoning from experience is caused by reasoning that invokes the Uniformity Principle, then factual inference to the unobserved is caused by reasoning that invokes the Uniformity Principle.

This might seem satisfactory, because the transitivity which is characteristic of causal relations makes (f1c) plausibly true (and the corresponding variant of formula (f2) is equally unproblematic). But moving on now to formula (f4), we must find a way of rendering ' $\neg FO(u, R)$ ' and ' $\neg FO(f, R)$ ' in causal terms. The latter is the ultimate conclusion of Hume's famous argument, and so consistency with the 'no argument' interpretation requires us to interpret these expressions as denials that the form of reasoning in question (respectively reasoning that invokes the Uniformity Principle, and factual inference to the unobserved) is itself caused by (further) reasoning. Hence we reach:

(f4c) If factual inference to the unobserved is caused by reasoning that invokes the Uniformity Principle, and reasoning that invokes the Uniformity Principle is not caused by (further) reasoning, then factual inference to the unobserved is not caused by (further) reasoning.

However (f4c) is logically quite inadequate to play its required role. First, it does nothing to solve the 'puzzle' mentioned in §10.1, for it provides no apparent explanation of why the form of conditional:

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<sup>76</sup> Hume's discussions of induction do admittedly include what would be on this interpretation two highly appropriate empirical observations. First, at *T* 103–4 (cf. *E* 54), where he remarks that we characteristically draw inductive conclusions immediately and unreflectively, even in cases where we have never before reflected on the relevant uniformity. And secondly, at *E* 39 (in what §9.3 above calls his 'parting shot'), where he points out that infants and animals universally make use of inductive prediction even though they are clearly in no position to understand, let alone to frame for themselves, higher-level arguments about it (cf. also *T* 178, *E* 106). In both cases these observations follow the statement of his famous argument, and he draws the moral that they corroborate the conclusion of that argument, but there is no sign that he views them as constituting essential, or even significant, parts of it.

<sup>77</sup> Here again I focus on the causal variant of the 'no argument' interpretation. The computational variant has even more trouble with the logic of Hume's argument, and indeed seems to be able to make sense of the 'founded on' relation only in conditional terms, so that 'FO(f, e)', for example, is rendered as something like 'if factual inference to the unobserved were to involve intermediate reasoning, then this would be reasoning from experience'. Not only is this extremely artificial, and without any obvious basis in the text of the *Enquiry*, but also it completely fails to explain the logic behind *either* (f1) *or* (f4).

$$FO(x, y) \ \& \ \neg FO(y, z) \ \rightarrow \ \neg FO(x, z)$$

which cannot in general be valid on Humean terms, should be thought acceptable in this instance. Secondly, it can seriously be questioned whether (f4c) as stated actually provides a legitimate instantiation of this (at least *superficially* plausible) form, because in the two propositions ‘reasoning that invokes the Uniformity Principle is not caused by (further) reasoning’ and ‘factual inference to the unobserved is not caused by (further) reasoning’, the phrase ‘(further) reasoning’ evidently refers to something different — in the former case it means *further reasoning beyond that which invokes the Uniformity Principle*, and in the latter it means *further reasoning beyond the factual inference to the unobserved*. Thirdly, and disastrously for the ‘no argument’ interpretation, the result of this equivocation is to make (f4c) not only invalid, but almost self-refuting. For if factual inference to the unobserved is caused by reasoning that invokes the Uniformity Principle, then it immediately follows that factual inference to the unobserved is indeed caused by ‘(further) reasoning’ — namely, that very reasoning which invokes the Uniformity Principle!<sup>78</sup>

The upshot of all this is that the structure of Hume’s argument concerning induction is no more comprehensible on the ‘no argument’ interpretation than it is on the ‘deductivist’ and ‘anti-deductivist’ interpretations. The latter are unable to explain why Hume’s reasoning is so complex, and in particular, why he takes the trouble even to consider the possibility of a ‘probable’ foundation for the Uniformity Principle. But on the ‘no argument’ interpretation a great deal of Hume’s discussion, including even his overall strategy of throwing light on inductive reasoning by examining its foundation through the Uniformity Principle, turns out to be not only irrelevant but also seriously fallacious. Given this damning verdict, it might naturally be wondered at this point whether my discussion of these rival interpretations has been somehow unfair or incomplete, overlooking some alternative way of understanding Hume’s language which would make good sense of everything he says in the appropriate terms. To address this possibility I can think of no better response than a Humean challenge: *if* anyone claims that there is some consistent and plausible way of understanding the logic of Hume’s argument in deductivist, anti-deductivist, causal, or computational terms, *then* let them spell out its logic in detail, making clear how the ‘founded on’ relation is to be understood, what logical properties (e.g. transitivity, asymmetry) this relation has, and how the structure of Hume’s argument, represented by the diagram in the appendix and/or formulae (f1) to (f4), can be made sense of in those terms. I hope I have proved that the interpretation presented here, which understands the ‘founded on’ relation in terms of the derivation of rational authority, and Reason as a supposed faculty that perceives evidential connexions (whether sensory, intuitive, demonstrative, or ‘probable’), is fully able to meet this challenge. But I am not aware of any other interpretation that even comes close to doing so.

