Hume's Fork, and his Theory of Relations[1]

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Hume's Fork—the distinction between "relations and ideas" and "matters of fact" introduced in his first *Enquiry*—is well known, though considered by most specialist scholars to be a crude simplification of the far more sophisticated theory of relations in his *Treatise*. But close analysis of the *Treatise* theory shows it to be an unsatisfactory reworking of Locke's taxonomy, implausibly identifying relations with mental operations and delivering a confused criterion of demonstrability which Hume subsequently abandons in favour of his Conceivability Principle. The latter then becomes the basis for Hume's Fork, the theory of which, as implicitly defined by the various criteria he specifies, turns out to be consistent and plausible. However it faces a number of potential problems, some of which Hume might have been expected to address, while others—particularly concerning his tendency to identify apriority, demonstrability, and necessity—derive from relatively recent Epistemology, Philosophy of Language, and Philosophy of Mathematics. All of these are considered, some requiring tightening of Hume's distinction while others imply limitations. Finally, a conclusion is drawn emphasising the continuing value of Hume's position, despite these difficulties.

Hume's Fork—his distinction between "relations of ideas" and "matters of fact"—is justly famous, and widely acknowledged as an influential ancestor of the familiar modern analytic/synthetic distinction. Given Hume's tendency to see ideas as the determinants of meaning, the very term "relations of ideas" suggests something like "truth in virtue of meaning". And the logical positivists, who took inspiration from Hume in formulating this modern notion of *analyticity*,[2] saw it also as the only legitimate source of *necessity* or *apriority*, making Hume's Fork appear as a clear and elegant anticipation of this identification of the three notions:

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[1] For discussion of this paper, I am very grateful to Amyas Merivale, Duncan Pritchard, and Hsueh Qu.

[2] Quine (1943: 120) reports this notion: "It is usual to describe an analytic statement as a statement that is true by virtue of the meanings of the words; or as a statement that follows logically from the meanings of the words." Pap (1944: 471) attributes it to Schlick (translating from a German original). Ayer's *Language, Truth and Logic* of 1936, heavily influenced by Schlick's Vienna Circle, gave the formulation "a proposition is analytic when its validity depends solely on the definitions of the symbols it contains, and synthetic when its validity is determined by the facts of experience" (1971: 105, cf. 21). In what follows, we shall focus exclusively on this notion of analyticity because it is closest in spirit to Hume, but note that Kant (*Critique of Pure Reason*, Introduction §IV) instead defines an analytic proposition as one in which "the predicate is contained within the subject", and Frege (*Foundations of Arithmetic* §3) as a proposition which is either a logical truth or is reducible to a logical truth by substitution of definitions.

Relations of Ideas [are] either intuitively or demonstratively certain. Propositions of this kind are discoverable by the mere operation of thought, without dependence on what is any where existent in the universe … Matters of fact, which are the second objects of human reason, are not ascertained in the same manner … The contrary of every matter of fact is still possible; because it can never imply a contradiction … We should in vain, therefore, attempt to demonstrate its falsehood. (*E* 4.1–2)

As the final sentence hints, Hume uses this distinction for the crucial purpose of delimiting the range of what can be *demonstrated* (*E* 4.18, 12.27–8), or in modern terms, *proved deductively*.[3] But this well-known passage comes from the *Enquiry concerning Human Understanding* of 1748, and Hume's Fork is not spelled out in anything like these terms in his *Treatise of Human Nature* of 1739. There, the comparable role is played by a complex theory of "philosophical relations" which is very different in detail. And this raises an important interpretative question: is Hume's Fork, as presented in the *Enquiry*, a *replacement* for his *Treatise* theory of philosophical relations, or a *simplification*? In other words, should we take Hume's Fork as an authoritative statement of his mature view, leaving the theory of the *Treatise* behind, or should we instead look to the *Treatise* for his authoritative theory, and view the *Enquiry* position as a later gloss, a simplified sketch for easy consumption?

Of those who have addressed this question, Norman Kemp Smith is the most conspicuous early example, remarking in 1941 that the *Enquiry* distinction "is at once more general and more satisfactory" (1941: 355). But later scholars have combined to argue strongly in the opposite direction, with Donald Gotterbarn (1974: 274, 279), Lewis White Beck (1978: 83–4), and Marina Frasca-Spada (1998: 126–7), for example, all taking the *Treatise* as authoritative. In the same spirit, David Owen (1999: ch. 5) and Helen Beebee (2006: §2.2–4) have provided sophisticated accounts of Humean "demonstration" that draw heavily on distinctive aspects of the *Treatise* approach to yield a concept very different from what we understand by "deduction", and thus move significantly away from the straightforward anticipation of modern logical categories that previous generations of philosophers have found (perhaps too readily) in the familiar text of the *Enquiry*. Owen, indeed, largely ignores the *Enquiry*, while Beebee fairly quickly puts it aside after suggesting "it is clear that [Hume] still has more or less the same underlying view in the later work" (p. 19). Don Garrett's recent book (2015) evinces a similar attitude, accepting the familiar terminology from the *Enquiry* but analysing and defending—on Hume's behalf—the theory of the *Treatise*. Henry Allison expresses a more forthright preference: "the *Enquiry* account, precisely because of its superficial clarity and aura of familiarity, is seriously misleading, if taken as the definitive expression of Hume's epistemology" (2008: 64).

Part of my purpose here is to argue against this consensus, by showing that the logical framework of the *Enquiry* is not only simpler than that of the *Treatise*, but also—as Kemp Smith correctly judged—"more general and more satisfactory". This will involve a fairly detailed analysis of Hume's theory of relations in the *Treatise*, his Dichotomy between "constant" and "inconstant" relations, and the interplay between the various

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[3] I have argued at length elsewhere—and will substantiate further in §3 below—that Hume's "demonstrative argument" is essentially the same as *deduction*, in the *informal* sense of an argument whose premises absolutely guarantee the truth of its conclusion (see Millican 1995: 96–8, 2002: §7.1, and especially 2007a: §V). Thus understood, "*P* can be demonstrated" is broadly equivalent to "*P* can be proved deductively".

criteria that he proposes for the two halves of his Fork. This comparative analysis will also be combined with two other aims: to clarify Hume's attitude to conceivability and inconceivability as criteria for "relations of ideas" and "matters of fact", and to provide an overview of how Hume's Fork stands up in the light of more recent developments in Epistemology, Philosophy of Language, and Philosophy of Mathematics.

1. Philosophical and Natural Relations

Hume introduces the topic of relations in the *Treatise* as part of his systematic taxonomy of the objects of the human mind, his main discussion of them coming in *Treatise* 1.1.5, "Of relations."[4] By this stage, the previous section "Of the connexion or association of ideas" (1.1.4) has already identified three associative principles by which our thoughts are naturally led from one idea to another:

> The qualities, from which this association arises, and by which the mind is after this manner convey'd from one idea to another, are three, viz. RESEMBLANCE, CONTIGUITY in time or place, and CAUSE and EFFECT. (*T* 1.1.4.1)

Hume ends this discussion of the association of ideas by highlighting one of its "remarkable" effects, in generating "those complex ideas, which are the common subjects of our thoughts and reasoning ... These complex ideas may be divided into *Relations*, *Modes*, and *Substances*." (*T* 1.1.4.7). He accordingly moves on to relations in *Treatise* 1.1.5, and modes and substances in 1.1.6.

Hume starts his treatment of relations by noting an important ambiguity, between "relation" understood in a *natural*, or a *philosophical* sense:

> The word *relation* is commonly us'd in two senses considerably different from each other. Either for that quality, by which two ideas are connected together in the imagination, and the one naturally introduces the other, after the manner above-explained; or for that particular circumstance, in which, even upon the arbitrary union of two ideas in the fancy, we may think proper to compare them. In common language the former is always the sense, in which we use the word, *relation*; and 'tis only in philosophy, that we extend it to mean any particular subject of comparison, without a connecting principle. (*T* 1.1.5.1)

He gives just one example here. Comparison of two things can reveal that they are very distant from each other—this is a *philosophical* relation between them. But it is not a *natural* relation, because distant things don't naturally lead the thought from one to the other.[5] Contiguity, by contrast, is *both* a philosophical *and* a natural relation—it is a relationship that can hold between two objects (*T* 1.1.5.5), *but also*, this relationship is of a type that naturally generates an association of ideas (*T* 1.1.4.1): if two objects are contiguous, then thought of one of them will often naturally lead to thought of the other.

Hume's main aim in this paragraph seems to be to clarify—for the benefit of his non-philosophical readers—how philosophers characteristically use the word "relation".

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[4]   As we shall see, other important contributions to his theory of relations are at *T* 1.3.1.1–5 and 1.3.2.1–3.

[5]   Hume introduces the term *natural relation* implicitly at *T* 1.1.5.9, and explicitly at *T* 1.3.6.16. Note that natural relations in this associational sense are not to be confused with those that are natural in the sense that is "oppos'd to *artificial*" (*T* 3.2.1.19, cf. *T* 3.1.2.9), as at *T* 3.2.2.11.

According to this usage, which owed much of its currency to John Locke,[6] we can talk of countless arbitrary relations as holding between *A* and *B*, even if the ordinary person wouldn't for a moment think of *A* and *B* as *related* in any natural or everyday sense. As Locke stresses, "there is *no one* thing, whether simple *Idea*, Substance, Mode, or Relation, or Name of either of them, *which is not capable of almost an infinite number of* Considerations, in reference to other things", and something is "capable of as many Relations, as there can be occasions of comparing [it] to other things, in any manner of agreement, disagreement, or respect whatsoever" (*Essay* II xxv 7). Thus relations in this philosopher's sense reach well beyond the bounds of ordinary relatedness. To take an extreme example, I can define relation *R* as holding between extinct volcano *X* and oyster *Y* if and only if *X* first erupted more than 2,000 miles from the place where *Y* died, and at least 10 million years earlier. *R* then relates, in the philosopher's sense, pairs of objects that nobody would normally think of as being *related* at all (unless, by some surprising coincidence, they came to be mentioned in the same story or some such).

As for the contrasting "common language" use of the word "relation", Hume is proposing that everyday relatedness can be identified with association of ideas by means of *resemblance*, *contiguity*, and *causation*, "after the manner above-explained" in the previous section. So just as the final paragraph of that section (*T* 1.1.4.7, quoted earlier) provides a neat link into the discussion of relations, so the first paragraph on relations provides a neat link back to the discussion of association of ideas. Moreover given Hume's theory that relatedness *in the everyday sense* is a function of the very association that he has just described, it is easy to understand why at this point—about to embark on a taxonomy of relations *in the philosopher's sense*—he finds it appropriate to start his new discussion by explicitly highlighting the otherwise potentially confusing contrast between the two senses. Another obvious motivation would be to guard against ambiguity in his own text, since later in the *Treatise* he will sometimes use the word "relation" in the narrow associational sense,[7] but mostly in the broader philosophical sense.[8]

We have seen that Hume's philosophical/natural distinction, at least as originally introduced, appears to be a simple verbal clarification. But many scholars have accorded the distinction far more importance. Thus John Robinson (1962: 134) states that "it is in fact utterly fundamental for a clear understanding of what Hume's philosophy is all about", and suggests "that it is the failure to get this distinction clear which is responsible for most of the misunderstanding and confusions which exist concerning Hume's treatment of causation". Likewise Alan Hausman (1967: 255) attributes "some common misunderstandings of Hume's views on causation" to "confusion about the distinction", though his

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[6]   For example the article on *Relation* in Chambers' influential *Cyclopaedia* of 1728 takes most of its content, either explicitly or implicitly, from Locke's discussion in Chapter II xxv of his *Essay concerning Human Understanding*.

