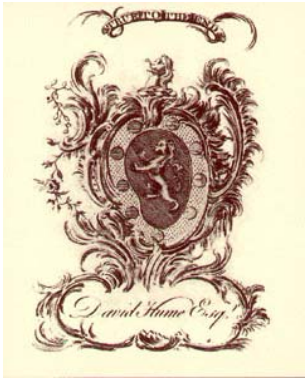

Hume and the Lockean Background: Induction and the Uniformity Principle

David Owen

Hume Studies Volume XVIII, Number 2 (November, 1992) 199-208.

Hume and the Lockean Background: Induction and the Uniformity Principle

David Owen

Introduction

What has come to be called Hume's problem of induction is special in many ways. It is arguably his most important and influential argument, especially when seen in its overall context of the more general argument about causality. It has come to be one of the great "standard problems" of philosophy and yet is, by most accounts, almost unique in having no ancient precursor. Interestingly, the argument is frequently presented in terms that the author never used. It is difficult for us not to think of the problem in terms of the contrast between deductive vs. inductive reasoning (or logic, or whatever). But this is a contrast nowhere to be found in Hume: he talks of demonstrative vs. probable (or moral) reasoning. Hume uses the word "induction" only twice in the *Treatise*[1] and in neither case is it clear that the word is used to report a piece of probable reasoning.[2] One of the few occurrences of "deduce" or "deducing" occurs in the second *Enquiry*, where he talks about "following the experimental method, and deducing general maxims from a comparison of particular instances,"[3] hardly a paradigm of what we would call deductive reasoning.[4] Many modern studies of Hume that make a real attempt to understand what Hume meant by demonstration and probability, in the context of his argument about induction, tend towards the ahistorical,[5] treating Hume's writings as contemporary texts. But failure to take into account some of the background concerning the nature of demonstrative and probable reason makes it unlikely, I think, that we can understand Hume's argument. Part of the problem is the failure to identify Hume's targets in that famous negative argument about induction (vague reference is sometimes made to the "rationalists") and part of the problem is identifying the role the uniformity principle plays in Hume's famous argument and the light it sheds on the conception of probable reasoning Hume was attacking. In this paper I want to argue that a careful look at Locke solves some of these problems: he has a well developed view of demonstrative and probable reasoning, his confidence in conformity as a ground of probability is a likely target of Hume's attack and his

account sheds much light on what role the principle of uniformity might play in Hume's account.[6]

Of course, at a certain level of philosophical abstraction it is irrelevant whether we have understood what Hume "really meant." The problem of induction has emerged as a central one in epistemology, philosophical logic, and philosophy of science. It would be an interesting question in philosophical historiography to trace the development of the "problem" from Hume's time to our own but that is not my task here. I trust one needs no justification for taking an historical look at a famous problem rather than tackling the problem head-on in one's own terms. But if one is needed, here is mine: sometimes, by looking at a problem from a different, historical perspective, one sees a different problem or a familiar problem in a new light. One's philosophical horizons are broadened. Furthermore, one may make an interesting historical discovery, or at least draw some interesting historical connections.

I take it as uncontroversial that Locke, following Descartes, rejected a formal, logical account of demonstrative reasoning. Instead of using a formal, syllogistic account of how two propositions can entail a third, Locke concentrated on the relation two ideas bear one to another.[7] Thus a demonstration, for Locke, gets its force, not from what we would call a deductive relation between one set of propositions (the premises) and another proposition (the conclusion), but rather from the relation one idea bears to another, either directly, or via a chain of intermediate ideas. It is true that Locke frequently talks of inferring one proposition from another, but this is always cashed out in terms of relations of ideas via a chain of intermediate ideas.[8] It is also true that Locke occasionally uses the terms "deduce" and "deduction." But these are never used in our sense that has to do with formal deductive validity. Rather, they are simply used loosely in the informal sense of "argue" or "infer," and "argument" or "inference."[9] In the rest of this paper, all uses of the word "deduction" and its cognates should be taken as having the modern sense, unless flagged as having "Locke's sense" or "Hume's sense." But on all this, more later.

What has not been made sufficiently clear is that Locke has a well developed account of probable reasoning as well as demonstrative reasoning. And like demonstrative reasoning, probable reasoning is accounted for in terms of relations of ideas, via a chain of intermediate ideas, and not in terms of logical relations between (sets of) propositions. I claim that, like Locke, Hume too used nothing like our sense of deductive validity to account for either demonstrative or probable reasoning. Instead, again like Locke, his account of both sorts of reasoning involves consideration of the relations between ideas, not

logical relations between propositions. A particularly graphic example, that alludes to both sorts of reasoning, is as follows:

> Thus as the necessity, which makes two times two equal to four, or three angles of a triangle equal to two right ones, lies only in the act of the understanding, by which we consider and compare these ideas; in like manner the necessity or power, which unites causes and effects, lies in the determination of the mind to pass from the one to the other. (T 166)

And again, in the *Abstract*, when talking about the possibility of probable or causal reasoning prior to experience, he says:

> It is not any thing that reason sees in the cause, which makes us *infer* the effect. Such an inference, were it possible, would amount to a demonstration, as being founded merely on the comparison of ideas. (T 650)[10]

Hume was justifiably proud of his grasp of the concept of probability. His argument about miracles is arguably a landmark in its development. In the *Abstract* he describes a main theme of the *Treatise* in the following way:

> The celebrated *Monsieur Leibnitz* has observed it to be a defect in the common systems of logic, that they are very copious when they explain the operations of the understanding in the forming of demonstrations, but are too concise when they treat of probabilities, and those other measures of evidence on which life and action intirely depend, and which are our guides even in most of our philosophical speculations. In this censure, he comprehends *the essay on human understanding, le recherche de la verité*, and *l'art de penser*. The author of the *treatise of human nature* seems to have been sensible of this defect in these philosophers, and has endeavoured, as much as he can, to supply it. (T 646-47)

The reference to Locke here is intriguing. Even though it is, in fact, Leibniz' reference, and alludes to Locke's failure to pay enough attention to probable reasoning, it is some indication that a close look at Locke (not to mention Malebranche and Arnauld) on probable reasoning will help us understand Hume's famous argument.

As far as I can tell, Hume's argument about induction has never been presented in terms of the Lockean background of a non-formal account of demonstrative and probable reasoning. But, I will argue, to

a large extent Hume took over Locke's views on these matters. Where they parted company is precisely what Hume's argument about induction is all about.[11]

Hume

In the *Treatise*, part 3 of book 1 is called "Of knowledge and probability." It soon emerges, in section 1, that Hume is using knowledge in the traditional sense of *scientia*: knowledge is certain, in this sense, and reserved for that which is intuitive or demonstrable, as opposed to probable beliefs or opinions. In the *Treatise*, the contrast is presented in an unappealing way in terms of the difference between two classes of the seven philosophical relations. These relations are supposed to exhaust the way the mind can compare ideas or objects and thus provide a complete taxonomy of the objects of knowledge or belief. The two classes are distinguished between those that "depend entirely on the ideas, which we compare together, and such as may be chang'd without any change in the ideas" (T 69). The former class is comprised of resemblance, contrariety, degrees in quality, and proportions in quantity and number. The latter class of relations is such that any given relation between objects or ideas may be changed "without any change on the objects themselves or on their ideas" (T 69). This class contains identity, causation, and relations of time and place. This way of making the distinction is foreign to modern ears because it is done in terms of properties of relations of ideas, rather than propositions (the importance of treating it this way can not be over-emphasized, as it is the basis for Hume's distinction between demonstrative and probable reasoning), but the point soon becomes clear enough. Hume is distinguishing between those objects of the understanding which depend solely on the mind comparing ideas and those which depend on further experiential input. In the first *Enquiry* this distinction was more happily made in terms of Relations of Ideas and Matters of Fact.