## 11. The Nature of Hume’s Inductive Scepticism

It is clear that Hume saw the conclusion of his argument concerning induction as a sceptical result. The very title of Section IV, ‘Sceptical Doubts concerning the Operations of the Understanding’ strongly suggests this, and he then confirms it by providing an unambiguously ‘negative answer’ (E 32) to the doubts that he there raises (at E 158 he also refers back to the argument as presenting ‘sceptical objections to *moral* evidence’). Moreover if my analysis of the argument’s logic is correct, it proceeds by undermining every possible source of rational evidential authority for the Uniformity Principle, a principle which is itself presented as being the

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<sup>78</sup> Note that there is no way round this problem by somehow trying to identify the two types of reasoning (e.g. by deeming that factual inference to the unobserved itself indirectly invokes the Uniformity Principle). For quite apart from any logical difficulties that would then arise elsewhere, the two relata of the ‘founded on’ relation must clearly be distinct if it is supposed to be interpreted in causal terms.

only potential source of such authority for inductive inferences. Hence it is no surprise to find Hume expressing his conclusion in words that are entirely consonant with the ‘no reason whatever’ interpretation that I have advocated:<sup>79</sup>

I say then, that, even after we have experience of the operations of cause and effect, our conclusions from that experience are *not* founded on reasoning, or any process of the understanding. (E 32)

. . . in all reasonings from experience, there is a step taken by the mind, which is not supported by any argument or process of the understanding . . . (E 41)

. . . we cannot give a satisfactory reason, why we believe, after a thousand experiments, that a stone will fall, or fire burn . . . (E 162)

Similar statements occur in the *Treatise*, including most emphatically:<sup>80</sup>

Let men be once fully perswaded of these two principles, *That there is nothing in any object, consider'd in itself, which can afford us a reason for drawing a conclusion beyond it; and, That even after the observation of the frequent or constant conjunction of objects, we have no reason to draw any inference concerning any object beyond those of which we have had experience;* I say, let men be once fully convinc'd of these two principles, and this will throw them so loose from all common systems, that they will make no difficulty of receiving any, which may appear the most extraordinary. (T 139)

Here Hume stresses that the negative conclusion of his famous argument, that ‘we have no reason to draw any [inductive] inference’, is sufficiently striking to ‘throw men loose from all common systems’. So he clearly cannot have understood this conclusion as being only a relatively modest result, such as a denial of the claim that induction has deductive warrant, or a denial that our use of induction is caused by higher-level argument. Neither of these claims was any part of the established Lockean orthodoxy, which as we have seen (in §2 above) fully acknowledged the fallibility of ‘probable’ reasoning,<sup>81</sup> and attributed our judgements of probability to the perception of probable connexions rather than to higher-level ratiocination.<sup>82</sup> So to make

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<sup>79</sup> Note that Hume’s sceptical conclusion is not confined to the general practice of induction, but applies, as these quotations make clear, to each individual inductive inference. Hence it must be read as meaning that *every such inference* lacks a ‘foundation’ or ‘support’ in Reason or the understanding, which tells strongly against the ‘no argument’ interpretation given that Hume repeatedly stresses the role of explicit *ratiocination* in many, or even most, such inferences (T 133, 175, E 86–7, 107‡n.). He sees *all* inductive inferences as lacking a foundation in Reason, but only *some* as being immediate, unreflective, and independent of *reasoning*.

<sup>80</sup> See also T 91: ‘not only our reason fails us in the discovery of the *ultimate connection* of causes and effects, but even after experience has inform’d us of their *constant conjunction*, ’tis impossible for us to satisfy ourselves by our reason, why we shou’d extend that experience beyond those particular instances, which have fallen under our observation’. Both this and the passage from T 139 (also A 652, 655–6) bear out Stove’s claim (*Probability and Hume’s Inductive Scepticism*, 32, 58–9) that Hume’s conclusion about factual inferences *from* experience is intended to echo his conclusion about factual inferences *prior to* experience (i.e. inferences that are ‘a priori’ in the Humean sense discussed in §4.1 above). The latter is clearly a *sceptical* conclusion, and this gives further grounds for taking the former to be sceptical also. In the *Enquiry* a similar echo occurs implicitly in the quotation above from E 32, and also between the two paragraphs at E 42.