[7]   When presenting his associationist theories, Hume has a tendency to confine "relation" to those that are natural: thus *T* 1.3.8.3 considers "the nature of relation, and that facility of transition, which is essential to it", and likewise *T* 1.4.2.34 says that "The very nature and essence of relation is to connect our ideas with each other, and upon the appearance of one, to facilitate the transition to its correlative." Other clear examples are at *T* 2.2.5.5, 2.2.8.14, and 2.2.8.20 (while *T* 1.3.16.9 is a rare case that seems genuinely ambiguous).

[8]   Even in contexts involving association, Hume repeatedly refers to resemblance, contiguity and causation as three amongst a wider set of relations (e.g. *T* 1.1.4.4, 1.2.5.21, 1.3.6.13, 1.3.9.2, 1.4.6.16, 2.1.12.7), and to "relations" in a way clearly intended to embrace all of his philosophical relations (e.g. *T* 1.3.2.1–3, 3.1.1.18-27, cf. also *T* 1.4.2.2–7).

account is "markedly" different from Robinson's (p. 255, n. 2). More recently, Helen Beebee (2006: 99–107; 2011) and Eric Schliesser (2007: 90–5) also appeal to the distinction—albeit again in very different ways—as key to understanding Hume's two definitions of cause. How is it that a distinction which is supposedly so crucial to Hume's position on such a central aspect of his philosophy can be interpreted so variously, both in significance and content?

The reason for such huge variation in the interpretation and assessment of the philosophical/natural distinction seems to be the paucity of textual evidence, combined with the potential importance of the few places where it is mentioned. Apart from *T* 1.1.5.1, where it is introduced, and *T* 1.1.5.9—which merely remarks that "the relation of cause and effect is a ... philosophical relation, as well as a natural one"—the distinction is entirely absent from the text of the *Treatise* (as likewise from the rest of Hume's works) except for two sentences, the first of which is a paragraph in itself:[9]

(A) Thus tho' causation be a *philosophical* relation, as implying contiguity, succession, and constant conjunction, yet 'tis only so far as it is a *natural* relation, and produces an union among our ideas, that we are able to reason upon it, or draw any inference from it. (*T* 1.3.6.16)

(B) There may two definitions be given of [cause and effect], which are only different, by their presenting a different view of the same object, and making us consider it either as a *philosophical* or as a *natural* relation; either as a comparison of two ideas, or as an association betwixt them. (*T* 1.3.14.31)

Much has been read into these passages, the first of which ends the section on induction, while the second introduces Hume's two "definitions of cause" at the culmination of his extended discussion of the relation of causation (which structures so much of this part of the *Treatise*). It is not surprising that such prominent passages should be suspected of being highly significant in Hume's philosophy.

Nor, perhaps, is it surprising that with so little textual evidence to go on, the interpretative options have ranged widely. Schliesser ambitiously takes passage (A) to be pronouncing a fundamental methodological maxim which is certainly not explicit either here or in the surrounding text: "Only reasoning with the natural relation [of causation] will produce belief ... So, theories that presuppose ... 'unnatural' philosophical relations of causation" such as Newtonian forces "may be very useful as predictive devices ... but they cannot be belief engendering" (Schliesser 2007: 93). Other readings more modestly look to the two passages to illuminate at least the philosophical/natural distinction itself. Thus Hausman—in a discussion that draws on (A)—argues that "*Philosophical* relations ... connect ordinary objects; *natural* relations connect our thoughts about them. The two categories are radically distinct. The first is ontological, the second, psychological." (1967: 255, and see pp. 266–7). Beebee sees passage (B) as likewise implying a distinction of disjoint categories, though "not between two different kinds of *relation*" but between "two different mental procedures by which causal judgments come to be made

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[9] This is not to deny that Hume uses the term "relation" in the two different senses, as already remarked, and he occasionally (*T* 1.1.5.2–3, 1.3.1.1–2) refers to "philosophical relations" to clarify that usage. But the only passages beyond *T* 1.1.5 to suggest an explicit contrast between the two sides of the distinction are *T* 1.3.6.16 and 1.3.14.31.

—namely, the comparison (first definition) and association (second definition) of ideas" (2011: 244). As more is read into the distinction, so in turn the greater potential this yields for interpreting these two passages as having fundamental significance for Hume's views more generally. And thus the interpretative bandwagon goes on, feeding on itself for want of substantial textual nourishment.

In opposition to all such readings, I believe that the philosophical/natural distinction is exactly what Hume presents it as being, namely, a generally harmless ambiguity in the understanding of the word "relation", one sense of which is more comprehensive than the other (since all relations whatever are "philosophical"). Hausman's claim that their relata are distinct—respectively objects and ideas—may seem marginally supported by passage (A), but Hume's main treatment of the topic seems clearly to imply that the very same relation can be *both* a philosophical *and* a natural relation, which counts against such distinctness. *Resemblance* is a philosophical relation which sometimes (but not always) "produces a connexion or association of ideas" (*T* 1.1.5.3);[10] even more explicitly, the "relation of cause and effect is a . . . philosophical relation, as well as a natural one" (*T* 1.1.5.9). When itemising the various categories of philosophical relation at *T* 1.1.5.3–9, Hume mostly refers to their holding between objects, but *contrariety* (*T* 1.1.5.6) is explained instead in terms of ideas. And in his initial statement of the distinction itself (quoted earlier from *T* 1.1.5.1), both sides are explained in terms of ideas. Hausman also seems to ignore passages in which Hume explicitly states that large classes of relations "must be common both to objects and impressions" (*T* 1.4.5.21) or common to objects and ideas (*T* 1.2.2.1). In general, Hume seems happy to talk indifferently of relations as holding between objects or between our ideas of them,[11] and there is no ground here for seeing the natural relations as anything more than a sub-category of the philosophical relations, consisting of those specific relations that correspond to associative tendencies of the human mind. Of course *contiguity*, say, between A and B can lead our thought from A to B only if *we are aware* of that contiguity: to this extent, it is obvious that a natural relation will involve *ideas* rather than just objects. But it is equally true that A's being *greater than B* (a philosophical relation involving "proportion of quantity or number") will lead us to conclude that B is *less than A* only if we are aware of that inequality. In neither case does this obvious epistemological point do anything to show that the relation in question cannot hold between the *objects* of which we think (or, indeed, between objects of which we have never thought).[12]

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[10]   *T* 1.1.5.1 and 1.1.5.3 (which is quoted near the beginning of §2 below) together seem to imply that whether some specific *resemblance* counts as a natural relation or not can depend on the relevant statistics: hence a natural relation is simply a philosophical relation that is sufficiently salient to correspond to an associative tendency of the human mind.

[11]   Terminological rigour is not Hume's greatest strength, and in the *Treatise* he talks in quick succession of a relation as a *complex idea* (*T* 1.1.4.7), a *quality*, a *circumstance*, and a *subject of comparison* (*T* 1.1.5.1). Later he refers to the relation of causation as an *object*, a *comparison of two ideas*, and an *association betwixt two ideas* (*T* 1.3.14.31). This should warn us against building interpretative castles on such textual snippets (especially when they involve the word "object", which Hume often uses as at *T* 1.3.14.31 to mean something like an *object of thought*—whatever we might be thinking about—rather than anything more specific). In the *Enquiry* Hume is less terminologically promiscuous, perhaps recognising that a relation, to borrow a phrase, "is what it is, and not another thing" (Butler 1729: 25, §33).

[12]   Locke also was happy to admit relations as holding across all categories of things—see the quotation from *Essay* II xxv 7 near the beginning of §1 above.

Beebee's claim that the philosophical/natural distinction reflects the mental difference between *comparison* and *association* has more initial plausibility, in that any relation's being *natural* is clearly a matter of its matching with human associational psychology, while Hume repeatedly mentions *comparison* in connection with philosophical relations (especially in *T* 1.1.5). Occasionally, indeed, he even goes so far as to suggest that a relation's holding depends upon some prior mental operation of comparison:

> ... let us consider, that since equality is a relation, it is not, strictly speaking, a property in the figures themselves, but arises merely from the comparison, which the mind makes between them. (*T* 1.2.4.21)

Mostly, however, he is very ready to treat objects' relations as quite independent of our minds, and indeed to explain our mental operations as causally influenced by those objective relations. In contrast to the passage just quoted, we are told elsewhere that instances of the very relation in question—mathematical equality—are *discovered* rather than mentally created:

> 'Tis from the idea of a triangle, that we discover the relation of equality, which its three angles bear to two right ones; and this relation is invariable, as long as our idea remains the same. (*T* 1.3.1.1)

Relations between physical objects and events are similarly objective:

> As to what may be said, that the operations of nature are independent of our thought and reasoning, I allow it; and accordingly have observed, that objects bear to each other the relations of contiguity and succession; that like objects may be observ'd in several instances to have like relations; and that all this is independent of, and antecedent to the operations of the understanding. (*T* 1.3.14.28)

> Wherever we have no successive perceptions, we have no notion of time, even tho' there be a real succession in the objects. (*T* 1.2.3.7)

Moreover Hume's occasional suggestion that relation itself depends upon comparison seems to be simply an expression of his nominalism rather than anything very specifically to do with relations, and is of a piece with his statement at *T* 1.1.4.7 (as quoted above in the first paragraph of this section) that *relations*, *modes* and *substances* are all "complex ideas".[13] The supposed link between relation and comparison is not a novel Humean doctrine but straightforwardly inherited from Locke, who likewise treats relations in the context of itemising our ideas within a nominalist agenda:

> *Relation* is a way of comparing, or considering two things together; and giving one, or both of them, some appellation from that Comparison, and sometimes giving even the

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[13]   In the section following "Of relations", ideas of modes and substances are accordingly described in deflationary terms as "nothing but a collection of simple ideas, that are united by the imagination, and have a particular name assign'd them ..." (*T* 1.1.6.2). Two paragraphs later, at *T* 1.1.7.1, Hume begins his treatment of abstract ideas, whose nominalistic aim—following Berkeley—is to explain our use of general terms without recourse to general ideas.

Relation it self a Name. ... *Relation* [is] not contained in the real existence of Things. (*Essay* II xxv 7–8)

So Hume's statement that "relation ... arises merely from ... comparison" appears to be a standard nominalist slogan rather than a carefully thought-out position.[14] And it disappears without trace after the *Treatise* (as in *M App.* 1.11–13, where he talks about discovering or inferring new or unknown relations, cf. *T* 3.1.1.18–27). When discussing actual relations—as opposed to abstractly considering their metaphysical status—Hume consistently treats them as objective. Their real link with *comparison* is simply that this provides the source of *our ideas* of them. Distance, for example, is "a true relation, because we acquire an idea of it by the comparing of objects" (*T* 1.1.5.1); but he never suggests that objective distance itself is *dependent on* mental comparison.[15]

The superficial textual link between philosophical relations and *comparison* thus provides only a very weak basis for Beebee's account of the philosophical/natural distinction. But her main argument in its favour is independent of all this (2011: 252, 254), resting on the claim that it can make good sense of Hume's passage (B) which states that his two definitions present causation "either as a *philosophical* or as a *natural* relation; either as a comparison of two ideas, or as an association betwixt them" (*T* 1.3.14.31). Accordingly, Beebee offers a "Procedural Interpretation" of the definitions which takes them to "reflect two different mental procedures by which causal judgments come to be made—namely, the comparison (first definition) and association (second definition) of ideas" (2011: 244; cf. 2006: 17, 102–3; 2007: 418-19). Since, however, Hume never explicitly suggests that his definitions concern *the making of causal judgements*, any support for Beebee's interpretation here is purely conjectural, or at best derives from the lack of satisfactory alternatives. As she herself says,

> The Procedural Interpretation gets its main support ... from the fact that other interpretations fail so badly in making sense of Hume's claim to be characterizing causation separately as a natural and a philosophical relation. (Beebee 2011: 254)

She also acknowledges that her interpretation faces difficulty with the other key passage (A) from *T* 1.3.6.16, which seems to imply that we cannot "reason upon ... or draw any inference from" causation as a *philosophical* relation. For this obviously conflicts with Beebee's understanding of the first definition as reflecting "a mental procedure by which causal judgments come to be made", given that coming to such a judgement through a mental procedure that respects the conditions enshrined in Hume's first definition looks rather like a paradigm case of *reasoning* and *inference*.