He goes on to claim that only those four relations that depend solely on our ideas can be "objects of knowledge and certainty" (T 70). These will become the more familiar "Relations of Ideas" in the *Enquiry*. Of more interest at the moment is his further division of this class into those three relations (resemblance, contrariety and degrees in quality) that "are discoverable at first sight, and fall more properly under the province of intuition than demonstration" (T 70). The idea here is that those three relations can be known immediately, simply by comparing the related ideas. Intuition requires no steps of reasoning: no intermediate idea need be found. Knowledge of relations of proportions of quantity or number, on the other hand, typically requires those mediate steps, as when we add up a column of figures. Interestingly,

Hume limits such demonstrative knowledge or science to algebra and arithmetic:

> There remain, therefore, algebra and arithmetic as the only sciences, in which we can carry on a chain of reasoning to any degree of intricacy, and yet preserve a perfect exactness and certainty. (T 71)

There is much that is problematic in the above account of the four relations, which depend solely on the ideas, that encompass all that we can intuitively or demonstratively know. Why is the relation of identity put in the other, more experiential class, and why is geometry excluded from the class of demonstrative knowledge? These questions are beyond the scope of this paper. We need only concern ourselves with why it is that only these four relations are objects of certain knowledge (they depend only on the ideas related; they are if you like "internal relations") and the difference between intuition and demonstration (immediate awareness and inference via "mediate" ideas).

In the next section, "Of probability; and of the idea of cause and effect," Hume turns his attention to the remaining three relations which comprise the objects, not of knowledge but of probability. Here too we find a division between those relations which are immediately known and that which requires intermediate steps of reasoning. The three relations are identity, situations in time and place and causation. Concerning the first two relations, both objects (or ideas) are present to the senses (or memory: an important addition added later [T 82]) and thus we have what is more properly called "perception rather than reasoning" (T 73). There is "a mere passive admission of the impressions thro' the organs of sensation" (T 73). Thus:

> According to this way of thinking, we ought not to receive as reasoning any of the observations we may make concerning *identity*, and the *relations* of *time* and *place*; since in none of them the mind can go beyond what is immediately present to the senses, either to discover the real existence or the relations of objects. 'Tis only *causation*, which produces such a connexion, as to give us assurance from the existence or action of one object, that 'twas followed or preceded by any other existence or action. (T 73-74)

The next one hundred pages of the *Treatise* are devoted to examining this relation of causation and its related mode of reasoning.

How far have we got? Well, we are a long way from the presentation of what has been called the problem of induction, but even though we

are only a section and a half into part 3, we have come a remarkably long way. All the pieces are there but one. Hume has distinguished the objects of the understanding into those that are known and those that are probable. Within each of these branches, there is that which we are aware of immediately (the intuitive awareness on the one hand, or the perceptual awareness on the other, of a relation) and that which requires inference or reasoning (the demonstrative reasoning of algebra or arithmetic and probable or causal reasoning). We can sum up this four-fold distinction in the following chart:

	Immediate	*Inferential*
Relations of Ideas	Intuitive	Demonstrative
Matters of Fact	Perception or Memory	Probable

By section 6, Hume has boiled the problem down to the following: in certain circumstances when we have an impression of an object or action, we come to have the idea of another object or action and furthermore we come to believe that this second object exists or will exist even though we have had no impression of it (T 84). It is clear that the inference from the impression to the idea is not demonstrative and prior to any experience of the objects going together: the idea and impression are distinct and it is always possible to have one without the other (T 87). This is an argument he has laid out before in some detail, especially in section 3, "Why a cause is always necessary," and is really just a further argument in favour of the original classification of the seven philosophical relations. Thus the inference must be based on experience, or be probable.

The circumstances of causal inferences involve, famously, contiguity, priority and constant conjunction. But, Hume thinks, this helps little in explaining the nature of the inference, for it

> implies no more than this, that like objects have always been plac'd in like relations of contiguity and succession; and it seems evident, at least at first sight, that by this means we can never discover any new idea. (T 88)

The worry is that though we now know that experience, in certain circumstances, produces in us a new idea when we are confronted with a present impression, we have yet to show that it is by a process of reason or legitimate inference. I submit that we can only understand this worry if we remember that probable inference, like demonstrative inference and unlike intuitive or perceptual awareness, requires some mediate step that stands between that which begins the inference and

that which ends it and, further, that the significant units in the inference are ideas, not propositions. The conception of reason that Hume is dealing with here involves becoming aware of how two ideas are related via the intervention of a further idea or ideas. This is necessary if the production of the new idea is to be the result of a process of reasoning and not of some other non-rational mental mechanism. So Hume asks,

> Whether experience produces the idea by means of the understanding or of the imagination; whether we are determin'd by reason to make the transition, or by a certain association and relation of perceptions..(T 88-89)

And he goes on to say,

> If reason determin'd us, it wou'd proceed upon that principle, *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) (The Uniformity Principle)

He then goes on, famously, to show that the principle is not a matter of knowledge (it is not intuitively known, nor is it demonstrable), nor can it be a matter of probability (it is not a perceived relation, nor can probable or causal arguments be non- circularly advanced in its defence).

This famous argument has been the subject of much critical discussion. Two positions on apparently opposite ends of the spectrum are these:

A. Hume has shown that all probable or inductive arguments are deductively[12] or logically invalid. But since only valid arguments are reasonable, he has shown that all probable arguments are unreasonable. (Stove, chap. 2, passim)
B. Hume has shown that inductive or probable reasoning cannot be conceived of in a particular rationalistic way as characterized by logical necessity. That conception of reasoning must be replaced by one that can account for the force of inductive or probable reasoning. (BR, chap. 2, passim)

The first position has Hume as an extreme sceptic concerning probable reasoning, while the second has Hume arguing against a certain outmoded rationalist conception of reason for the purpose of replacing

it with his own more adequate account. Though they appear radically different, they share three very important points:

1. Demonstrative arguments are deductively valid arguments with necessarily true or self-evident a priori premises. (Stove, 35; BR, 43)
2. The conception of probable argument being attacked in Hume's argument is that of a deductively valid argument with at least one contingent or empirical premise about the observed, and a conclusion about the unobserved. (Stove, 36-38; BR, 42-47)[13]
3. The role of the uniformity principle is to function as a premise in probable arguments. Without this premise, the arguments would be deductively invalid or lack the feature of logical necessity. (Stove, 42-44; BR, 8, 49)