<sup>81</sup> See also *Essay* IV. xv. 2 for Locke’s clear recognition of the fallibility of probable reasoning, and *Essay* IV. iii. 9–17, 21–9, and IV. vi. 7–16 for his views on the very narrow limits of certain ‘knowledge’.

<sup>82</sup> The idea that our practice of induction might be founded on higher-level reasoning also seems profoundly un-Lockean in spirit, given his view of Reason in general as having a God-given ‘native Faculty’ to perceive evidential connexions directly and thus avoid any dependence on meta-inferential formal rules (*Essay* IV. xvii. 4).

sense of his own assessment of it, Hume's conclusion must be significantly more radical than what is attributed to him by either the 'anti-deductivist' or the 'no argument' interpretation.

However at the other extreme, if the conclusion of his famous argument is to be at all consistent with his other discussions of inductive reasoning, that conclusion cannot be quite as radical as the 'deductivist' interpretation maintains. For deductivism would have the implication that all factual inferences to the unobserved are completely worthless, or, in Stroud's memorable phrase, that 'as far as the competition for degrees of reasonableness is concerned, all possible beliefs about the unobserved are tied for last place'.<sup>83</sup> And this would obviously make a nonsense of Hume's efforts, in both the *Treatise* and the *Enquiry*, to develop a theory of scientific reasoning whose whole point is to distinguish between good and bad inductive inferences. Focusing here on the *Enquiry*,<sup>84</sup> perhaps the clearest denial of indiscriminating inductive scepticism comes in Section X, which explicitly relies on the principle that factual inferences can vary in force according to their conformity with experience, thus implying that they are not all worthless: 'One, who in our climate, should expect better weather in any week of JUNE than in one of DECEMBER, would reason justly, and conformably to experience . . . A wise man . . . proportions his belief to the evidence.' (E 110). Hume goes on to apply this general principle to inferences from testimony in particular, and thus erects what becomes the central pillar of his celebrated argument concerning miracles: 'the evidence, resulting from . . . testimony, admits of a diminution, greater or less, in proportion as the fact is more or less unusual' (E 113). But this argument of Section X is not a special case — indeed much of the *Enquiry* can be seen as developing a general and fairly systematic theory of how inductive inferences should be made and judged. Some highlights of this theory appear at E 86–7 (recommending a search for hidden causes), E 104–5 (on reasoning from analogy), E 107–8 (giving some hints on experimental method), E 56–9 and 110–11 (dealing with probability in cases of inconsistent experience), and E 136–7 (proposing norms of proportionate inference). Whether these passages add up to anything approaching a comprehensive theory may be debatable, but it cannot seriously be denied that Hume in the *Enquiry* makes numerous comparative judgements about inductive inferences which are clearly inconsistent with thoroughgoing deductivist scepticism.

What kind of scepticism is it, then, that on the one hand denies that we have *any reason whatever*, or *any kind of evidence*, to ground our reliance on induction, but on the other hand proposes a theory of inductive inferences which draws normative distinctions among them, and recommends that we rely on them in proportion to 'the evidence'? An answer emerges if we contrast the Lockean account of induction, which Hume rejects, with the alternative that he develops in *Enquiry* V, his so-called 'Sceptical Solution' to his earlier 'Sceptical Doubts'.

Hume's 'Sceptical Solution', as the term implies, 'solves' his problem of the foundation of inductive inference, but does so in a way that is consistent with the sceptical conclusion of his argument concerning induction. That conclusion remains entirely intact:

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<sup>83</sup> B. Stroud, *Hume* (London and Boston: Routledge & Kegan Paul, 1977), 54.

<sup>84</sup> For a corresponding discussion focusing primarily on the *Treatise*, see Millican, 'Hume's Argument concerning Induction', 128–34. This draws attention to several passages in which Hume clearly implies that 'probable' arguments can vary in force (e.g. *Treatise* I. iii. 11–12, T 31, 173–5, 181–2), and it also outlines his attempt (*Treatise* I. iii. 9–13, T 225–6) to develop a systematic theory of factual inference based on 'general rules' and on the distinction within the imagination between those principles that are 'permanent, irresistible, and universal' and those that are 'changeable, weak, and irregular'. Notoriously, however, this distinction breaks down in the conclusion of *Treatise* Book I (T 267–8), apparently plunging Hume more deeply into scepticism than ever occurs in the *Enquiry*.