Instead of drawing back from this tension within her interpretation, Beebee appeals to other texts to back up her claim "that Hume is clearly and explicitly committed to the claim that causation considered as a philosophical relation *is* a route to causal judgment"

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14   The entry on "relation" in Chambers' *Cyclopaedia* (1738) states early on that "*relation*, take it as you will, is only the mind; and has nothing to do with the things themselves".

15   Note also that at *T* 1.1.5.5 Hume itemises "contiguous" as another of the spatio-temporal relations whose ideas arise from comparison, notwithstanding that *contiguity* is a natural relation. Hume will later argue —in the famous Section 1.3.14 on the idea of necessary connexion—that the most crucial element of the idea of causation arises in a different manner. But this is a special case, and evidently does not follow simply from causation's being a natural relation.

(2011: 259).[16] She thus challenges the authority of the straightforward reading of passage (A), taking this not as prohibiting reasoning based on the first definition, but merely as insisting that natural inference comes first:

> The basic idea is just this: once we have the idea of causation (an idea that requires that we have the habit of association that generates the needed impression-source for the idea of necessary connection), we are perfectly capable of deploying it in cases where the associative mechanism does not operate … just as we can for any other idea. (Beebee 2011: 261)

I am very sympathetic to this sort of approach to the two definitions, having long recommended it myself.[17] But note that it requires the second definition to be understood in a genetic or historical manner, as encapsulating *the circumstances in which the impression of necessary connexion arises*. And this seems to be flatly inconsistent with Beebee's Procedural Interpretation, which understands both definitions as encapsulating *ongoing ways of making causal judgements*. Beebee does not address this problem, but it looks fatal to her attempt to render her interpretation consistent with passage (A). That being so, her overall case for the interpretation seems very weak: there are no clear texts to support its central claims, and its only distinctive support comes from its alleged ability to make sense of passage (B), but this comes at the cost of making nonsense of passage (A).

We have so far seen no significant objection to our initial understanding of Hume's philosophical/natural distinction as a straightforward matter of verbal clarification. But by now it might well be wondered whether this simple account can do any better than Beebee in explaining the two key passages (A) and (B), which have seemed to endow the distinction with such potential significance. It is unrealistic to expect to build definitive judgements on such scanty textual evidence, but a plausible account can easily be given. First, then, it is clear that Hume was struck by the contrast between the "philosophical" reasoning standardly considered to be characteristic of rational man, and his own "natural" account of inductive inference based on instinctive association. His argument of *Treatise* 1.3.6 had shown that without the crucial input from this inductive instinct—and relying purely on philosophical reason "comparing" ideas—we would have remained forever unable to make any inference to the unobserved.[18] He had also developed a theory (cf.

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16   These other texts are from the sections on "Rules by which to judge of causes and effects" (*T* 1.3.15) and "Liberty and necessity" (*T* 2.3.1). Such texts tell strongly against an interpretation such as Schliesser's that accords great weight to passage (A) in this respect, especially when supplemented by passages from the *Enquiry* where Hume appears to support scientific inference based on a Newtonian understanding of forces (e.g. *E* 1.15, 7.25 n. 16, 7.29 n. 17), thus spreading the legitimate scope of causal inference even further from "natural" custom.

17   "The second definition … satisfies the demands of the Copy Principle, and shows how the distinctive conceptual content that characterizes causal judgements (i.e. the element of connexion or consequentiality) is derived. Once we have acquired that concept, however, we are free to apply it in a far more disciplined way than our natural instinctive reactions alone could achieve … [through appeal to Hume's first definition, the rules that expand on it, systematization of probability judgements, and the search for hidden causes etc.] … Nothing in [Hume's] theory of meaning demands that an idea—once acquired—should continue to be confined to the circumstances that originally produced it. His second definition, in short, reflects his *genetic* perspective on meaning, and makes no claim to be *analytic*. Hence there is no requirement that it should be co–extensive with the first definition." (Millican 2009: 665–6).

18   Like Beebee I am happy to see this as a *genetic* point about the *origin* of causal inference and of the idea of necessary connexion, but without any inconsistency, because this genetic reading conforms exactly to my interpretation of Hume's second definition of cause.

T 1.3.2.1–3, quoted near the end of §3 below) which identified the operation of such inference specifically with causation, uniquely amongst the (philosophical) relations. Hence he concluded his discussion of induction with the observation (A) that "tho' causation be a *philosophical* relation ..., yet 'tis only so far as it is a *natural* relation, and produces an union among our ideas, that we are able to reason upon it, or draw any inference from it". This observation seems to be reasonably appropriate given the background and upshot of his argument, requiring no special further interpretation (and therefore sanctioning none). The case of passage (B) from *T* 1.3.14.31 is more tricky, the text seeming to imply that the philosophical/natural distinction is doing significant theoretical work and generating a need for two definitions where only one might have been expected. Here, I speculate that Hume independently found that he needed two definitions (for a quite different reason, explained below), and then was struck by their apparent correspondence with the philosophical/natural distinction, in that the first definition specifies objective conditions of the sort that one might philosophically contemplate and "compare", while the second emphasises the "natural" associative contribution of the inferentially engaged mind. Having noticed this parallel, Hume might well have felt an understandable temptation to cite it as justification for his (otherwise puzzling) provision of two definitions.[19]

All this adds up to a very deflationary account of the philosophical/natural distinction and its significance, so I shall conclude by showing why such an account is well motivated not only textually but also philosophically, in that no matter how we may interpret the nuances of the distinction, the two famous passages that allude to it are philosophically insubstantial, even on Hume's own theory. Thus (A), though superficially quite plausible, actually mislocates the crucial factor that makes inductive inference possible, which is not *causation*'s role as merely one of the three natural associative relations (alongside resemblance and contiguity), but rather, the operation of *custom*—causal *inference* from a present impression—which is uniquely able to channel the force and vivacity of that impression to generate belief. Mere association of ideas—my thoughts drifting from object *P* to the resembling *Q*, to its cause *R*, to the contiguous *S*—is quite inadequate to generate *belief*, which as Hume repeatedly emphasises—even in the immediately preceding sentence at *T* 1.3.6.15—requires the operation of custom starting from a present impression (cf. *T* 1.3.7.6, 1.3.8.10). Moreover the natural relations of *resemblance* and *contiguity*, even if acting on a present impression, are unable to generate sufficient vivacity for belief, so "reasoning upon" a natural relation isn't by itself enough to support factual inference.[20] Nor, indeed, is the relation of *causation*—even acting on a present impression—sufficient for belief, if it is *merely* acting associationally (e.g. I see a painting of Salisbury Cathedral by John Constable and think of him as related to it causally, just as I might think of the cathedral itself as related to it through resemblance). Such association *presupposes* belief in the causal relationship, whereas the *generation* of belief requires the operation of *custom*: inference to the unobserved based on a present impression *and* an observed constant conjunction. Custom is indeed *analogous* to the

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[19]   Another factor plausibly relevant to both passages (A) and (B) is Hume's evident concern in the *Treatise* to present a systematic theoretical structure. They might well have appealed to him as explicitly linking the initial theory of relations, from which his epistemology builds, with two of the major conclusions of that epistemology.

[20]   Hume attempts to explain this contrast within his three natural relations at *T* 1.3.9.2–7, without clearly focusing on the distinction between *causation* as a mere associative relation, and *custom* starting from a present impression.

association of ideas, close enough perhaps to be described as "a principle of association" (*T* 1.3.7.6), but it is *not* the same as causation's merely being a "natural" relation, a difference about which Hume seems rather vague in the *Treatise*, but eventually recognised clearly at *E* 5.18–20.[21]

Perhaps surprisingly, the second definition of cause at *T* 1.3.14.31—which purports to define causation "as a natural relation"—suggests an implicit recognition of precisely this point:

> A CAUSE is an object precedent and contiguous to another, and so united with it, that the idea of the one determines the mind to form the idea of the other, and the impression of the one to form a more lively idea of the other.

This gives separate clauses covering causal association (where an idea leads to an associated idea) and custom (where an impression leads to a belief). But the paragraph as a whole nevertheless evinces confusion over the relevance of the philosophical/natural distinction, because it is *not* causation's being a natural (as well as philosophical) relation which requires the two definitions. If it were, one would expect the other two natural relations—*resemblance* and *contiguity*—also to require two definitions, but Hume gives no hint of this, nor indeed is it easy to see how there could be room for paired definitions in these cases. (One could try providing, say, one "definition" of *real* contiguity and another of *perceived* contiguity, but separate definitions of the two are no more required here than for any of the other spatio-temporal relations in Hume's list at *T* 1.1.5.5: "*distant*, *contiguous*, *above*, *below*, *before*, *after*, &c.".) What actually leads Hume to sense a need for two definitions, judging from his preceding discussion, is his identification of the impression that generates our idea of *necessary connexion*, the key component of our idea of cause. This then opens up a gap between the characteristic circumstances in which that impression arises in an observer (as captured by the second definition) and an abstract, observer-free, idealisation of those circumstances (the first definition), yielding conditions under which we can judge something to be a cause quite independently of that impression.[22] This neatly explains why Hume sees a parallel need for two definitions in the case of *moral virtue*, where again we have a distinctive impression (namely a *pleasing sentiment of approbation—M App.* 1.10) whose circumstances of occurrence can be abstracted and generalised (namely to *mental qualities, useful or agreeable to the person himself or to others—M* 9.1), thus again yielding a second "definition" (*M* 9.12) which enables the resulting idea to be applied systematically to cases where the impression does not occur.[23] So when composing *T* 1.3.14.31, Hume was misidentifying the reason why *necessary connexion* (and hence causation) warrants two definitions, misled by a contextual coincidence, that causation is both a philosophical and a natural relation.

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[21]   At *T* 1.3.8.6, Hume gives an example of association of ideas involving causation but not custom, in the case of holy relics. But then he rather smudges the distinction by concluding "This phaenomenon clearly proves, that a present impression with a relation of causation may enliven any idea, and consequently produce belief or assent". The parallel passage at *E* 5.18 avoids any mention of generating belief, as does *E* 5.19, while *E* 5.20 points out explicitly that "in these phaenomena, the belief of the correlative object is always presupposed". The *Enquiry*, indeed, seems to be clear about the distinction from the beginning, illustrating causal association at *E* 3.3 thus: "if we think of a wound, we can scarcely forbear reflection on the pain which follows it"—an example of associative thought, but not custom.

[22]   For more on this, see §4 of Millican (2009), from which the quotation in note 17 above is taken.

[23]   For more discussion of this parallel, see Garrett (1997: 107–8) and Millican (2009: 662–6).

By the time he came to write the *Enquiry*, Hume had apparently seen through this mistake. Even though his argument concerning induction there is far more extended than in the *Treatise*, and even though his definitions of causation and necessity are emphasised just as much, he makes no mention whatever of the distinction between philosophical and natural relations.[24] This is entirely to be expected if the thoughts outlined here are on the right track, but is hard to square with the presumption—which by now seems highly implausible—that the distinction is of profound significance for the understanding of his philosophy. It is the statement of a superficial ambiguity, which deserves to be noted to clarify Hume's usage and avoid potential misreading, but that is all.