These three points hang together and seem plausible because they make sense of the text. The characterization of demonstrative reasoning (point 1) bears a resemblance to the scholastic view of demonstration derived from Aristotle, though I will later argue, as I have already suggested, that it needs to be couched in terms of relations of ideas rather than propositions. But even as it stands, it makes sense of Hume's argument that there can be no demonstrative arguments for the principle of uniformity.[14] The characterization of the model of probable reasoning (point 2) that Hume was attacking as deductive has almost become orthodoxy,[15] replacing the older view that Hume's demonstrative/probable distinction is equivalent to the deductive/inductive distinction. The main reason for the prevalence of this view is that it appears to make sense of Hume's argument, both in terms of the role of the uniformity principle and the charge of circularity made against any attempt to prove the principle by probable reason. That is to say, points two and three above hang together. An appealing way to interpret Hume's claim, that, "If reason determin'd us, it wou'd proceed upon that principle" (T 89) of uniformity, is to say that any probable argument has a deductive structure, but is invalid unless the principle is added as a premise.[16] Thus Stove claims (pp. 43-44) that the principle is required as a premise to turn an otherwise deductively invalid argument into a valid one. This is what Hume meant by saying that if reason determined us, it must proceed upon the principle of uniformity. And the charge of circularity is thus substantiated: if we attempt to prove the uniformity principle by probable arguments, those arguments, if valid, will have that very principle as a premise.[17]

These three points don't, of course, by themselves determine an overall interpretation of Hume's famous argument. As we saw above, they are the basis for both the radically different positions of A and B

above. An interesting way to characterize the difference is as follows.[18] Both A and B agree that Hume was attacking a view of probable reasoning that held that while there are two sorts of arguments, probable and demonstrative, there is only one form of inference, deductive. The difference between the arguments lies in the nature of the premises, not the mode of inference. Position A could claim that Hume accepted this account of reason, and thus concluded that probable arguments are unreasonable. Position B could claim that Hume took the argument to show that this conception of reason was unacceptable and replaced it with one that allowed two sorts of inference as well as two sorts of argument. Contrary to both these positions, I want to maintain that Hume was concerned with, both positively and negatively, distinctive demonstrative and probable modes of inference, insofar as it is appropriate to talk of inference at all when the relevant relations are between ideas, not propositions. However, it must be admitted that since the three principles explain the text, support Hume's argument and allow for such diversity of interpretation, they are very attractive. Nonetheless, I think all three are false as interpretative principles of Hume's famous argument, and misidentify Hume's target in that argument. We have already noted that Hume's target can't be those, if any, who thought probable argument were demonstrative. Hume, of course, was concerned to distinguish probable or causal arguments from demonstrative arguments, and not reduce the former to the latter. But that task is already completed before the famous argument even starts. Of course, others have rejected points 2 and 3. Stroud,[19] for instance, has plausibly suggested that all Hume needs is the claim that a reasoner must believe the uniformity principle to be true in order for it to be reasonable to move from the present impression to the unobserved idea. This claim is plausible without any undue restriction on what it is to be reasonable, such as, "It is only reasonable to infer B from A if A together with other premises known to be true deductively entail B." For surely there is no sense in which it would be reasonable to infer B from A on the basis of past experience if one didn't think that past experience was relevant to future experience. But to say that this is all Hume needs is only to suggest that there is a line of thought available to Hume; it is not to uncover his actual argument. Fogelin,[20] while sympathetic to Stroud's account, thinks that the truth or falsity of points 2 and 3 "cannot be resolved because Hume's text is undetermined on the matter." But I will argue that we can show that points 2 and 3 are false by showing that point 1 is false. If we are going to understand the conception of probable reasoning that Hume is attacking, we must understand the contrast between demonstrative and probable reasoning. And understanding that contrast requires rejecting the

characterization of either type of reasoning as involving a deductive relationship between (sets of) propositions.

Locke on Demonstrative and Probable Reasoning

Locke's account of intuitive and demonstrative knowledge is well known. For our purposes, it is important to emphasize, firstly, that the crucial relations in both sorts of knowledge are relations among ideas, and not formal relations among propositions,[21] and secondly, that the intuitive knowledge is immediate while demonstrative knowledge involves reasoning. Hume shared both these views with Locke. And if the crucial relations in knowledge are among ideas, not propositions, then it is fair to assume that if we are to understand Locke on reasoning we must look for structures of ideas, not formal structures of propositions. This in turn will help us understand probable reasoning, and we shall see that the notion of deductive validity has nothing to do with it.

For Locke, famously, knowledge is "*the perception of the connexion and agreement, or disagreement and repugnancy, of any of our Ideas*" (Locke, 4.1.2). Intuitive knowledge is had when "the Mind perceives the Agreement or Disagreement of two *Ideas* immediately by themselves, without the intervention of any other" (Locke, 4.2.1). This intuitive knowledge is immediate: the agreement of ideas is apprehended immediately, without the intervention of any intermediate ideas. Hume uses a similar notion of intuition (for example, T 70). Moreover, such intuition is the basis of demonstrative knowledge as well: "Certainty depends so wholly on this intuition that in the next degree of *Knowledge*, which I call *Demonstration*, this intuition is necessary in all the Connexions of the intermediate *Ideas*, without which we cannot attain Knowledge and Certainty" (Locke, 4.2.1; not in Wynne).

Sometimes the mind cannot immediately apprehend the agreement or disagreement of any two ideas because "the Mind cannot so bring its *Ideas* together as by their immediate Comparison and as it were Juxta-position or application one to another." In order "to perceive their Agreement or Disagreement, it is fain, by the Intervention of other *Ideas* (one or more, as it happens) to discover the Agreement or Disagreement which it searches; and this is that which we call *Reasoning*" (Locke, 4.2.2). Demonstrative reasoning, then, is a means of apprehending the agreement or disagreement of two ideas by the intervention of other intermediate ideas. These intermediate ideas are called "proofs" and a quickness in the mind in discovering them is called sagacity (Locke, 4.2.3). Such reasoning, then, is a chain of ideas, not propositions, and the link between any two ideas in the chain is intuitive: "Now, *in every step Reason makes in demonstrative Knowledge, there is an intuitive Knowledge* of that Agreement or

Disagreement it seeks with the next intermediate *idea* which it uses as a Proof: For if it were not so, that yet would need a Proof. Since without the Perception of such Agreement or Disagreement, there is no Knowledge produced" (Locke, 4.2.7).

Although it would be familiar to Cartesians, this conception of demonstrative reasoning, and indeed reasoning in general, is so foreign to both the scholastic/Aristotelian syllogistic reasoning that preceded it and the more modern notion of deductive reasoning that succeeded it that it is worth pausing to consider the differences. Although syllogistic reasoning is a logic of terms, each piece of syllogistic reasoning can be perspicaciously rendered as a set of propositions. So, too, with deductive reasoning. This is because what makes either syllogistic or deductive reasoning good reasoning is formal validity, which depends on the structure of the propositions and the overall structure of the piece of reasoning. The content of the propositions is irrelevant: the goodness, that is, validity, of the reasoning can be displayed in formal terms. But Lockean reasoning is utterly different. What can one say about the structure of a piece of Lockean reasoning? It is a chain of ideas. If one tried to represent its "formal structure" it would look something like this:

$$a - b - c - d,$$

where the letters stand for different ideas and the dashes for agreement or disagreement. What makes the reasoning good reasoning is not its structure, but the content of the ideas. They must be such that the mind can perceive the agreement or disagreement of any two adjacent ideas in the chain.