in all reasonings from experience, there is a step taken by the mind, which is not supported by any argument or process of the understanding (*E* 41)

But the point of Hume's 'solution' is to deny that this negative result will, or should, have any effect on our tendency to infer inductively, because the crucial 'step taken by the mind' whose foundation it questions — the assumption of uniformity between past and future — is one that we cannot help making:

If the mind be not engaged by argument to make this step, it must be induced by some other principle of equal weight and authority . . . (*E* 41)

This principle is CUSTOM or HABIT. . . . By employing that word, we pretend not to have given the ultimate reason of such a propensity. We only point out a principle of human nature, which is universally acknowledged, and which is well known by its effects. Perhaps, we can push our enquiries no farther, or pretend to give the cause of this cause; but must rest contented with it as the ultimate principle, which we can assign, of all our conclusions from experience. (*E* 43)

[Belief arising from inference through custom] is the necessary result of placing the mind in such circumstances. It is an operation of the soul, when we are so situated, as unavoidable as to feel the passion of love, when we receive benefits; or hatred, when we meet with injuries. All these operations are a species of natural instincts, which no reasoning or process of the thought or understanding is able, either to produce, or to prevent. (*E* 46–7)

Thus inductive inference has after all a foundation of sorts, though clearly not of the kind that Hume had previously been seeking. For although 'custom' is explicitly described here as a source of 'authority' (corroborating the interpretation of the foundational relation developed in §10.1 above), this is obviously nothing like the *rational* authority that Locke had purported to find in the perception of objective probable connexions. Quite the contrary, for Hume's theory implies a Copernican reversal of this explanatory order: inductive evidential connexions, so far from being 'read off the world' as Locke had implied, turn out instead to be 'read into it' (in the guise of causal relations) by our entirely non-rational assumption of inductive uniformity. In terms of the traditional theory of perceptual Reason, this reversal is therefore *profoundly* sceptical.<sup>85</sup> Nevertheless it need not mean that as far as factual inference is concerned, 'anything goes' — that any such inference is as good (or as bad) as any other. For as Hume forcefully demonstrates in the remainder of the *Enquiry*, the universality and irresistibility of this new foundation for induction enables such indiscriminating scepticism to be very effectively opposed through an insistence on what Noxon calls 'methodological consistency'.<sup>86</sup> Thus, for example, the superstitious theist may appeal to a reported miracle to ground his faith, but *the very same* inductive principles that underlie his confidence in the truth of the miracle report can be shown to tell more strongly in the opposite direction. When fully informed and faced with the balance of empirical evidence, therefore, his beliefs will be pressured to change through the force of custom operating within him. Perhaps neither the rationalist nor the indiscriminating sceptic will initially be impressed with this kind of *ad hominem* appeal to an admittedly non-rational and potentially deceitful instinct.<sup>87</sup> But since

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<sup>85</sup> Hume's Copernican revolution, though less celebrated, is epistemologically far more radical than Kant's later version, because of its *non-rational* basis. So far from being sceptical, Kant used this sort of explanatory reversal to try to *rescue* a priori knowledge of matters of fact from the Humean critique, by appeal to a supposed a priori knowledge of our own minds' synthetic capacities (a supposition which Hume, quite correctly, would never have allowed, as made clear by *E* 64–9). Hume may have woken Kant from his dogmatic slumbers, but as Bertrand Russell quips, Kant 'soon invented a soporific which enabled him to sleep again' (*A History of Western Philosophy* (London: George Allen & Unwin, 1946), 731).

<sup>86</sup> J. Noxon, *Hume's Philosophical Development* (Oxford: Clarendon Press, 1973), 180–7.

<sup>87</sup> ' . . . nothing leads us to [inductive] inference but custom or a certain instinct of our nature; which it is indeed difficult to resist, but which, like other instincts, may be fallacious and deceitful' (*E* 159).

they too, just like the theist, are irresistibly governed by this instinct (whether they like it or not), their own inferential tendencies can likewise be harnessed to persuade them in the direction of sound empirical science. Many, no doubt, will resist such a following through of the consequences of inductive thinking, perhaps by refusing to listen to the evidence proposed or to examine its full implications. Others may be intellectually incapable of the kind of careful analysis involved, which may require ‘that nice distinctions be made, just conclusions drawn, distant comparisons formed, complicated relations examined, and general facts fixed and ascertained’ (E 173).<sup>88</sup> But such refusal or incapacity is unambiguously a failing of *rationality*, thus providing an entirely appropriate basis for normative judgement. So Hume is fully justified in drawing a distinction between ‘the wise’ and ‘the vulgar’ on this basis, between those who systematically pursue the consequences of our irresistible assumption of uniformity, and those who do not. The *Enquiry* shows how such a systematic pursuit involves searching for hidden causes, careful design of experiments, disciplined reasoning from analogy and probability, and so forth. All this effectively vindicates the methods of Humean empirical science, by demonstrating that they are ‘nothing but the reflections of common life, methodized and corrected’ (E 162).