2. Relations: Locke and the Treatise

Having drawn the philosophical/natural distinction, Hume sets out to provide a complete enumeration of the various types of quality "which make objects admit of comparison, and by which the ideas of *philosophical* relation are produc'd" (1.1.5.2). They fall, he proposes, into just seven categories:

1. *Resemblance*: Hume remarks without further explanation that this is involved in all relations since "no objects will admit of comparison, but what have some degree of resemblance" (*T* 1.1.5.3).[25] Resemblance can generate association of ideas, as we have seen (in which case it is also a natural relation), but it will not usually do so if the resembling quality is "common to a great many individuals". Thus thinking of George won't naturally lead to thinking of John if their only significant resemblance is that both are men, but it might do so if both are great British empiricist philosophers, or if both are members of The Beatles.

2. *Identity* "as apply'd in its strictest sense to constant and unchangeable objects" (*T* 1.1.5.4): "Of all relations the most universal is that of identity, being common to every being, whose existence has any duration". Note therefore that Hume is thinking here of *identity over time*.

3. Relations "of *space* and *time*, which are the sources of an infinite number of comparisons, such as *distant*, *contiguous*, *above*, *below*, *before*, *after*, &c." (*T* 1.1.5.5).

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[24] In the *Enquiry*, the word "relation" is generally used in the "philosophical" sense (including within the phrase "relations of ideas"), but the "natural" sense dominates at *E* 5.14–20 when discussing the effects of "relations or principles of association". The word is used in the everyday sense—as implying relatedness—at *E* 8.29 and 11.1.

[25] It is not clear why Hume makes this claim, which features in the numbered paragraphs 6 and 7 below, and then only once later in the *Treatise* (at *T* 1.4.5.11). Passmore (1980: 23–4) suggests that he treats resemblance as a logical surrogate for Lockean "agreement", as will be mentioned shortly. I suspect that Hume inherited the doctrine from philosophers who were less clear on the natural/philosophical distinction, and hence interpreted *relation* as requiring positive *relatedness*. Most pertinently, Francis Hutcheson, in his *Synopsis of Metaphysics* of 1742 (a Latin teaching text), states that "a property . . . which is common" must form "a *ground* . . . in which [the objects] are compared or . . . which affords a reason for comparison" (p. 106), and later confirms that where things have nothing in common, "there will be no relation or connection between them" (p. 124). Perhaps this in turn was intended to reflect Locke's thought that "There must always be in relation two ideas, or things, . . . and then a ground or occasion for their comparison." (*Essay* II xxv 6). But Locke himself allows that such "occasions of comparing" can involve *disagreement* as well as agreement (II xxv 7), which suggests that he is not committed to the resemblance doctrine.

4. "All those objects, which admit of _quantity_, or _number_, may be compar'd in that particular; which is another very fertile source of relation." (*T* 1.1.5.6). When later referring back to this category of relation, Hume calls it *"proportion[s] in quantity or number"* (*T* 1.3.1.1–3).

5. "When any two objects possess the same _quality_ in common, the _degrees_, in which they possess it, form a fifth species of relation." (*T* 1.1.5.7).

6. "The relation of _contrariety_ may at first sight be regarded as an exception to the rule, *that no relation of any kind can subsist without some degree of resemblance*.[26] But ... no two ideas are in themselves contrary, except those of existence and non–existence, which are plainly resembling, as implying both of them an idea of the object" (*T* 1.1.5.8).[27]

7. *Cause and effect* "is a seventh philosophical relation, as well as a natural one. The resemblance imply'd in this relation, shall be explain'd afterwards". (*T* 1.1.5.9).

Hume's taxonomy of relations is clearly heavily influenced by Locke's discussion (in Book II of the *Essay*, chapters xxv to xxviii), which gives special emphasis in turn to "Cause and Effect" (II xxvi 1–2), "Relations of Time" (II xxvi 3–4), "Relations of Place and Extension" (II xxvi 5), "Identity and Diversity" (II xxvii), and "Proportional Relations" (II xxviii 1). The last of these embraces both what Hume calls "degrees in quality" and "proportions in quantity or number":

> ... some one simple *Idea*; which being capable of Parts or Degrees, affords an occasion of comparing the Subjects wherein it is to one another, in respect of that simple *Idea*, *v.g. Whiter*, *Sweeter*, *Bigger*, *Equal*, *More*, etc. These Relations depending on the Equality and Excess of the same simple *Idea*, in several Subjects, may be called, if one will, *Proportional* ... (*Essay* II xxviii 1)

But after this, Locke goes on to deal with a range of other relations, remarking that there are "infinite others" (II xxviii 1). He starts with what he calls *"natural Relations"* such as *"Father* and *Son*, *Brothers* ... *Country-men"* (II xxviii 2),[28] contrasting these with *"Instituted*, or *Voluntary"* relations such as *"General* ..., *Citizen*, ... *Patron* and *Client*, ... *Constable*, or *Dictator"* (II xxviii 3). He then moves on to a

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[26] Contrariety is not the same as *difference*, which according to Hume is "a negation of relation" and "of two kinds as oppos'd either to identity or resemblance. The first is call'd a difference of *number*; the other of *kind*." (*T* 1.1.5.10).

[27] This perfunctory argument seems to draw on Hume's treatment of the idea of existence in the section "Of the idea of existence, and of external existence": "The idea of existence ... is the very same with the idea of what we conceive to be existent. To reflect on any thing simply, and to reflect on it as existent, are nothing different from each other." (*T* 1.2.6.4). Perhaps the argument is best interpreted as claiming that contrariety is always relative to some object, property or proposition *P*, so that *denial-of-P* is then contrary to *assertion-of-P*, and these resemble in both making reference to *P*. Difficulties will then arise, however, with objects or properties that can take a range of mutually exclusive values, or propositions that are contrary rather than contradictory—see also note 36 below.

[28] Note that Locke's "natural relations", based mainly on blood relationships, are quite different from Hume's. As explained in §1 above, a Humean "natural relation" is one that corresponds to a natural association of ideas (from resemblance, contiguity, or causation), in which an idea of the one related thing naturally leads to an idea of the other.

variety of moral relations (II xxviii 4–16), before ending with some general reflections (II xxviii 17–20).

If we take Locke's "Diversity" to map onto *contrariety*,[29] then of Hume's seven types of "philosophical relation", only the first, *resemblance*, is absent from Locke's list. However this is clearly a very special case, since Hume has stressed that resemblance is present in *all* instances of comparison between objects (which as we have seen, is what supposedly gives rise to ideas of relation). As such, it seems that resemblance is broadly taking the place, within Hume's system, of Locke's general notion of *agreement*:[30]

> [A] man may at once be … capable of as many relations, as there can be occasions of comparing him to other things, in any manner of agreement, disagreement, or respect whatsoever. For … relation is a way of comparing or considering two things together, and giving one or both of them some appellation from that comparison; and sometimes giving even the relation itself a name. (*Essay* II xxv 7)

For his part, Locke apparently omits resemblance from his own list because he would classify any similarity between things not in terms of "resemblance" as a category, but rather in terms of *the respect in which they resemble*, for example "the Equality … of the same simple *Ideas*, in several Subjects" (II xxviii 1: a "proportional relation"), or "*Country-men*, *i.e.* those who were born in the same Country" (II xxviii 2: a "natural relation"). This would involve a huge proliferation of types of resemblance relation, of which "'Twould make a Volume, to go over all sorts" (*Essay* II xxviii 17). But Hume wants none of this, because as we shall see he has important philosophical reasons for wanting to truncate Locke's list, so as to pin down more narrowly the categories of relation on offer. This agenda, indeed, seems to have a significant impact as early as the previous short section on the association of ideas, two paragraphs of which are devoted to arguing very explicitly (but without mentioning names) that both Locke's "natural relations" and his "instituted relations" can be subsumed under the general relation of "causation":

> In general we may observe, that all the relations of blood depend upon cause and effect, and are esteemed near or remote, according to the number of connecting causes interpos'd betwixt the persons. (*T* 1.1.4.3)

> We may carry this farther, and remark, not only that two objects are connected by the relation of cause and effect, when the one produces a motion or any action in the other, but also when it has a power of producing it. And this we may observe to be the source of all the relations of interest and duty, by which men influence each other in society, and are plac'd in the ties of government and subordination. (*T* 1.1.4.5)

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[29]   Locke says very little specifically about *diversity*, treating it as merely non-identity. It therefore has a structural similarity to Hume's *contrariety*, which as we have seen is explained in terms of existence and non-existence. For both philosophers, the relation in question seems to function primarily as a means of recognising the need for some form of *negation* within their taxonomy, though neither of them explores this function with any care or rigour.

[30]   And also to some extent Lockean *disagreement*, as suggested by Passmore (1980: 23–4), whose discussion of Hume's theory of relations, dating mainly from 1952, remains one of the best and most insightful in the literature.

The focus on human relations here, as Kemp Smith prominently remarked, can seem rather "puzzling", but there is no need to follow him in seeing it as evidence of Hume's having a prior and predominant interest in ethics.[31] On the contrary, it makes perfect sense on the assumption that Hume's aim is quite specifically to oppose Locke's multiplicity of relations, and thus to impose a reduced taxonomy. If relations of blood, institution and morals are removed from Locke's list, and "agreement" added, then as already explained, we get an extremely close match between the two:

Locke	Hume
(Agreement)	Resemblance
Cause and effect	Cause and effect
Relations of time	Space and time
Relations of place and extension	
Identity	Identity
Diversity	Contrariety
Proportional relations	Proportions in quantity or number
	Degrees in quality

This seems far too close for coincidence, and establishes beyond reasonable doubt the indebtedness of Hume's taxonomy to that of Locke.

3. Hume's Dichotomy, and Demonstrability

Hume's interest in reducing Locke's potentially "infinite" categorisation of relations to just seven starts to emerge only at the beginning of *Treatise* Book 1 Part 3, "Of knowledge and probability":

> THERE are seven different kinds of philosophical relation, *viz. resemblance*, *identity*, *relations of time and place*, *proportion in quantity or number*, *degrees in any quality*, *contrariety*, *and causation*. These relations may be divided into two classes; into such as depend entirely on the ideas, which we compare together, and such as may be chang'd without any change in the ideas. (*T* 1.3.1.1)

It is possible that a hint for this dichotomy came from Locke's marginal summary to *Essay* II xxv 5: *"Change of Relation may be without any Change in the Subject"*. But

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[31]   Kemp Smith (1941: 245): "The only answer, in any degree satisfactory, to [various questions about Hume's theory of association] is, I should contend, supplied by the view, already outlined, that the bulk of Books II and III is prior, both in the first thinking-out of their teaching and in the date of first composition, to the treatment of association in Book I, where, it will be observed, association by causality is illustrated exclusively by those examples of blood and social relationship which are required for the purposes of Hume's argument in Books II and III." The chronology implied by Kemp Smith's hypothesis is scarcely credible, given the relative speed with which Hume wrote (at least) the bulk of Books 1 and 2 of the *Treatise* in France between 1734 until 1737 and then published them in January 1739, around 21 months prior to the publication of Book 3.