For any piece of Lockean reasoning, it makes little sense to talk of premises or conclusions. Consider our little model above. What one is trying to demonstrate is that the idea a stands in the relevant relation to idea d. One starts with the idea a and if one is sagacious one will discover the relevant intermediate ideas or proofs such that one has intuitive knowledge of a's relation to b, b's to c, c's to d and hence demonstrative knowledge of a's relation to d. If one insisted on talking of premises and conclusions, one would have to say that one starts with part of the conclusion, and ends with the rest of the conclusion, while the premises fill up the middle![22]

Consider Locke's example of demonstrative reasoning in 4.2.2. One wants "to know the Agreement or Disagreement in bigness between the three Angles of a triangle and two right ones" but one does not immediately perceive the relation.[23] What is one to do? "In this Case the Mind is fain to find out some other Angles, to which the three Angles of a Triangle have an Equality, and finding those equal to two right

ones, comes to know their Equality to two right ones." That is to say, one starts with the idea of the three angles of a triangle, one finds an idea of some other angles intuitively known to be equal to those three angles, and if those other angles are intuitively known to be equal to two right angles, one's demonstration is complete.

Locke's view of probable reasoning is strictly analogous to his view of demonstrative reasoning: it is a chain of ideas such that the connection between the ideas is not a matter of intuitive certainty but only appears to hold for the most part:

> 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 connection one with another: so *Probability* is nothing but the appearance of such an Agreement or Disagreement by the intervention of Proofs, whose connection 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. (Locke, 4.15.1)

As he says in the title of 4.15.1, "*Probability is the appearance of agreement upon fallible proofs*." Probable reasoning results in belief or opinion, not knowledge (Locke, 4.15.3). Probability thus supplies "the defect of our Knowledge, and (guides) us where that fails" (Locke, 4.15.4; not in Wynne). One person can have demonstrative knowledge of the equality of the three angles of a triangle and two right angles, if he perceives "the certain immutable connexion there is of Equality, between the three Angles of a *Triangle* and those intermediate ones, which are made use of to shew their equality to two right ones," while another "who never took the pains to observe the Demonstration" may have a probable belief on the basis of the testimony of a mathematician. In this case, the intermediate idea or proof is the veracity of the speaker (Locke, 4.15.1; not in Wynne).

As one might expect,[24] as an early practitioner in probability Locke is concerned to a large extent with testimony, as the example just given shows. But he was also concerned with probability whose ground was not testimony but "conformity of any thing with our own Knowledge, Observation, and Experience" (Locke, 4.15.4). Locke thought conformity with experience was a distinct ground of probability from testimony; Hume of course thought that probable reasoning based on testimony was just another instance of reasoning from experience, as he clearly states in his famous argument concerning miracles. Hume

and Locke disagreed on the evidence concerning miracles as well, but that is another issue.

Locke thought conformity with "Knowledge, Observation and Experience" could provide probable grounds for belief or opinion in unobserved matters of fact and was careful to point out that this did not constitute knowledge. Thus he held that sensitive knowledge "*extends as far as the present Testimony of our Senses*, employ'd about particular Objects, that do then affect them, *and no further*" (Locke, 4.11.9). Thus if I see a man now, I have knowledge of his existence. But one minute later, if I am alone, that knowledge is replaced by probable belief "since there is no necessary connection of his Existence a minute since, with his Existence now: by a thousand ways he may cease to be since I had the Testimony of my Senses for his Existence" (Locke, 4.11.9; added to the expanded version of Wynne, 1770). And again:

> And therefore though it be highly probable, that Millions of Men do now exist, yet whilst I am alone writing this, I have not that Certainty of it, which we strictly call Knowledge; though the great likelihood of it puts me past doubt ... But this is but probability, not Knowledge. (not in Wynne)

Our past experience of objects is a guide to our probable beliefs about such objects unobserved. Suppose I perceive a body of water, with some fine colours and a bubble upon that water. A little later,

> being now quite out of the sight both of the Water and Bubbles too, it is no more certainly known to me, that the Water doth now exist, than that the Bubbles or Colours therein do so; it being no more necessary that Water should exist to day, because it existed yesterday, than that the Colours or Bubbles exist to day because they existed yesterday, though it be exceedingly much more probable, because water hath been observed to continue long in Existence, but Bubbles, and the Colours on them quickly cease to be. (Locke, 4.11.11; not in Wynne)

Our probable beliefs about what is unobserved should conform to our past experience: it is more probable that the water exists now than the bubbles because water has been observed in the past to continue in existence longer than bubbles. Just as the man who believed in the equality of the three angles of a triangle to two right angles on the basis of testimony reasoned from the idea of the three angles to the idea of two right ones via the "fallible proof" (Locke, 4.15.1, section summary, p. 654) or "probable medium" (Locke, 4.17.16, p. 685) of testimony, so

too the person who believes the water he saw a minute ago still exists reasons from the idea of water once existing to the idea of the same water still existing via the probable medium of conformity to past experience.

It is worth noting that both in the geometry case, where probable reasoning depended on testimony, and in the bubble and colour case, where probable reasoning depends on conformity to past experience, the probable medium or fallible proof is not some general rule of inference. Rather, it is a specific, intermediate idea that applies to the particular case. In the geometry case he explicitly identifies the proof, or intermediate idea:

> In which case, the foundation of his Assent is the Probability of the thing, the Proof being such, as for the most part carries Truth with it: The Man, on whose Testimony he receives it, not being wont to affirm any thing contrary to, or besides his Knowledge, especially in matters of this kind. (Locke, 4.15.1)

It is true that Locke talks about two general grounds of probability: "conformity with our own Experience, or the Testimony of others Experience" (Locke, 4.15.4, section summary). But it would be utterly out of keeping with his account of reasoning to suggest that these grounds function as general rules of inference or premises in a deductively valid argument. Rather, these general grounds serve to distinguish two general classes of particular ideas that can function as intermediate ideas in individual pieces of probable reasoning. In the geometry case, the idea is the veracity of the particular speaker; in the bubble and water case it is our constant experience that "Water hath been observed to continue long in Existence, but Bubbles, and the Colours on them quickly cease to be" (Locke, 4.11.11).[25]

Locke has much to say of interest to our current concerns in 4.17, "Of Reason." Much of this chapter is devoted to arguments against syllogistic reasoning, and as a result has been deemed to be of little interest. But syllogistic reasoning was the only formal account of reasoning available to Locke, and his (and Hume's) rejection of it is further evidence that they had a non-formal account of reasoning. It is also of interest to note that Locke's commitment to probabilities as well as knowledge is one reason for his rejection of syllogism:

> But however it be in Knowledge, I think I may truly say it is of *far* less or *no* use at all in *Probabilities*. For the Assent there being to be determined by the preponderancy, after a due weighing of all the Proofs, with all Circumstances on both sides, nothing is so unfit to assist the Mind in that as

> Syllogism; which running away with one assumed Probability, or one topical Argument, pursues that till it has led the Mind quite out of the sight of the thing under Consideration. (Locke, 4.17.5)

In fairness to Aristotle, Locke admits that "all right reasoning may be reduced to his Forms of Syllogism" (Locke, 4.17.4, p. 671; not in Wynne). The trouble is that the way we actually reason is unsyllogistic, and trying to reason syllogistically may actually hamper us in the all-important task of discovering intermediate ideas. Once the intermediate ideas are discovered, and their connections perceived, we can then lay out the connections syllogistically:

> Syllogism serves our Reason, but in only one of the aforementioned parts of it; and that is, to shew the connexion of the Proofs in any one instance, and no more: but in this it is of no great use, since the Mind can perceive such Connexion where it really is as easily, nay, perhaps, better without it. (Locke, 4.17.4)