Philo in the *Dialogues* sums up nicely how Hume’s view of induction, as founded on non-rational custom, can be comfortably combined with a healthy respect for systematic empirical science:

To whatever length any one may push his speculative principles of scepticism, he must act, I own, and live, and converse like other men; and for this conduct he is not obliged to give any other reason than the absolute necessity he lies under of so doing. If he ever carries his speculations farther than this necessity constrains him, and philosophises, either on natural or moral subjects, he is allured by a certain pleasure and satisfaction, which he finds in employing himself after that manner. He considers besides, that every one, even in common life, is constrained to have more or less of this philosophy; that from our earliest infancy we make continual advances in forming more general principles of conduct and reasoning; that the larger experience we acquire, and the stronger reason we are endowed with, we always render our principles the more general and comprehensive; and that what we call *philosophy* is nothing but a more regular and methodical operation of the same kind. To philosophise upon such subjects is nothing essentially different from reasoning on common life; and we may only expect greater stability, if not greater truth, from our philosophy, on account of its exacter and more scrupulous method of proceeding. (D 134)

## 12. Hume’s Reinterpretation of ‘Reason’

We have now seen that there is a sense in which Hume is genuinely sceptical about induction, and another sense in which he is not. We can very crudely encapsulate the sceptical and non-sceptical aspects of his position, each within a single sentence, as follows:

We can see *no reason whatever* for supposing that the past gives any evidence at all regarding what will happen in the future, and hence *no reason whatever* why induction should be a reliable method of inference.

We cannot help taking for granted that the past is a reliable guide to the future and making inferences on that basis, and there is no other method of factual inference which has this irresistibility; hence we should treat induction as our norm of factual reasoning.

The first of these uses the idiom of the perceptual view of Reason, and aims to express Hume’s ‘sceptical doubts’ concerning the operations of that faculty as thus conceived. But the second suggests a very different,

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<sup>88</sup> In this quotation from the *Enquiry concerning the Principles of Morals* Hume is expressing how Reason enters into *moral* rather than inductive decisions, but there is a great similarity between his views in these two fields, as indicated by the long quotation from the *Dialogues* below. Both involve building on fundamental principles which are themselves non-rational, although the working out of their consequences is nevertheless answerable to Reason.

naturalistic, view of human Reason, relieving it of the futile attempt to understand and predict matters of fact through pure perceptual insight, and steering it instead in the direction of a relatively modest inductive science. Hume himself adopts this latter view in most of his writings, counting inductive inference as a genuine operation of Reason, and even (as we have seen in §11) distinguishing it as the normative criterion by which all ‘reasoning concerning matter of fact and existence’ is to be judged. This can seem paradoxical or confused, for while in his famous argument he very explicitly denies that induction is founded on Reason, and moreover seems to deny that it is itself an operation of Reason,<sup>89</sup> elsewhere he very clearly states that inductive causal inference is one of Reason’s most central operations:

The understanding exerts itself after two different ways, as it judges from demonstration or probability . . . reason is nothing but the discovery of [causal] connexion . . . (T 413–14)

. . . reason, in a strict and philosophical sense, can have an influence on our conduct only after two ways: Either when it . . . informs us of the existence of something . . . or when it discovers the connexion of causes and effects (T 459)

. . . reason [is] . . . sufficient to instruct us in the pernicious or useful tendency of qualities and actions . . . Reason judges either of *matter of fact* or of *relations*. (E 286–7)

However this apparent inconsistency is not seriously problematic, and its basis is fairly evident. Hume naturally enough begins by using the word ‘reason’ in a way that is (so to speak) *extensionally* consistent with that of his contemporaries as described in §2 above: he means by it the faculty by which we judge of truth and falsehood.<sup>90</sup> In his argument concerning induction he also uses the word in a way which is *intensionally* consistent with the usage of his contemporaries, meaning a faculty whose operations are all founded on *perception*. But clearly in the aftermath of that argument, he *cannot* continue to use the word in a way that is *both extensionally and intensionally* consistent with the standard usage. Given his sceptical conclusion, *either* he must relinquish the idea that we have a faculty of Reason capable of factual inference, *or* he must cease to treat Reason as the conventionally presumed faculty of rational insight. Hume not surprisingly chooses the second option, continuing to acknowledge a faculty of Reason that embraces ‘probable’ inference, but

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<sup>89</sup> A denial that induction is an operation of Reason is, for example, clearly implicit in two passages from Section V, where Hume recapitulates his argument: ‘though he should be convinced, that his understanding has no part in [an inductive inference]’ (E 42); ‘Reason is incapable of any such variation. [i.e. the variation with experience that is characteristic of inductive inference]. . . . All inferences from experience, therefore, are effects of custom, not of reasoning’ (E 43).