Hume is apparently quite original in aiming to use such a division within the taxonomy of relations to pin down those relations "which depending solely on ideas, can be the objects of knowledge and certainty" (I shall call these *constant* relations, echoing Hume's apparent usage at *T* 1.3.2.2).[32] He continues:

> These four are *resemblance*, *contrariety*, *degrees in quality*, and *proportions in quantity or number*. Three of these relations are discoverable at first sight, and fall more properly under the province of intuition than demonstration. When any objects *resemble* each other, the resemblance will at first strike the eye, or rather the mind; and seldom requires a second examination. The case is the same with *contrariety*, and with the *degrees* of any *quality*. . . .
>
> We might proceed, after the same manner, in fixing the *proportions* of *quantity* or *number* . . .
>
> I have already observ'd, that geometry, or the *art*, by which we fix the proportions of figures; tho' it much excels both in universality and exactness, the loose judgments of the senses and imagination; yet never attains a perfect precision and exactness. Its first principles are still drawn from the general appearance of the objects; and that appearance can never afford us any security, when we examine the prodigious minuteness of which nature is susceptible. . . .
>
> 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. We are possest of a precise standard, by which we can judge of the equality and proportion of numbers; and according as they correspond or not to that standard, we determine their relations, without any possibility of error. When two numbers are so combin'd, as that the one has always an unite answering to every unite of the other, we pronounce them equal;[33] and 'tis for want of such a standard of equality in extension, that geometry can scarce be esteem'd a perfect and infallible science. (*T* 1.3.1.2–5)

So the aim of Hume's Dichotomy between *constant* and *inconstant* relations is to delimit those areas—notably mathematics—that are susceptible of intuitive or demonstrative proof, and thus to undermine the ambitions of those philosophers who would attempt to achieve certainty beyond these bounds. Later, Hume appeals to this analysis in two specific cases, first to deny that the Causal Maxim can be intuitively certain:

> All certainty arises from the comparison of ideas, and from the discovery of such relations as are unalterable, so long as the ideas continue the same. These relations are *resemblance*, *proportions in quantity and number*, *degrees of any quality*, *and contrariety*; none of which are imply'd in this proposition, *Whatever has a beginning has also a cause of existence*. That proposition therefore is not intuitively certain. (*T* 1.3.3.2)

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[32] It is not entirely clear that Hume is indeed alluding to this distinction when he talks of "relations, either constant or inconstant", but this terminology is by now familiar to scholars, and as appropriate as any. At *T* 1.3.3.2, Hume talks of the privileged group of relations as being "unalterable, so long as the ideas continue the same" and as "infallible".

[33] This clause, defining numerical equality in terms of one-to-one correspondence, was quoted approvingly by Frege (1884, §63), and has since become well known within the Philosophy of Mathematics as "Hume's Principle".

And secondly to deny that relations of virtue and vice are demonstrable:

> If you assert, that vice and virtue consist in relations susceptible of certainty and demonstration, you must confine yourself to those *four* relations, which alone admit of that degree of evidence; and in that case you run into absurdities ... *Resemblance*, *contrariety*, *degrees in quality*, and *proportions in quantity and number*; all these relations belong as properly to matter, as to our actions, passions, and volitions. 'Tis unquestionable, therefore, that morality lies not in any of these relations, nor the sense of it in their discovery. (*T* 3.1.1.19)

Although Hume's aims here are clear enough, he is never explicit about the principle to which he is appealing. If, for simplicity, we subsume both intuitive and demonstrative certainty under the single term "demonstrable", then his wording at *T* 1.3.3.2 suggests the following:

(a) Any demonstrable proposition must involve some constant relation.

However this principle would become completely vacuous when combined with Hume's claim that resemblance—one of the constant group—is involved in *all* relations (*T* 1.1.5.3). On this basis, no relational proposition (not even the Causal Maxim itself) could be ruled out as non-demonstrable.[34] More plausibly, the wording at *T* 3.1.1.19 seems to suggest a different principle:

(b) Any demonstrable proposition can involve only constant relations.

But as we shall see, any principle of this kind—and indeed Hume's Dichotomy itself—is deeply problematic, and he presumably came to see this, because both disappear entirely from his later works.

The problems with the Dichotomy start right at the beginning, with *resemblance*. Hume claims boldly that this is "discoverable at first sight" and knowable by intuition, but such a claim is ridiculous if intended to cover all of the wide range of resemblances that things can bear to each other.[35] Hume's language suggests that he is attracted to this claim from a *visual* understanding of resemblance, but also that he wishes to generalise beyond that: "When any objects resemble each other, the resemblance will at first strike the eye, *or rather the mind*" (my

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[34] Recently Don Garrett has sketched a defence of Hume by appeal to his theory of abstract ideas: "it is hard to see how the four [constant] relations ... could suffice ... to underwrite all knowledge in the strict sense ... without the relations of resemblance that are offered by abstract ideas sharing elements of their revival sets" (2015: 58). Garrett also argues that Hume "must" recognise *idealized* revival sets, which are not confined to objects of the thinker's experience but "*would* result from an indefinite extension of veridical experience ..." (p. 56). It would be interesting to see this theory spelled out in detail, but I remain extremely sceptical, since I do not believe that any viable theory of demonstrability has ever been developed along these lines, and it is well known that a proposition's demonstrability often depends not so much on the specific predicates or relations involved, as on the ordering and implied scope of "quantifiers" and connectives. Moreover Garrett's proposal looks vulnerable to essentially the same objection as stated here. For on such a theory, *any* universal claim (e.g. the Causal Maxim, which according to *T* 1.3.3.2 does not imply any resemblance) will be proposing an overlap—and hence resemblance—between the idealized revival sets of two abstract ideas (e.g. "things that begin to exist", "things that have a cause of existence"), and thus will fail to be excluded by Hume's criterion as understood in (a).

[35] All the more so if my suggestion in §2 above is correct, that Hume intends "resemblance" to cover the multitude of types of resemblance that Locke would have classified separately.

emphasis). And his only plausible defensive move seems to be to restrict his understanding of resemblance, in so far as it qualifies as a constant relation amenable to intuitive and demonstrative certainty, to types of resemblance that follow immediately and evidently from the nature of what is compared. Much the same can be said about *contrariety* (assuming that this is intended to cover dissimilarity),[36] and also *degrees in quality*, where Hume's text suggests at least some awareness of the problem:

> ... tho' it be impossible to judge exactly of the degrees of any quality, such as colour, taste, heat, cold, when the difference betwixt them is very small; yet 'tis easy to decide, that any of them is superior or inferior to another, when their difference is considerable. And this decision we always pronounce at first sight, without any enquiry or reasoning. (*T* 1.3.1.2)

His obvious fallback position, therefore, would be to insist that intuition and demonstration are limited to the four relations of *resemblance*, *contrariety*, *degrees in quality*, and *proportions in quantity or number*, and limited moreover to a narrow range of the immediately evident within the first three of these. This disrupts his relatively tidy taxonomy, and he no longer has a clean division—within the seven kinds of relation—between four that are constant and three inconstant, but the price might be worth paying if it worked. Sadly, though, it doesn't get close. As Locke had pointed out (*Essay* IV ii 9), intuitive relationships are not restricted to a narrow range of ideas, and hence counterexamples to this fallback position are very easy to find. For instance we saw in §2 that human family relationships, on Hume's own account, are instances of "causation", but this in no way prevents us from finding intuitive or demonstrative truths about them. "Every mother is a parent" is an instance of the former; "Anyone whose paternal grandparents have two sons, has an uncle" of the latter. There is also the obvious point that demonstrative arguments "involving quantity or number" can themselves concern *other* relations also (e.g. a proof that "In any group of seven or more families, each with two sons and two daughters, at least two of the families must have the same male-female birth order."). Hume has not even gestured towards taking these into account, and his apparent implicit principle that *any demonstrable proposition can involve only constant relations* therefore seems

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[36] Hume says so little about contrariety, and what he says is so unsatisfactory, that it is hard to know exactly how to interpret his view of it. We have already seen, in §2 above (cf. note 27), his crude and undefended claim that "no two ideas are in themselves contrary, except those of existence and non-existence, which are plainly resembling, as implying both of them an idea of the object" (*T* 1.1.5.8). The immediately following paragraph continues: "7. All other objects, such as fire and water, heat and cold, are only found to be contrary from experience, and from the contrariety of their *causes* or *effects*; which relation of cause and effect is a seventh philosophical relation ...". Here Hume is apparently anticipating his discussion "Of the probability of causes" at *T* 1.3.12.3–19, but his position seems almost self-contradictory. Suppose, for example, that fire and water can indeed be "found to be contrary" *indirectly*, "from the contrariety of their ... effects". This then clearly presupposes that those effects are contrary—either directly or indirectly—and so by following this regress, at some point we must reach effects that are *directly* contrary. Yet it is hard to see how they can be so, if "no two ideas ... except those of existence and non-existence" are "in themselves contrary". The only way I can see of making sense of this is an assumption that in applying probability, I need only weigh up how often an object *A* has caused *B* as opposed to *not(B)*. But the suggestion that we can do all the reasoning we need without ever having to judge whether *B* is contrary to some alternatives *C* or *D* (e.g. different possible outcomes, or temperatures in a range) seems very dubious, and Hume says nothing to defend it.

both hopelessly unargued and completely false.[37] Nor does it seem at all likely that any similar principle will be defensible, and his cursory discussion gives no basis for optimism that it is possible to derive a sound criterion of demonstrability based on the relations involved in a proposition.

How could Hume, who is generally so acute, make such a bad mistake over relations? Jonathan Bennett, in two excellent discussions of the issue, attributes this to an ambiguity in Hume's Dichotomy.[38] On the one hand, he suggests that Hume wants "to distinguish (a) relations between ideas which do yield analytic [or a priori] truths from (b) ones which do not" (1971: 252).[39] On the other hand, Bennett detects a second understanding of the Dichotomy, corresponding to "the line between (a) *reducible* and (b) *irreducible* relations" (p. 253), where a relational property is *reducible* if its holding between *x* and *y* can be factored into, or supervenes on, the properties of *x* and *y* individually. This diagnosis is attractive because it seems to make good sense of where Hume draws his line, and also the language in which he expresses it. Consider again the key passage:

> THERE are seven different kinds of philosophical relation, *viz. resemblance*, *identity*, *relations of time and place*, *proportion in quantity or number*, *degrees in any quality*, *contrariety*, *and causation*. These relations may be divided into two classes; into such as depend entirely on the ideas, which we compare together, and such as may be chang'd without any change in the ideas. (*T* 1.3.1.1)

The phrase "such as depend entirely on the ideas, which we compare together" does sound very like an expression of Bennett's *reducibility*: the relation's holding between (our ideas of) *x* and *y* depends only on the individual properties of (our ideas of) *x* and *y*, and hence is *supervenient*. Such a relation cannot therefore "be chang'd without any change in" (our ideas of) *x* and *y* themselves. Moreover as Bennett goes on to explain,[40]

> The supervenient/non-supervenient reading is strongly confirmed by what [Hume] says about where his (a)/(b) line falls. He says that (a) contains just four (species of) relations: namely, *resemblance*, *contrariety*, *degrees in quality*, and *proportions in quantity and number*. Instances of these would be, respectively, "has the same colour as", "has a different colour from", "is warmer than", and "has more legs than", all of which are supervenient. As for the three (species of) relations which Hume says exhaust (b), two of these [*relations of time and place* and *cause and effect*] are clearly non-supervenient, and we can at least see why Hume would place [*identity*] in that category. . . . Hume is thinking of

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[37]   Bennett (1971: 256 cf. 2001: 244) gives the example "Any earthquake which causes every house to fall down causes every small house to fall down". And of course there are countless others to be had, including not only tautologies of this general sort (corresponding to theorems of first-order logic if represented appropriately), but any number of other demonstrable propositions from rule-governed systems outside mathematics and logic of which Hume takes no account (e.g. the law, or chess: "It is possible for White to be checkmated in two moves from the initial position.").