In this chapter Locke speaks of reason and reasoning in general: it is the discovery of the intermediate ideas (sagacity) and the perception of the connection between each idea and its adjacent idea in the chain (illation, also referred to as "inference"). If the perceived connection is certain and immutable, knowledge results; if the perceived connection is only probable or for the most part, we have opinion (Locke, 4.17.2). There is a common structure to demonstration and probability, but it is not deductive validity![26] It is the finding of intermediate ideas to link the first and last idea in the chain, and the perception of their agreement and disagreement. The following is perhaps the clearest statement of the similarities and differences between demonstration and probability:

> There are other *Ideas*, whose Agreement, or Disagreement, can no otherwise be judged of, but by the intervention of others, which have not a certain Agreement with the Extremes, but an usual or likely one: And in these it is that the *Judgement* is properly exercised, which is the acquiescing of the Mind, that any *Ideas* do agree, by comparing them with such probable *Mediums*. This, though it never amounts to knowledge, no, not to that which is the lowest degree of it: yet sometimes the intermediate *Ideas* tie the extremes so firmly together, and the Probability is so clear and strong, that

> Assent as necessarily follows it, as Knowledge does Demonstration. (Locke, 4.17.16)

Throughout this chapter, Locke frequently talks of words and propositions, deductions, and even "deducing one Proposition from another, or making *Inferences in Words*" (Locke, 4.17.18). But all this is not evidence that Locke had a concept of deductive validity and that reasoning proceeds as formal relations among propositions. On the contrary, it is just further evidence that "deduction" is just a generic term for "argument," either demonstrative or probable, though it is often confined to arguments that have been put into words, and that all reasoning with propositions is utterly dependent on the perceived connection of ideas. Consider the passage quoted above in full:

> Though the deducing one Proposition from another, or making *Inferences in Words*, be a great part of Reason, and that which it is usually employ'd about: yet the principal Act of Ratiocination is the finding the Agreement, or Disagreement of two *Ideas* one with another, by the intervention of a third ... Words have their Consequences, as the signs of such *Ideas*: and Things agree or disagree, as really they are; but we observe it only by our *Ideas*.

Furthermore, concentrating on the inference of one proposition from another rather than on the real structure of ideas can lead to bad reasoning. This was one of the drawbacks of syllogism:

> To infer is nothing but by virtue of one Proposition laid down as true, to draw in another as true, *ie.* to see or suppose such a connexion of the two *Ideas* of the inferred proposition ... The Question now is to know, whether the Mind has made this Inference right or no; if it has made it by finding out the intermediate *Ideas* and taking a view of the connexion of them placed in a due order, it has proceeded rationally, and made a right Inference. If it has done it without such a View, it has not made so much an Inference that will hold, or an Inference of right reason, as shewn a willingness to have it be, or be taken for such. (Locke, 4.17.4, p. 672)

We sometimes infer one proposition from another. But if we reason rightly, we will attempt to perceive the connection of the two ideas of the inferred proposition in virtue of the intermediate idea(s) supplied by the proposition it is inferred from. Locke's example here is the inference from, "Men shall be punished in another world," to, "Then

men can determine themselves." If we reason rightly, we should start off with the idea "men" and try to perceive its connection with the idea "can determine themselves" via a series of intermediate ideas that Locke lays out in some detail in this section.

Locke had a well developed notion of probability. Like Hume, he thought that apart from knowledge, which was very limited, attention must be paid to belief or opinion. Furthermore, like Hume, he thought that knowledge could be obtained either immediately by intuition or mediately by demonstrative reasoning, and that belief or opinion could be obtained mediately by probable reasoning. They differed in that Locke thought that what was obtained immediately by sense perception was sensitive knowledge, whereas Hume took that sort of cognitive awareness to be belief.[27] And, like Hume, he thought that (at least one) ground of probability was conformity with past experience.

Locke and Hume

Locke's notion of opinion and probability as needed addenda to the more traditional categories of knowledge and demonstration is an important theme of his *Essay* and was one of the earlier attempts to incorporate the relatively new notion of probability into what we now call epistemology. By the time Hume came to write the *Treatise*, Locke's *Essay* was arguably the most famous contemporary philosophical work in Britain and perhaps Europe. He shared with Locke an emphasis on ideas rather than words or propositions. Like Locke, indeed more so, he was concerned with belief and probable reasoning, not just knowledge and demonstrative reasoning.

Like Locke, Hume rejected scholastic logic, that is, syllogism. After listing his eight rules by which to judge of causes and effects, Hume says,

> Here is all the LOGIC I think proper to employ in my reasoning; and perhaps even this was not very necessary, but might have been supply'd by the natural principles of our understanding. Our scholastic head-pieces and logicians shew no such superiority above the mere vulgar in their reason and ability, as to give us any inclination to imitate them in delivering a long system of rules and precepts to direct our judgment, in philosophy. (T 175)

His rules are not rules of formal validity; they are rules by which to fix the probable connections between ideas of causes and effects. Not being formal rules of inference, it is not clear that his rules are even needed to reason justly; coming at the end of a long discussion of probable

reasoning, they are presented more in the nature of a summary than as a logical guide to probable reasoning.[28]

Hume's too brief account of demonstration and intuition shares with Locke an emphasis on the relation of ideas. It starts, in the section entitled, "Of knowledge," with the classification of seven relations of ideas (T 69). Intuition (T 70), like sense (T 73), is immediate and doesn't count as reasoning. It is the immediate awareness of two ideas. Reasoning is demonstrative if "we can carry on a chain of reasoning to any degree of intricacy, and yet preserve a perfect exactness and certainty" (T 71). In other words, like Locke, Hume thinks that in each link in the chain of ideas we must perceive with certainty the relation between those adjacent ideas. Interestingly, Hume thinks demonstrative reasoning is limited to algebra and arithmetic (T 71), whereas Locke thinks it can be extended to morality (Locke, 4.2.9).

In the section, "Of Probability; and of the idea of cause and effect," Hume claims that, "All kinds of reasoning consist in nothing but a *comparison*, and a discovery of those relations, either constant or inconstant, which two or more objects bear to each other" (T 73). Since he is here concerned with belief and probability, rather than knowledge and demonstration, he goes on to distinguish the two cases of sense perception (and memory [T 82]), or immediate awareness, and probable reasoning, or inferential awareness. Of the former he says,

> When both the objects are present to the senses along with the relation, we call *this* perception rather than reasoning; nor is there in this case any exercise of the thought. (T 73)

Probable reasoning takes place when only one, or neither, of the objects is present to the senses or memory. In these cases we have an inference from an impression to an idea, when one of the objects is present, or an inference from an idea to another idea (when neither of the objects is present). The question of how such reasoning occurs occupies Hume for the rest of part 3 of book 1 of the *Treatise*.