<sup>90</sup> Though often the word is restricted, by both Hume and his contemporaries, to imply the *appropriate* operation of that faculty, so in this sense *faulty* reasoning or judgement does not count as deriving from Reason. Don Garrett (‘Ideas, Reason, and Skepticism: Replies to my Critics’, *Hume Studies*, 24 (1998), 171–94 especially 186–7) argues quite persuasively in response to two of my earlier papers (‘Hume’s Argument concerning Induction’, and ‘Hume on Reason and Induction: Epistemology or Cognitive Science?’, *Hume Studies*, 24 (1998), 141–59) that such normative usage in itself should not be taken to imply any ambiguity in the faculty term, so here I have retreated somewhat from the explicit ‘multiple senses’ interpretation that I previously espoused. (However my critical view of Garrett’s own interpretation is essentially unchanged, as will be clear in particular from §10.3 above.)

reinterpreting its nature.<sup>91</sup> His notion of Reason therefore remains coextensional with Locke's, but behind this façade of similarity hides a philosophical revolution.

The extent of Hume's revolution, though anticipated in Section IV, does not become fully apparent until very nearly the end of the *Enquiry*. By that stage Section VII has emphasized the impossibility of aprioristic knowledge even of our own minds, and has shown that we have absolutely no conception of necessity or power in objects independent of our own inferential tendencies. Section XII then mobilizes a range of further sceptical arguments, the most important of which serve to demonstrate both the weakness of our grounds for any claim to knowledge of the physical world, and also how little we understand of its nature (*E* 151–5). Our belief in body, just like our confidence in induction, turns out to be an irresistible natural instinct with no basis in rational insight. But unlike induction, this instinct yields no promise of scientific progress, for the deeper we try to go in understanding the nature of matter (e.g. by invoking the popular distinction between primary and secondary qualities), the more confusion and absurdity we encounter. Only now can the radical implications of Section IV be fully appreciated. The comfortable idea that the behaviour of matter is somehow 'comprehensible', inspired by the 'naturalness' of Newtonian physics (cf. *T* 111–12), turns out to be an illusion. Even the effect of colliding billiard balls, widely supposed to be a paradigm of rational understanding, is no more predictable a priori than any other causal interaction. So in place of the seductive but illusory ideal of a science built on perceptual Reason, our *only* recourse is to Humean Reason, modestly looking for correlations in the phenomena without any pretence to ultimate rational insight:

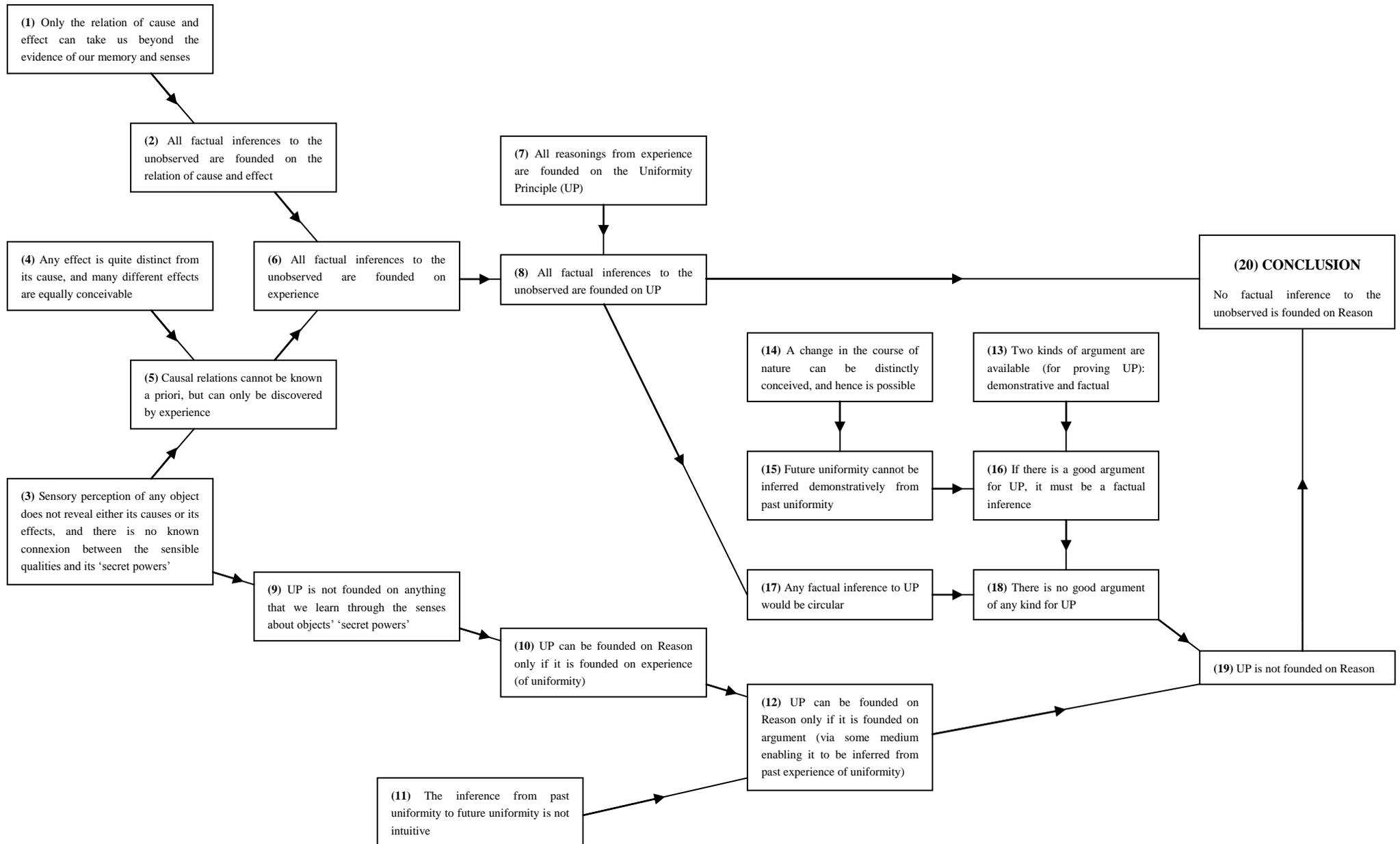
the utmost effort of human reason is, to reduce the principles, productive of natural phaenomena, to a greater simplicity, and to resolve the many particular effects into a few general causes, by means of reasonings from analogy, experience, and observation. But as to the causes of these general causes, we should in vain attempt their discovery . . . These ultimate springs and principles are totally shut up from human curiosity and enquiry. Elasticity, gravity, cohesion of parts, communication of motion by impulse; these are probably the ultimate causes and principles which we shall ever discover in nature; and we may esteem ourselves sufficiently happy, if, by accurate enquiry and reasoning, we can trace up the particular phaenomena to, or near to, these general principles. The most perfect philosophy of the natural kind only staves off our ignorance a little longer . . . (*E* 30–1)

Hume's Reason is *inductive* Reason, not because we have any rational ground for expecting induction to be reliable, but simply because its irresistibility makes it the best we have left once the bogus ideal of perceptual insight has been swept away. And so paradoxically, in an age of continuing rationalistic ambition amongst 'our modern metaphysicians' (*E* 73‡n.), induction's greatest sceptic becomes also its foremost champion.

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<sup>91</sup> Not only is the second option preferable given the obvious association of 'reason' and 'reasoning', but also it enables Hume to retain the faculty word for honorific purposes, to distinguish the proper conclusions of well-disciplined inductive inference from the 'whimsies and prejudices' of the imagination. This motivation is apparent in the footnote at *T* 117, which distinguishes a wide sense of 'imagination' (encompassing all operations that involve the vivacity of ideas) from a narrow sense which excludes demonstration and induction on the grounds that they are sufficiently epistemologically respectable to be counted instead among the operations of 'reason'. See Millican, 'Hume on Reason and Induction', 145–7, for a discussion of this arguably very significant footnote.