[38]   Bennett's two discussions, in his 1971: 250–6 and 2001: 242–4, seem to be by far the most detailed discussions in the literature. It is a shame that more commentators have not made the attempt to grapple seriously with what is going on in Hume's thinking here, especially those who take his Dichotomy to be interpretatively authoritative.

[39]   In his 1971, Bennett expresses this idea in terms of analyticity. In his 2001 (p. 243) he prefers to say that Hume is dividing "*relations* into supervenient and not, and . . . *propositions* into a priori knowable and not".

[40]   In this quotation and the next I have silently replaced "1" with "(a)" and "2" with "(b)", so as to conform to the notation used in Bennett's earlier discussion. I have also used italics instead of Bennett's boldface.

identity as in statements of the form "The thing that is F at T_1 is the thing that is G at T_2", and making the point that no piling on of monadic descriptions of how the former is at T_1, and the latter at T_2, will decisively settle whether this is one thing or two. (2001: 242–3)

Bennett does not explain in so much detail how Hume's discussion fits with his first distinction, between (a) relations that yield analytic (or a priori) truths and (b) those that do not, but the general idea is clear enough:

> Taking "ideas" as meanings or concepts, Hume is distinguishing (a) propositions that are knowable a priori, because they owe their truth purely to the natures of the concepts they involve, from (b) ones that are knowable only a posteriori, because they owe their truth partly to how the actual world is arranged. (2001: 243)

It seems that Hume must be appealing to something like this when he says that only the constant (a) relations "can be the objects of knowledge and certainty" (*T* 1.3.1.2). And as Bennett points out, Hume's explanation of why *cause and effect* is not constant fits this account precisely:

> ... as the power, by which one object produces another, is never discoverable merely from their ideas, 'tis evident *cause and effect* are relations, of which we receive information from experience, and not from any abstract reasoning or reflection. (*T* 1.3.1.1)

Here the emphasis is clearly on epistemology, on what is "discoverable ... from ... ideas", rather than on anything to do with supervenience.

Bennett's account is very illuminating, but I believe there is another factor in play which he somewhat overlooks, namely, Hume's failure to distinguish clearly between *objects* and *ideas of objects*.[41] Since the crucial Dichotomy is introduced in *Treatise* 1.3.1, "Of knowledge", it is not surprising that Hume's interest here concerns not so much *the relations of objects* themselves, as *how much we can know of them*. Any such knowledge, for Hume, must be mediated by our ideas of the objects concerned, so it is entirely natural that he should focus on those ideas and what can be discovered through them. But then it is very easy indeed to slide between *what is implied by the properties of the objects themselves* (independently of further information about their relative situation etc.) and *what is implied by the ideas of the objects themselves* (independently of other ideas). The former leads to Bennett's supervenient interpretation, and the latter to his analytic (or a priori) interpretation. As an example of the former, the proposition *that Venus is larger than Mars* is actually true, and could not cease to be true without a change in the objects themselves, but nothing in the typical person's idea of Venus and Mars guarantees this. As an example of the latter, the proposition *that the furthest planet is no closer than the closest planet* can be known a priori based on the ideas involved,[42] but this does not imply that comparative distance is reducible (in Bennett's sense), nor that distance is an intrinsic property of the objects. Overall, then, my diagnosis is that Hume, by conducting his *Treatise* discussion at too high a level of abstraction, without drawing a

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[41] When discussing the supervenience interpretation, Bennett remarks that it "really classifies relations between items of any kind, not only between ideas" (2001: 242) and his subsequent discussion proceeds accordingly.

[42] Here for simplicity we ignore complications about non-existence.

clear distinction between objects and ideas, and without enough concrete examples to keep the discussion properly anchored, seems to have confused himself between two quite different ways in which a relational claim can "depend only on the ideas" of the relevant objects. Under the supervenient interpretation, such a relational claim's truth *is determined by the individual properties of those objects* and is otherwise independent of their situation. Under the analytic (or a priori) interpretation, the relational claim's truth *can be known by reference to the individual ideas of those objects* without appeal to any further information about their situation. Looked at abstractly in this way the two are indeed very easy to conflate, and it seems that Hume did exactly that. He then went on to develop a theory about the limits of demonstration which made good sense under the latter interpretation (that a demonstrative proof can build only on a priori relations of ideas) but no sense at all under the former (that a relation's being supervenient somehow makes it specially amenable to demonstrative proof). Yet it is that nonsensical interpretation which kindled Hume's novel idea that the relations involved in a proposition determine its potential demonstrability.

Hume's theory is very sketchy and unargued, and he does virtually nothing with it except at two specific points in the *Treatise* (*T* 1.3.3.2 and 3.1.1.19), as quoted earlier. Even here he seems less than entirely convinced, going on immediately to supplement his case with further arguments. Moreover his supplementary argument for the non–demonstrability of the Causal Maxim (at *T* 1.3.3.3) employs an alternative criterion which, though inspired by a similar underlying thought to his Dichotomy— that a demonstration can build only on a priori relations of ideas—is entirely independent of his confused taxonomy of relations. This alternative criterion is based on what is commonly known as his *Conceivability Principle*, that "whatever we conceive is possible" (*T* 1.4.5.10) which, as we shall see in §§4–5 below, is widely used in the *Treatise* and fully maintained in Hume's later works (e.g. *A* 11, *E* 4.18, *D* 9.5).[43] By contrast, it seems likely that he eventually recognised the inadequacy of his analysis in terms of constant and inconstant relations (perhaps under pressure from counterexamples such as those we have seen). And although we cannot know when exactly this happened, all trace of it had disappeared by the time he came to write the first *Enquiry*, with its explicit discussion of applied mathematics (*E* 4.13) that clearly refers to demonstrations involving the (paradigmatically causal) notion of *force*. By then, Hume had evidently come to realise that "inconstant" relations such as causation can after all play a role in demonstrative argument, and his Dichotomy was accordingly— and rightly—abandoned.

To provide a criterion of (non-)demonstrability, the Conceivability Principle—that conceivability implies possibility—simply needs to be combined with the principle that *nothing which is possible can be demonstrated to be false* (as for example at *T* 1.3.6.5, cf. *T* 1.2.2.8–10, 1.3.3.3, 1.3.14.13). In order to make sense of this latter principle, however, it is essential to recognise that something's *being demonstrated* requires more than its simply *being the conclusion of some demonstrative argument*. Any argument by means of logically valid Aristotelian syllogisms, for example, must count as *demonstrative* for Locke and Hume, because syllogisms rely on "relations of ideas"

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43   The supplementary argument at *T* 1.3.3.3 also appeals to (what is commonly called) Hume's Separability
      Principle of *T* 1.1.3.4 and 1.1.7.3, which in the *Treatise* is sometimes combined with the Conceivability
      Principle (cf. *T* 1.3.6.1, 1.4.3.7, 1.4.5.5) but disappears from the *Enquiry*.

(*E* 4.2) that are "constant, immutable, and visible" (*Essay* IV xv 1), rather than on merely "probable connexions" or causal assumptions.[44] But if such an argument starts from premises that are *false*, then clearly it cannot count as a *demonstration of* its conclusion, and that conclusion cannot thereby be said to have been *demonstrated*.[45] This distinction is clear enough in everyday English, and Hume's usage is consistent with it, but he never acknowledges it, perhaps because when he talks of demonstrative arguments, his interest is usually in what they can or cannot *prove*. He also thinks that informative demonstrative arguments—as opposed to trivial syllogisms—tend to be confined to mathematics, where again deductive *proof* is typically the aim.[46] He does, however, discuss some demonstrative arguments from contingent premises—most importantly involving *applied* mathematics—which are, accordingly, *demonstrative arguments* with conclusions that are not thereby *demonstrated* and whose negations are possible.[47] Hence when he denies the possibility of demonstrating the falsehood of something that is possible, he must indeed, on pain of inconsistency, be implicitly recognising the distinction between an argument's being *demonstrative* (or in modern terms *deductively valid*), and its being a *demonstration of* (i.e. a *deductive proof of*) its conclusion.[48]

Hume's Fork arises very naturally from the combination of the Conceivability Principle—*conceivability implies possibility*—with the principle that *nothing which is possible can be demonstrated to be false*. As we shall see, this brings a considerable simplification in the logical framework of the *Enquiry* as compared with the *Treatise*, where the relationship between Hume's Dichotomy and Conceivability Principle remains unexamined and obscure. Nevertheless, as mentioned at the beginning of this paper, scholarly tradition has overwhelmingly viewed his Dichotomy as more authoritative than his Fork. Thus Helen Beebee, one of the most recent contributors to this tradition, focuses mainly on Hume's theory of relations in the *Treatise*, then extrapolates it to the *Enquiry* with the comment that although "Hume does not mention philosophical relations at all in the *Enquiry*, ... it is clear that he still has more or less the same underlying view in the later work." (Beebee 2006: 19). This leads her into a careful and sensitive discussion that attempts to fit together Hume's "three distinctions: the distinction between class *A* and class *B* relations [i.e. the Dichotomy]; the distinction between what can and cannot be 'demonstrated'; and the distinction between what can

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[44] Each individual step in a syllogistic argument will be *intuitive*, and a demonstration is a sequence of intuitive steps (*Essay* IV ii 7). Locke talks of "probable connexion" at *Essay* IV xvii 2 and 4. Hume insists that probable arguments rely on causal relations (*T* 1.3.6.6–7, *E* 4.4), rather than on the relations of ideas that characterise demonstrations.

[45] Suppose I argue: "All birds are swans. All swans are white. *Therefore* all birds are white." My argument is demonstratively valid, but I clearly have not *demonstrated* that all birds are white. By analogy with verbs, one might say that this argument is a "demonstration" in an *intransitive* sense (i.e. it is demonstratively valid), but not in a *transitive* sense (i.e. it does not provide a demonstration *of its conclusion*).

[46] Hume's explanation is that only mathematical ideas interconnect sufficiently precisely to allow lengthy but secure chains of reasoning: see *T* 1.3.1.5 (quoted near the beginning of §3 above), and *E* 12.27 (discussed in §4 below).

[47] At *T* 2.3.3.2 Hume considers demonstrative reasoning about financial accounts (and also mentions mechanics). At *E* 4.13 he considers an application of the conservation of momentum (stressing that the physical law is contingent and known only by experience), and at *E* 4.18 the attempt to demonstrate future uniformity from past observed uniformity. At *T* 1.2.4.10 he apparently recognises that a demonstration—so far from having to start from premises known to be true—can serve as a *reductio ad absurdum* of its premise.

[48] For longer expositions of the argument of this paragraph, see the references in note 3 above.

and cannot be known with certainty." Here Beebee endorses David Owen's view that Hume's Dichotomy rules out an understanding of "demonstration" as anything like valid deduction (cf. Owen 1999: 93–4).[49] She then proceeds—as does Owen—to develop an elaborate theory of Humean demonstration that attempts to make sense of what is, I believe, ultimately incoherent.[50] In doing so, both scholars apply vastly more subtle analysis than is apparent in Hume's own discussion of relations, and they are far too respectful of it. Neither of them remarks on the crude derivativeness of Hume's taxonomy from that of Locke, nor alludes to Bennett's insightful diagnosis of the Dichotomy's confusions,[51] nor considers the possibility that Hume might have omitted all this from the *Enquiry* not for the sake of brevity, but instead to be rid of it. If my discussion in this section has been on the right lines, however, then the latter is very much more likely.