All this is not to say that Hume's account of probable reasoning is just the same as Locke's. On the contrary. Nonetheless, the overall similarity (emphasis on ideas rather than words and propositions, rejection of formal accounts of reasoning) in the early sections of the *Treatise* must indicate that Hume had Locke, or a Lockean theory, very much in mind. And both Locke and Hume thought that conformity with past experience was a ground of probability. Indeed, much of the *Treatise* involves a sustained use of probable reasoning. But Locke thought that opinion based on probability was grounded in reason and the understanding every bit as much as demonstrative knowledge. Hume's famous argument concerning induction is an attack on this

Lockean thought. Of course, Hume then goes in to give his own account of the nature and basis of probable reasoning, but the details of that account are beyond the scope of this paper.[29]

The first paragraph in section 6 of part 3, entitled, "Of the inference from the impression to the idea," begins by repeating the argument that prior to experience the impression of one object can never carry the mind to the belief in the existence of another object. The idea or impression of the first object can never stand in the relevant relation to the idea of the second; there is no medium that can carry us demonstratively from one to the other. This is Hume's rejoinder to those who thought we could have demonstrative knowledge of effects on the basis of causes, prior to the experience of their conjunction. The famous argument, which comes three paragraphs later, has a different target. Once we have past experience of the constant conjunction of two sorts of objects, we do indeed infer the existence of the second object. But now the question is, are we determined by reason to make the transition? On a Lockean view of probable reasoning, we are. We have an idea of the first object. Since we don't yet perceive the second object, we can have no knowledge of its existence, any more than we can have knowledge of the existence of the man who left the room a minute ago. But the conformity of the present object with our past experience of objects of that sort provides probable grounds for a reasonable inference to a belief in the existence of an unobserved object of the relevant kind (men, for instance, but not bubbles). Such an idea is the medium via which we can reason. Analogously, the past experience of objects of the relevant sorts being conjoined provides probable grounds for, that is to say provides the probable medium for, the inference from the perceived idea of the observed object to the idea of the existence of the unobserved object. As Locke says:

> This we call an Argument from the nature of Things themselves. For what our own and other Men's constant Observation has found always to be after the same manner, that we *with reason* conclude to be the Effects of steady and regular Causes. (Locke, 4.16.6; emphasis added)

Constant observation, by ourselves and others, that, "Fire warmed a man," seems then to provide us with the probable medium that can take us from the idea of this fire to the idea that it has or will warm a man. Such constant experience puts us

> past doubt, that a relation affirming any such thing to have been, or any prediction that it will happen again in the same manner, is very true. (Locke, 4.16.6)

The probable medium here would be in accordance with one of the general grounds of probability, that is, conformity to experience. So the first idea would be "this fire," the proof or intermediate idea would be "conforms to past experience with respect to warming," and the last idea would be "has or will warm a man." But nowhere does Locke address the question of how constant experience or constant observation of a sort of thing's behaviour in the past can give rise to the idea that a current instance of that sort of thing conforms to that past experience.

Hume's insistence that if, after experience, reason determined us, it would proceed upon the uniformity principle, is just his way of addressing this question. We have an impression of a fire. We have a constant experience of fires warming men. We come to have the idea of warming men that is suitably related to our impression of this fire. That is to say, we believe that this fire will warm a man. But there is a gap in the chain of ideas that constitutes this piece of probable reasoning, if it is matter of reason determining us. As it stands, we can't get from the idea of experienced warming to the idea of unexperienced warming, unless there is a further intermediate idea of conformity of unexperienced fires to past experienced fires in this respect of warming. The claim that, "If reason determin'd us, it wou'd proceed upon that principle" (T 89) of uniformity is just the claim that if reason determined us, some such idea would always be available.

The appeal to a principle here can mislead us. For a principle sounds like some general proposition that might well function as a premise in a deductively valid argument. But Hume does not usually use the term in that way. Consider how he uses the notion of a principle, not in this negative argument about probable reasoning, but in his positive account of probable reasoning. Just a few pages later (T 92) he says:

> When the mind, therefore, passes from the idea or impression of one object to the idea or belief of another, it is not determin'd by reason, but by certain principles, which associate together the ideas of these objects, and unite them in the imagination.

These principles are, of course, the three principles of association, as Hume makes clear in the next paragraph. No one, as far as I know, has suggested that when Hume appeals to the principles of association as an explanation for a certain sort of activity in our mental life, he is really presenting a deductively valid argument where one of those principles functions as a premise. The principles function as empirical generalizations that explain their instances by subsuming them. Similarly, if reason determined us, in probable reasoning, each

instance of probable reasoning would contain, as an intermediate idea or "probable medium," some instance of the uniformity principle that would allow the transition from some past experience to some relevantly similar unobserved idea.

Hume argued for his principles of association earlier in the *Treatise* (T 10-13), and thus felt free to use them when explaining and defending his positive account of probable reasoning. But it is his negative account that chiefly concerns us. If reason determined us, in probable reasoning, then each such instance of probable reasoning would contain the relevant intermediate idea of conformity to past experience; that is to say, each piece of probable reasoning would proceed upon the uniformity principle. Thus, to prove that reason does not determine us, that is, that such intermediate ideas are not available to us, it suffices to show that the principle is false.

We can look at the situation in the following way:[30] since the principle is available to us neither by intuition nor sense perception, then if it is available to us at all, it must be as a result of demonstrative or probable reasoning. Suppose, contrary to what Hume argues, it is provable demonstratively. Then the situation would be as follows: we are trying to find a demonstrative argument "to prove, *that those instances, of which we have had no experience, resemble those, of which we have had experience*" (T 89). But no such argument is possible; such an argument would start with the idea of experienced instances and then, via a chain of intermediate ideas, each of which is necessarily related to its adjacent ideas, end with the idea of resembling unexperienced instances. As a result, the first idea of experienced instances would be necessarily related to the last idea of unexperienced instances. But we know in advance that such an argument is not possible: we can easily form an idea of unexperienced instances that do not resemble experienced instances. "To form a clear idea of any thing, is an undeniable argument for its possibility, and is alone a refutation of any pretended demonstration against it" (T 89).

Now suppose, again counterfactually, that the principle is believed as the result of probable arguments rather than known as the result of the demonstrative arguments. Then the situation would be as follows: we are trying to find a probable argument that will take us from the idea of experienced instances to the idea of resembling unexperienced instances. But no such argument is possible; such an argument would have to proceed from the former idea, via a chain of intermediate ideas, to the latter idea. But in a probable argument, such a chain of intermediate ideas would include a link that takes us from the idea of experienced instances to an idea of resembling unexperienced instances, and that is the very link we are trying to establish by this probable argument! "[P]robability is founded on the presumption of a

resemblance betwixt those objects, of which we have had experience, and those, of which we have had none; and therefore 'tis impossible this presumption can arise from probability" (T 90).

Locke argued that conformity to experience was a ground of probability, and Hume concurred. But Hume showed that that ground was not based on reason, either demonstrative or probable. Hume's appeal to the principle of uniformity has nothing to do with the need for a premise to turn an otherwise deductively invalid argument into a valid one; rather it has to do with the lack of a suitable idea that would form the crucial connection in the chain of ideas that constitute a piece of probable reasoning. The relevant probable medium or fallible proof is just not available to us.