## Appendix: Hume's Argument concerning Induction (from Section IV of the *Enquiry concerning Human Understanding*)



## *Hume's Own Statement of the Propositions Identified in the Structure Diagram*

- (1) By means of [*Cause and Effect*] alone can we go beyond the evidence of our memory and senses. (E 26)
- (2) All reasonings concerning matter of fact seem to be founded on the relation of *Cause and Effect*. (E 26)  
... all arguments concerning existence are founded on the relation of cause and effect ... (E 35)  
... all our evidence for any matter of fact, which lies beyond the testimony of sense or memory, is derived entirely from the relation of cause and effect ... (E 159)
- (3) No object ever discovers, by the qualities which appear to the senses, either the causes which produced it, or the effects which will arise from it ... (E 27)  
It is allowed on all hands, that there is no known connexion between the sensible qualities and the secret powers ... (E 33)
- (4) ... every effect is a distinct event from its cause. It could not, therefore, be discovered in the cause, and ... the conjunction of it with the cause must appear ... arbitrary; since there are always many other effects, which, to reason, must seem fully as consistent and natural. (E 30)
- (5) ... the knowledge of [cause and effect] is not, in any instance, attained by reasonings *à priori*; but arises entirely from experience ... (E 27)  
... *causes and effects are discoverable, not by reason, but by experience* ... (E 28)  
In vain, therefore, should we pretend to ... infer any cause or effect, without the assistance of observation and experience. (E 30)
- (6) ... nor can our reason, unassisted by experience, ever draw any inference concerning real existence and matter of fact ... (E 27)  
In vain, therefore, should we pretend to determine any single event ... without the assistance of observation and experience. (E 30)
- (7) ... we always presume, when we see like sensible qualities, that they have like secret powers, and expect, that effects, similar to those which we have experienced, will follow from them ... (E 33)  
We have said, that ... all our experimental conclusions proceed upon the supposition, that the future will be conformable to the past ... (E 35)  
... all inferences from experience suppose, as their foundation, that the future will resemble the past, and that similar powers will be conjoined with similar sensible qualities ... (E 37)
- (8) [This proposition is implicit in the inferential sequence:] We have said, that all arguments concerning existence are founded on the relation of cause and effect; that our knowledge of that relation is derived entirely from experience; and that all our experimental conclusions proceed upon the supposition, that the future will be conformable to the past. (E 35)
- (9) ... the mind is not led to form such a conclusion concerning [sensible qualities and secret powers'] constant and regular conjunction, by any thing which it knows of their nature ... (E 33)
- (10) [This proposition is implicit in Hume's transition from considering 'a priori' evidence for the Uniformity Principle to considering experiential arguments for it:] As to past *Experience*, it can be allowed to give *direct* and *certain* information of those precise objects only, and that precise period of time, which fell under its cognizance: but why this experience should be extended to future times, and to other objects, which for aught we know, may be only in appearance similar; this is the main question on which I would insist. (E 33)
- (11) The connexion between these propositions [*I have found that such an object has always been attended with such an effect and I foresee, that other objects, which are, in appearance, similar, will be attended with similar effects*] is not intuitive. (E 34)
- (12) There is required a medium, which may enable the mind to draw such an inference, if indeed it be drawn by reasoning and argument. (E 34)
- (13) All reasonings may be divided into two kinds, namely demonstrative reasoning, or that concerning relations of ideas, and moral reasoning, or that concerning matter of fact and existence. (E 35)

- (14) . . . it implies no contradiction, that the course of nature may change . . . May I not clearly and distinctly conceive [such a thing]? (*E* 35)
- (15) That there are no demonstrative arguments in the case, seems evident . . . (*E* 35)  
. . . whatever is intelligible, and can be distinctly conceived, implies no contradiction, and can never be proved false by any demonstrative argument or abstract reasoning *à priori* . . . (*E* 35)
- (16) If we be, therefore, engaged by arguments to put trust in past experience, and make it the standard of our future judgment, these arguments must be probable only, or such as regard matter of fact and real existence . . . (*E* 35)
- (17) To endeavour, therefore, the proof [that the future will be conformable to the past] by probable arguments, or arguments regarding existence, must be evidently going in a circle, and taking that for granted, which is the very point in question. (*E* 35–6)
- (18) . . . it may be requisite . . . to shew, that none of [the branches of human knowledge] can afford such an argument . . . (*E* 35)  
. . . we have no argument to convince us, that objects, which have, in our experience, been frequently conjoined, will likewise, in other instances, be conjoined in the same manner . . . (*E* 159)
- (19) . . . it is not reasoning which engages us to suppose the past resembling the future, and to expect similar effects from causes, which are, to appearance, similar . . . (*E* 39)  
. . . nothing leads us to [expect constant conjunctions to continue] but custom or a certain instinct of our nature . . . (*E* 159)
- (20) I say then, that, even after we have experience of the operations of cause and effect, our conclusions from that experience are *not* founded on reasoning, or any process of the understanding. (*E* 32)  
. . . in all reasonings from experience, there is a step taken by the mind, which is not supported by any argument or process of the understanding. (*E* 41)  
All belief of matter of fact or real existence [is due merely to] a species of natural instincts, which no reasoning or process of the thought and understanding is able, either to produce, or to prevent. (*E* 46–7)