Before leaving Hume's theory of relations, it is worth briefly mentioning a further blind alley into which he was led by it. We have seen how in *T* 1.3.1.1–2 he presents his Dichotomy between the four constant and three inconstant relations. But his analysis goes further than this, drawing subdivisions within each category. Consider again the beginning of the long passage quoted near the start of this section, where he prepares to divide up the constant relations:

> These four are *resemblance*, *contrariety*, *degrees in quality*, and *proportions in quantity or number*. Three of these relations are discoverable at first sight, and fall more properly under the province of intuition than demonstration. (*T* 1.3.1.2)

Hume quickly concludes that only *proportions of quantity or number* give any prospect of grounding "a chain of reasoning" that we can "carry on . . . to any degree of intricacy, and yet preserve a perfect exactness and certainty" (*T* 1.3.1.5): he thus delimits "the province" of *demonstration*. Now compare the following passage from the next section of the *Treatise*, in which Hume divides up the inconstant relations in a somewhat similar manner:

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[49] Beebee (pp. 20–1) also accepts Owen's claim (p. 87)—inherited from Stove (1973: 35)—that "Hume says . . . frequently . . . that there are no demonstrative arguments with conclusions that are possibly false". Owen (p. 87 n. 8) acknowledges that Millican (1995) contests the claim (as in my previous paragraph), but unfortunately neither he nor Beebee (2007: 413) addresses this fundamental objection to their account, nor indeed takes any notice of Hume's repeated acknowledgement of applied mathematics, which has to be "the crucial test case" (Millican 2007a: 177).

[50] Beebee's theory is implausibly complex, involving consideration of the Separability Principle as well as the Conceivability Principle, and incorporating a distinction between *demonstration* and *deduction* (in the modern sense) which Hume supposedly "implicitly recognizes" (p. 30), even though he apparently lacks any term of his own for the latter. Owen's theory is simpler, but I believe takes Locke's vague hints about chains of ideas (*Essay* IV xvii 2–4) far more seriously than they deserve, both philosophically and as applied to Hume. Locke's chain model is hopeless for dealing with inferences involving multiple premises and/or quantified propositions, while any influence that it might have had on Hume seems to have evaporated by the time of the *Enquiry*, which speaks far more of *propositions* and their logical relations than of sequences of ideas (cf. Millican 2002: 113 nn. 15, 16).

[51] Beebee (2006: 19 and 226, n. 4) does, however, mention Bennett's 1971 book as contributing to the "standard way" of understanding Hume's distinctions along the lines of the necessary/contingent, analytic/synthetic, and deduction/induction distinctions.

... the other three [relations], which depend not upon the idea, and may be absent or present even while *that* remains the same ... are *identity*, *the situations in time and place*, and *causation*.

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. This comparison we may make, either when both the objects are present to the senses, or when neither of them is present, or when only one. 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 ... but a mere passive admission of the impressions thro' the organs of sensation. 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 ... nor can the other two relations be ever made use of in reasoning, except so far as they either affect or are affected by it ...

Here then it appears, that of those three relations, which depend not upon the mere ideas, the only one, that can be trac'd beyond our senses, and informs us of existences and objects, which we do not see or feel, is *causation* ... (*T* 1.3.2.1–3)

It is easy to appreciate the elegant appeal of the resulting architectonic structure, lining up the operations of the mind against the seven different types of relation:

	Constant relations	*Inconstant relations*
Perception	**Intuition** • *resemblance* • *contrariety* • *degrees in quality*	**Sensory Perception** • *identity* • *situations in time and place*
Reasoning	**Demonstration** • *proportions in quantity and number*	**Probability** • *causation*

This must have seemed an attractively systematic way of explaining both why successful *demonstrative* argument is concentrated in the mathematical sciences, and also why *probable* argument typically involves causal relations. Captivated by the thought that the key to these things could be found in the relations involved, Hume's imagination got to work and filled in the structure accordingly. But unfortunately it is a failure: both demonstrative and probable argument can involve *any* of the relations concerned, as becomes clear as soon as one considers practical examples (e.g. astronomical calculations about the position, identity, temperature or apparent similarity of comets; or inductive confirmation of the principles from which those calculations start). It should be no surprise, then—and is to Hume's credit—that after the *Treatise* all this was completely abandoned.

Although Hume's systematic categorisation of relations, with his Dichotomy at its heart, is abandoned in the *Enquiry*, it is very tempting to take it as authoritative for his philosophical logic, because it presents a complex and interesting theory which is

therefore presumed to be carefully worked out. If we then observe, with Beebee, that Hume "still has more or less the same underlying view in the later work" (2006: 19), it is again very tempting to extrapolate the authority of the Dichotomy from the *Treatise* to the *Enquiry*, as she and many other scholars have done.[52] But this is all the wrong way round. Hume's "underlying view" in the two works is indeed similar, but that should lead us to expect that the genuinely fundamental principles will be apparent not only in the *Treatise*, but in *both* works.[53] And in that case the core of Hume's "underlying view" about the limits of demonstration must be encapsulated not in his sketchy and ill-thought-out Dichotomy—which rarely features even in the *Treatise*—but instead in his Conceivability Principle, which is prominent in both works. It is this, rather than the Dichotomy, that provides Hume's central criterion of demonstrability, and thus becomes the demarcation principle behind his "Fork".

4. Hume's Fork, and Its Various Criteria

After the complications of his account of relations in the *Treatise*, with its difficulties, ambiguities and confusions, Hume's corresponding discussion in the *Enquiry* comes as a welcome relief. In just two elegant and justly famous paragraphs, he sets the scene for the discussion of induction to follow:

> ALL the objects of human reason or enquiry may naturally be divided into two kinds, to wit, *Relations of Ideas*, and *Matters of Fact*. Of the first kind are the sciences of Geometry, Algebra, and Arithmetic; and in short, every affirmation, which is either intuitively or demonstratively certain. *That the square of the hypothenuse is equal to the square of the two sides*, is a proposition, which expresses a relation between these figures.[54] *That three times five is equal to the half of thirty*, expresses a relation between these numbers. Propositions of this kind are discoverable by the mere operation of thought, without dependence on what is any where existent in the universe. Though there never were a circle or triangle in nature, the truths, demonstrated by EUCLID, would for ever retain their certainty and evidence.
>
> Matters of fact, which are the second objects of human reason, 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

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demonstratively false, it would imply a contradiction, and could never be distinctly conceived by the mind. (*E* 4.1–2)

This distinction between *relations of ideas* and *matters of fact* has become widely known, in the wake of Antony Flew's book of 1961 (p. 53), as "Hume's Fork". Hume's terminology here contrasts with that of the *Treatise*, in that although "relations of ideas" had already appeared with a similar usage in *Treatise* Book 3 (at *T* 3.1.1.9 and 3.2.2.20), in Books 1 and 2 the term had invariably signified a psychological *associational* relation,[55] except when explicitly qualified ("relations of ideas, consider'd as such" at *T* 1.3.6.6 and "abstract relations of ideas" at *T* 2.3.10.11).[56] The term "matter of fact" is more familiar, occurring repeatedly—often in the *Enquiry* sense—in both *Treatise* Book 1 (published in January 1739) and the *Abstract* (March 1740).[57] But it is not until the first section of Book 3 (October/November 1740) that we see a clear anticipation of Hume's Fork using the term:

> Reason is the discovery of truth or falshood. Truth or falshood consists in an agreement or disagreement either to the real relations of ideas, or to real existence and matter of fact. (*T* 3.1.1.9)

At *T* 3.1.1.18–19, Hume follows this up by saying that "the operations of human understanding divide themselves into two kinds, the comparing of ideas, and the inferring of matter of fact", and then reminds us that the former "degree of evidence" is confined "to those *four* relations" that are constant. Thus although his Fork is clearly anticipated, and in very similar language, it is still firmly linked with his Dichotomy. Only in the *Enquiry* is this link dropped.

Hume's Fork can easily be illustrated with some typical examples, of which four are his own:

Relations of Ideas	*Matters of Fact*
Pythagoras' Theorem (*E* 4.1)	The sun will rise tomorrow (*E* 4.2)
$3 \times 5 = \frac{1}{2} \times 30$ (*E* 4.1)	The sun will not rise tomorrow (*E* 4.2)
All bachelors are unmarried	Hume's *Enquiry* was published in 1748
A metre is 100 centimetres	Oxford is on the River Thames

However the distinction's exact nature bears further examination. The two paragraphs quoted above from *E* 4.1–2 provide several criteria for distinguishing between the two

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[55]   See for example *T* 1.2.5.20, 1.4.6.21, 2.1.5.5, 2.1.9.5, 2.1.10.1, and 2.2.2.6–25. The only associative use in Book 3 is at *T* 3.2.3.10 n. 75.4.

[56]   Even in Book 3 the new usage is signalled explicitly; thus *T* 3.2.2.20 refers to "relations of ideas, which are eternal, immutable, and universally obligatory". Surprisingly, given Hume's prominent introduction of the term "relations of ideas" at *E* 4.2, its *only* other occurrence in the *Enquiry* is at *E* 4.18, where he talks about reasoning "concerning relations of ideas". In Section 12 he seems to use "the abstract sciences" almost equivalently (see *E* 12.18–19, 27, and 34; also *L* 37), though at *E* 5.9 "the abstract sciences" apparently include empirical psychology.

[57]   In Book 1, see for example *T* 1.3.6.12, 1.3.7.2–3, 1.3.12.23, and 1.4.2.21; in the *Abstract*, see *A* 8, 14, 18, and 21.

categories of proposition, criteria which Hume seems to be treating as largely coincident. On the one hand, *relations of ideas*:

(Rm) include all mathematical truths;

(Rd) are "intuitively or demonstratively certain" (i.e. they are *demonstrable*);[58]

(Ra) are discoverable "by the mere operation of thought, without dependence on what is any where existent in the universe" (i.e. they are a priori).[59]

On the other hand, *matters of fact*:

(Ma) "are not ascertained in the same manner" (i.e. they are not discoverable a priori "by the mere operation of thought");

(Mp) are both possibly true and possibly false (i.e. they are *contingent*);

(Mc) can be distinctly conceived to be true or to be false, without contradiction;

(Md) cannot be demonstrated to be true or to be false.

These last three criteria incorporate the point emphasised by Hume's example of the sun rising or not rising: if *P* is a matter of fact in this sense, then not(*P*) is also a matter of fact.[60] By contrast, the category of relations of ideas includes only truths, so Hume's distinction does not cover the entire domain of propositions: "1 + 1 = 3", for example, counts as neither a matter of fact nor a relation of ideas.[61] Given his clear initial declaration that "All the objects of human reason or enquiry may naturally be divided into [these] two kinds", it seems therefore that Hume would discount any such proposition as being an "object of human reason or enquiry" altogether, presumably on the grounds of its inconceivability. (The obvious alternative way of dealing with this issue would be to extend Hume's taxonomy by introducing a category of *false relations of ideas*, so as to render it complete.)

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[58] As his terminology suggests, Hume is straightforwardly following Locke here (*Essay* IV ii 1–7), in viewing *intuition* as direct intellectual grasp of a relation of ideas (e.g. that one plus one equals two, or of a single syllogistic step—cf. note 44 above) and *demonstration* as a sequence of intuitive steps (as for example in the proof of Pythagoras' Theorem).