Locke never explicitly appeals to anything much like a principle of uniformity with respect to probability. He is content to say that conformity with experience is a suitable ground of probability, that is, can provide, along with testimony, a probable medium. Interestingly enough, however, he does appeal to something very like the principle of uniformity when talking about habitual knowledge in 4.1.9. Suppose a person has once successfully demonstrated that the three angles of a triangle are equal to two right ones, and that he "*retains the Memory of the Conviction without the Proofs*," that is, he remembers that he demonstrated the equality but he no longer remembers the intermediate ideas via which the demonstration occurred. Locke admits that at one point he thought that such a person could not really know the equality but rather had a sort of assurance which was greater than belief or opinion but still not knowledge. Assurance, incidentally, is the term Locke uses, for example, at 4.16.6, to characterize the beliefs we have that are characterized by the highest degree of probability.[31] In any case, Locke now thinks that the person who retains the memory of the conviction without the proofs can be said to know "with perfect certainty." This is because, although the original intermediate ideas that enabled us to perceive the agreement of the ideas of the two sets of angles are no longer to be had, there are "other intermediate *Ideas* that shew the Agreement or Disagreement of the *Ideas* contained in the Proposition whose certainty we remember" (not in Wynne). The person remembers that he was once certain of the truth of the proposition, and,

> The immutability of the same relations between the same immutable things is now the *idea* that shews him, that if the three Angles of a triangle were once equal to two right ones, they will always be equal to two right ones. And hence he comes to be certain that what was once true in the case is always true, what *Ideas* once agreed will always agree, and

> consequently what he once knew to be true he will always know to be true, as long as he can remember that he once knew it.

The immutability of the same relations between the same immutable things is very similar to Hume's uniformity principle, which asserted the uniformity of unexperienced instances of a sort with experienced instances of that sort. In Locke's forgotten demonstration case, that immutability serves as the intermediate idea that enables a demonstration to proceed from the idea of two ideas once agreeing to the idea of two ideas always agreeing. In the probable case, the uniformity principle, or instance of it, is the intermediate idea (or ideas) that would enable a probable argument to proceed from an idea of what was once the case to an idea of its always being the case. The parallels, between Locke's argument and my exposition of what Hume thought the role of the uniformity principle would play if we are determined by reason, are striking and worthy of note. Though hardly decisive in themselves, they provide some measure of support for my exposition.

Conclusion

Hume famously argued against a certain conception of probable arguments as grounded in reason and the understanding. It has been my task to uncover what that conception actually was in order better to understand Hume's argument. That conception was non-formal, concerned at the most basic level with ideas rather than propositions, and always involved showing that two ideas stood in a certain relation via showing that each idea was in turn related to an intermediate idea. In demonstrative reasoning, each link in the chain was certain while in probable reasoning each link was perceived to hold only "for the most part." Hume's argument concerning induction was thought by him to show that the requisite intermediate idea or ideas for probability were simply not available. Thus probability was not grounded in reason or the understanding as traditionally conceived.

Hume goes on, in the next eighty pages of the *Treatise*, to give his own account of probability and probable reasoning. The details of that account are almost as controversial as the details concerning the argument about induction, but I only want to make one point here to avoid misunderstanding. In abandoning the notion of probability as grounded in reason and the understanding, traditionally conceived, Hume abandons the notion that reasoning always requires an intermediate idea to link the two ideas shown to be related. This is made abundantly clear in an important footnote (T 96-97). There he says that the received view takes "[r]easoning to be the separating or uniting of different ideas by the interposition of others, which show the

relation they bear to each other." This view is faulty, as he has shown: "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 97n). In these cases of probable reasoning from cause to effect a person reasons without reflecting on past experience and without recourse to the uniformity principle (T 103-4). Not all causal reasoning is like this, however. In those instances where we reason causally after only one experiment, we do indeed reflect on past experience and make use of something very like the uniformity principle (T 104-5). But the point remains. Hume has supplanted a view of reasoning which requires intermediate ideas with one that doesn't.

We started with the warning that to understand Hume's famous argument about induction we must resist the temptation to treat the demonstrative/probable distinction as the same as the deductive/inductive contrast. Much recent work has avoided that trap, but at the cost of treating both demonstrative and probable arguments as having deductive structure. This strategy, though initially attractive, is equally flawed. Locke's neglected account of the distinction between demonstration and probability is the best starting point for understanding the conception of reasoning Hume was attacking, and consequently, for understanding the account he put in its place.[32]

University of Arizona

1. David Hume, *A Treatise of Human Nature*, ed. L. A. Selby-Bigge, 2d ed., rev., ed. P. H. Nidditch (Oxford, 1987), 27, 628 (hereafter cited as "T"). This edition also contains the *Abstract*.
2. *Pace* D. C. Stove, *Probability and Hume's Inductive Scepticism* (Oxford, 1973), 27, who only notices the latter occurrence.
3. David Hume, *Enquiries Concerning Human Understanding and Concerning the Principles of Morals*, ed. L. A. Selby-Bigge, 3d ed., rev., ed. P. H. Nidditch (Oxford, 1975), 174.
4. In 1959, A. C. MacIntyre was well aware that Hume was unlikely to have meant by his use of the term "deduce" anything like what we would mean by that term. However, he makes the still serious mistake of identifying Hume's demonstrative arguments with our deductive arguments, and shows some sympathy with ascribing the "deductive or defective" view of arguments to Hume. See "Hume on 'Is' and 'Ought'," *The Philosophical Review* 68 (1959).

5. In this paper I shall treat the positions taken in T. L. Beauchamp and A. Rosenberg's *Hume and the Problem of Causation* (Oxford, 1981) (hereafter cited as "BR"), and D. C. Stove's *Probability and Hume's Inductive Scepticism* (above, n. 2) as paradigms of the result of careful work that transcends the simple mistake of mistaking Hume's demonstrative/probable contrast for the deductive/inductive one. Both of these admirable books pay close and scrupulous attention to Hume's texts, but because of their somewhat ahistorical nature mislocate Hume's target in his negative argument concerning probable reasoning, especially concerning the role of the principle of uniformity and the place of the formal notion of deductive validity.
6. That Hume read Locke by the time he wrote the *Treatise* is of course beyond doubt, given the frequent references to Locke in that work. There is some question whether he read the complete *Essay* or John Wynne's abridgement, which was popular in Scotland throughout the eighteenth century. Wynne's abridgement first appeared, with Locke's approval, in 1696, and was clearly based on the third edition. I have examined four editions (1696, 1752, 1770, and 1774) in the rare book room of the Robarts Library at the University of Toronto. The latter three editions are based on Locke's fourth edition of 1700. My hunch is that Wynne's abridgement was changed from being based on the third edition to the fourth well before 1752, although I cannot prove that without looking at post-1700 editions before 1752.

   It is overwhelmingly likely that Hume read the unabridged Locke for the following reason: Wynne's abridgement leaves out all of book 1 except for the first introductory chapter; that is to say, it leaves out everything about innate ideas. But Hume discussed innate ideas in the last paragraph of 1.1.1 (T 7), and although he doesn't explicitly refer to Locke at this point, he has just referred to Locke a few pages earlier concerning ideas in general. And the author (Hume himself by most accounts) of the *Abstract*, published the year after the first two books of the *Treatise*, explicitly refers to Locke on innate ideas (T 648).

   In any case, almost all of the passages from Locke to which I will allude in this paper are in Wynne (based on the fourth edition), either entire or in slightly abridged form. Where this is not the case, I will indicate it.
7. See J. A. Passmore, "Descartes, the British Empiricists, and Formal Logic," *The Philosophical Review* 62 (1953), referred to in this context in J. Barnes, "Proof Destroyed," in *Doubt and Dogmatism: Studies in Hellenistic Epistemology*, ed M. Schofield et al. (Oxford, 1980). See also J. W. Yolton, *Locke and the Compass*

of Human Understanding (Cambridge, 1970), 91-95. Yolton relies here on M. Wilson, "Leibniz and Locke on 'First Truths'," *Journal of the History of Ideas* 28 (1967).

8. A graphic example of this can be found in John Locke, *An Essay Concerning Human Understanding*, ed. P. H. Nidditch (Oxford, 1975), bk. 4, chap. 17, sec. 4, p. 672, l. 25 to p. 673, l. 31. Henceforth such references will be given in the form 4.17.4. Where useful, page and line numbers will be given as well.
9. See Yolton (above, n. 7), 93.
10. Here Hume is clearly talking about an inference or argument amounting to a demonstration, but note the grounds on which it is asserted that the inference would be a demonstration. And on the next page he asserts that, "What is possible can never be demonstrated to be false; and 'tis possible the course of nature may change, since we can conceive such a change" (T 651). See also T 79, 80, 87, and 161-62. In all these cases, the only consistent reading is that something can be demonstrated only if the relevant two ideas cannot be conceived separately. If it is possible to conceive one of the relevant ideas (e.g., "whatever begins to exist") without the other (e.g., "cause of existence"), then the relevant proposition, *"whatever begins to exist, must have a cause of existence,"* cannot be demonstrated to be true. This has little to do with the conclusion of a deductively valid argument, even from necessarily true premises.
11. I do not mean to suggest that Hume's views on probable reasoning derive solely from, and in reaction to, Locke's, nor that Locke's views arose in a vacuum. The rise of the modern conception of probability in general, and Hume's conception of probable reasoning in particular, is a long, difficult and controversial story. Much of it is admirably presented in Ian Hacking's *The Emergence of Probability* (Cambridge, 1975), a book to which I am much indebted. My purpose here is not to tell that whole story. I have the much more limited aim of clarifying the structure of Hume's celebrated argument concerning induction in terms of his, and Locke's, views on the nature on demonstrative and probable reasoning.
12. Remember that here, as in what follows, "deductive" and its cognates are being used in their modern sense unless flagged otherwise.
13. In a few places, BR seem to be maintaining the implausible thesis that the conception of probable reasoning that Hume is attacking is the claim "that at least some inductive arguments are demonstrative" (pp. xviii, 41). This is implausible for the following reason: since they hold that demonstrative arguments have

"self-evident *a priori* premises," it is clear that Hume had already shown that probable arguments could not be demonstrative by the beginning of section 6, well before the famous argument. So on this view, that famous argument is otiose! But later they make the weaker, more plausible claim that probable arguments share with demonstrative arguments, not the characteristic of having self-evident premises, but only the feature of "logical necessity attending demonstrative arguments" (p. 43), or of "logical necessity that uniquely characterizes demonstrative reason" (p. 46).

14. As Stove (above, n. 2) correctly notes (p. 35). He further notes (pp. 35-36) that it avoids saddling Hume with the view that there cannot be a deductively valid argument which has a contingent conclusion. This is more problematic, as will emerge later.
15. Antony Flew, for instance, in *David Hume: Philosopher of Moral Science* (Oxford, 1986), attributes this to Hume as a Cartesian assumption.
16. Anne Jacobson, in her review of Flew (above, n. 15) in *Mind* (1988): 297, though not agreeing with this tendency, realizes its near universal current acceptance: "Hume does also *appear* to assume that any good, rational argument for a matter of fact claim about the unobserved must include as a premise that the future will resemble the past and exegesis of Hume has nearly universally assumed or argued that a particular conception of right reasoning or good argumentation is what gives rise to the requirement of the presence of this premise."
17. In "A Defence of Induction," in *Perception and Identity*, ed. G. F. Macdonald (London, 1979), 115-16, J. L. Mackie accepts Stove's interpretation of Hume and adds the following consideration: if you interpret the model of probable reasoning that Hume is attacking as having a non-deductive structure so that experience probabilified an inductive conclusion, then "Hume's claim that 'probability' would have to appeal, circularly, to the uniformity principle would be false." That is to say, points two and three above not only explain Hume's appeal to circularity, they are the only explanation of that circularity.
18. Here I am indebted to R. J. Fogelin, *Hume's Skepticism in the Treatise of Human Nature* (London; Boston, 1985), 153-54.
19. In B. Stroud, *Hume* (London, 1977), 60-62.
20. Fogelin (above, n. 18), 157
21. See note 8 and p. 191 below. Even in the chapter on truth, 4.5, where Locke most frequently talks about propositions, he reduces propositions, at least mental propositions, to ideas and their relations. I leave aside, for this paper, the complications raised by words and verbal propositions.

22. See Locke's extensive, detailed discussion of an example that makes just this point in 4.17.4, p. 672 l. 19 to p. 673 l. 31. It is perhaps worth remarking that this discussion was added to the fourth edition, and thus not in Wynne 1696.

    This difficulty of talking about premises and conclusions is the reason I was reluctant, in note 14, to go along with Stove's reason for ascribing to Hume the view that demonstrative arguments were deductively valid with necessarily true premises. One of Stove's reasons was a disinclination to saddle Hume with the view that there could be no deductively valid arguments with contingent premises. But if I am right, that view, or its denial, would be simply incomprehensible to Hume.
23. Though an angel might. See Locke, 4.17.14
24. See Hacking (above, n. 11), passim.
25. There is of course a problem here that Hume was quick to pounce on, and that Locke never really addresses: that we have experienced water to continue long in existence, but not bubbles, does not ground our probable conclusion that the water, but not the bubbles, still continues to exist when we have no sensitive knowledge of that fact unless we have some reason to think that this water is like past experienced water in that respect. The intermediate idea has to be that this water conforms to past experienced water in persistency of existence. Locke of course realizes that the particular intermediate idea must have this characteristic of "conformity to our experience" but doesn't seem to think that there is any problem with this requirement. For further discussion, see below, p. 193-94.
26. There is a passage in 4.17.2 that the unwary might take as evidence that Locke thought that both demonstrative and probable inferences were characterized by deductive validity:

    > *Illation* or *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.

    Here Locke talks of both demonstrative and probable arguments being "deductions." But both his general account of reasoning as non-syllogistic, and his clear reference in this passage to the agreement or disagreement of ideas, indicate that here as elsewhere we must treat Locke's use of the term "deduction" as merely a synonym for "argument."

27. The comparison of intuition with sense perception is made explicitly twice in 4.17.2, as is the comparison of demonstration with probability.
28. The role of principles and rules, especially general rules, is of extraordinary interest in the attempt to understand Hume. They feature prominently in all three books of the *Treatise*, and I'm convinced a thorough study of them would inform the issue at hand. I discuss them *very* briefly below, pp. 194-95.
29. But see pp. 194-95, 197-98 below.
30. This strategy was suggested to me by Stephen Schiffer.
31. The change of mind occurred between the third and the fourth editions. See Locke, 4.1.9, pp. 528-29.'
32. Remote ancestors of this paper were read at colloquia at the University of Texas, Austin, and the University of Arizona, where I received many helpful comments. M. A. Stewart and John Wright both provided so many helpful comments and suggestions to a later version of the paper that acknowledgement at each place where they helped became virtually impossible. A shorter version was then read at the Hume Society Conference, in Lancaster, England, in August, 1989. Apart from *The Emergence of Probability*, Ian Hacking's *Why Does Language Matter In Philosophy?* (Cambridge, 1975) greatly influenced my early thinking on these matters, especially in its insistence on treating Locke's appeal to ideas as seriously as Locke clearly intended.