[59] Hume is not of course saying that relations of ideas must be discoverable by a process which has no dependence on the mental activity of the discoverer; nor is he saying that they cannot involve ideas acquired through experience (since he holds that all ideas are thus acquired). *All bachelors are unmarried*, for example, is knowable a priori because *having acquired the relevant ideas* I can then know for certain, without any empirical investigation, that it is true. So what makes a truth a priori is that it can be *justified* without appeal to experience, by thought alone. Flew's *Dictionary of Philosophy* accordingly gives the following definition: "An a priori proposition is one that can be known to be true, or false, without reference to experience, except in so far as experience is necessary for understanding its terms. An a posteriori proposition can be known to be true, or false, only by reference to how, as a matter of contingent fact, things have been, are, or will be." (1979: 15). For discussion of Hume's notion (or notions) of apriority, see §6.1 below.

[60] This is confirmed by Hume's general usage in the *Treatise* and *Enquiry*, where the phrase "matter of fact" is almost always indifferent between truth and falsehood (there are obvious exceptions at *E* 4.21: "contrary to plain matter of fact", and *E* 8.24: "that it be consistent with plain matter of fact"). In the second *Enquiry*, however, Hume's usage seems to change slightly, for he apparently equates "matter of fact" with truth at *M* 5.15: "This is a matter of fact, confirmed by daily observation."; *M* 5.44: "It appears to be a matter of fact, that ...": and (arguably) *M* App 1.6: "where is that matter of fact, which we here call *crime*").

[61] *Treatise* 3.1.1.9, however, carries a hint that relations of ideas can indeed be false, or at least, not "real": "Truth or falshood consists in an agreement or disagreement either to the *real* relations of ideas ..." (emphasis in original).

Hume's text gives greatest prominence to the criteria based on demonstrability and apriority, and it is fairly easy to explain why he takes these to coincide. Assuming (as he apparently does) that intuition or demonstration count as methods of discovery "by the mere operation of thought", any proposition satisfying (Rd) must also satisfy (Ra). Moreover he seems to consider intuition and demonstration to be the *only* such methods of a priori discovery—that being so, any proposition satisfying (Ra) must also satisfy (Rd), and hence the two criteria are equivalent. But then since it is clear from the wording of (Ma) and (Md) that they are intended to be mutually exclusive with (Ra) and (Rd) respectively, it follows that (Md) and (Ma) must also be equivalent, as long as the overall domain of "objects of human reason or enquiry" is the same in both cases.

So far, then, we have (Ra) and (Rd) as equivalent (as likewise (Ma) and (Md), their complements within the appropriate domain), while the following passages confirm that these criteria are indeed intended to apply to all, and only, relations of ideas:

> Propositions of this kind [*Relations of Ideas*] are discoverable by the mere operation of thought, without dependence on what is any where existent in the universe. (*E* 4.1)

> Of the first kind [*Relations of Ideas*] are ... in short, every affirmation, which is either intuitively or demonstratively certain. (*E* 4.1)

The former says that all relations of ideas satisfy (Ra); the latter says that anything satisfying (Rd) is a relation of ideas. The ellipsis here also introduces our remaining criterion for a relation of ideas, (Rm):

> Of the first kind [*Relations of Ideas*] are the sciences of Geometry, Algebra, and Arithmetic ... (*E* 4.1)

Hume seems to be asserting that all mathematical truths count as relations of ideas, but there is no indication yet that he sees relations of ideas as being entirely confined to mathematics. Something like this claim does indeed come later, at *E* 12.27, on the basis that only in mathematics are our ideas sufficiently clear and precise to allow the reliable exploration of "intricate and involved" relationships between them. Thus any confinement of relations of ideas to mathematics is a consequence of our conceptual limitations, rather than a matter of definition. Indeed in the same paragraph, Hume seems to acknowledge that there can be *trivial* relations of ideas outside mathematics: with a sly dig at Locke (*Essay* IV iii 18), he cites the example "*that where there is no property, there can be no injustice*", taking injustice to be by definition a violation of property. So there is no prohibition in principle on relations of ideas outside mathematics, and indeed the huge and fruitful developments in formal (and especially computational) systems since Hume's day have demonstrated that there is far more scope for these than he envisaged.[62] From now

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[62] We might also view relations of ideas as extending well beyond precise formal systems, to include at least some propositions in philosophy and similar disciplines. Hume himself usually describes philosophy as part of the empirical science of human nature, and it is a shame that he did not consider this question more critically when categorising "the proper subjects of science and enquiry" (*E* 12.26). Despite his long-held presumption that useful demonstration is confined to mathematics—associated as we have seen with his problematic theory of relations—he would surely have realised, on reflection, that some of his philosophical results must count as relations of ideas (for instance, his statements at *T* 1.3.3.4–8 that certain would-be demonstrative proofs of the Causal Maxim are fallacious).

on, therefore, we can put criterion (Rm) to one side, and acknowledge that relations of ideas will have a wider scope than Hume himself realised.

Having covered the three criteria for relations of ideas, let us move on to the remaining criteria for matters of fact, starting with (Mp) and Hume's statement:

> The contrary of every matter of fact is still possible ... (*E* 4.2)

Here the context makes clear that Hume is thinking of the contrary of a *true* matter of fact as being possible (albeit in fact *false*); and he is obviously taking for granted that the matter of fact itself—being true—is *ipso facto* possible. The upshot is that whenever *P* is a matter of fact, both *P* and not(*P*) are possible; so any matter of fact must satisfy criterion (Mp). The implication in the other direction—specifically from (Mp) to (Md)—can also quickly be inferred from the text of *E* 4.1–2, given Hume's acceptance of the Conceivability Principle or, more crudely, that anything implying a contradiction is impossible.[63] As a first step in this reasoning, the following sentence takes us from demonstrative falsehood to impossibility:

> Were [a proposition] demonstratively false, it would imply a contradiction ... (*E* 4.2)

This link between demonstrability and impossibility of the contrary is also stated more directly elsewhere, for example:[64]

> wherever a demonstration takes place, the contrary is impossible, and implies a contradiction. (*A* 11)

Now any relation of ideas *P*, by criterion (Rd), must be demonstrable, and as we have now seen, this implies that *P*'s falsehood is impossible, and hence that *P* violates criterion (Mp). Contrapositively, therefore, any "object of human reason or enquiry" that satisfies (Mp) cannot be a relation of ideas, and hence must be a matter of fact. (Mp) thus joins (Ma) and (Md) as a necessary and sufficient criterion for a matter of fact—Hume apparently takes all three to be equivalent.

The situation with the conceivability criterion, (Mc), however, is more delicate. Even in *E* 4.2 alone, we have three passages to consider, which we shall take in order:

> 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.

This seems to be saying that where *P* is any matter of fact which (as above) is presumed true and therefore possible, the conceivability without contradiction of not(*P*) implies that

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[63] Hume normally takes it absolutely for granted that a literal contradiction is impossible, e.g. *T* 1.1.7.4, 1.2.2.2, 1.2.2.4, 1.4.2.3 etc., but he does occasionally spell this out, e.g. *T* 1.3.6.1, 1.3.9.10, *A* 11, *D* 2.12. Beyond the early sections of *Treatise* Book 1, Hume often uses the word "contradiction" less literally, as meaning an absurdity or conflict (e.g. "a new ... contradiction in our reason", *T* 1.3.13.12; "any contradiction ... to the sentiments", 1.4.2.37; "the contradiction betwixt ... the imagination and passion", 2.2.2.24).

[64] For other relevant passages, see *T* 1.2.2.10, 1.3.3.3, 1.3.6.5, 1.3.9.10, 1.3.14.13; and *A* 18.

it too is possible. Hence anything that satisfies criterion (Mc) must also satisfy criterion (Mp).

> *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.

Here not(*P*)'s "intelligibility"—which the context indicates is a mere variation for "conceivability"—without contradiction implies that it cannot be demonstrated to be false. Clearly *P*, which is equally intelligible, cannot be demonstrated to be false either, and it follows that satisfaction of criterion (Mc) implies satisfaction of (Md).

> Were it demonstratively false, it would imply a contradiction, and could never be distinctly conceived by the mind.

In other words, if not(*P*) could be demonstrated to be false, then it could not be distinctly conceived without contradiction. This shows that violation of criterion (Md) implies violation of (Mc), and hence again that satisfaction of (Mc) implies satisfaction of (Md). The upshot of all these three passages is therefore exactly the same, namely, that (Mc) is a sufficient criterion for a matter of fact, by implying either (Mp) or (Md).

It is far from clear, however, that (Mc) is intended by Hume to be a *necessary* criterion for a matter of fact—at least, nothing in the passages above implies this. The first of them, admittedly, gives some appearance of doing so:

> 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.

This plainly indicates that (Mp)—possibility of both a proposition and its contrary—applies to *the entire category of matters of fact*. But it is not saying that (Mc)—distinct conceivability—likewise applies to the entire category. For it does not state *that the contrary of every matter of fact is distinctly conceivable*; instead, it states *that the contrary of every true matter of fact is as distinctly conceivable as if that contrary were true*. So Hume's idea seems to be that *the conceivability of any matter of fact is independent of its truth or falsehood*. This does not require that every matter of fact should be conceivable, and indeed nothing else in our discussion so far implies that (Mc) should extend to the entire category. For all that we have seen, therefore, it might be that Hume is prepared to countenance matters of fact whose truth and falsehood are each *in*conceivable (though nevertheless possible). This uncertainty gives us good reason for analysing (Mc) further, to distinguish:

(Mcd) *P* can be distinctly conceived to be true or to be false;
(Mcc) Neither *P*'s truth, nor its falsehood, implies a contradiction.

Hume clearly takes any contradiction to be impossible by definition (cf. note 63 above), and since he insists (repeatedly, as we shall see in §5 below) that distinct conceivability implies possibility, it follows that satisfaction of (Mcd) guarantees satisfaction of (Mcc). Indeed he explicitly asserts both this implication and its contrapositive:

> 'Tis in vain to search for a contradiction in any thing that is distinctly conceiv'd by the mind. Did it imply any contradiction, 'tis impossible it cou'd ever be conceiv'd. (*T* 1.2.4.11)

> What is demonstratively false implies a contradiction; and what implies a contradiction cannot be conceived. (*A* 18)

Less obviously, Hume seems to believe that a proposition can be impossible (if and) *only if* it implies a contradiction. This is at least strongly suggested by the quotation above, "The contrary of every matter of fact is still possible; because it can never imply a contradiction", and also by other texts:

> Here then is an idea of extension, which ... implies no contradiction: consequently 'tis possible for extension to exist conformable to it ... (*T* 1.2.2.9; cf. also 1.4.2.40)

> wherever a demonstration takes place, the contrary is impossible, and implies a contradiction. (*A* 11)

It seems, therefore, that Hume takes (Mcc) to be equivalent to (Mp)—and hence also to the other criteria considered earlier. But (Mcd) is potentially a distinctive (and stronger) criterion for a matter of fact, implying (Mcc) and the other criteria but perhaps not implied by them.

To summarise, then, Hume's Fork boils down to the following principles. Every potentially true proposition is either a *relation of ideas* or a *matter of fact*. *Relations of ideas*—which include mathematical truths—are all *a priori* and *demonstrable* (i.e. "intuitively or demonstratively certain"), meaning that their denial implies a contradiction and cannot be distinctly conceived. *Matters of fact*, on the other hand, are never *a priori* nor *demonstrable*, but are always *contingent* (i.e. possibly true and possibly false), with neither their truth nor falsehood implying a contradiction. But it remains to be seen whether all matters of fact are distinctly conceivable, with no texts so far decisive either way.

5. Conceivability, Inconceivability, and Possibility

Hume explicitly states, on numerous occasions, that conceivability implies possibility, a claim now generally known as his *Conceivability Principle*. We have already seen several examples of such statements in §4 above, and here are some others:

> 'Tis an establish'd maxim in metaphysics, *That whatever the mind clearly conceives includes the idea of possible existence*, or, in other words, *that nothing we imagine is absolutely impossible*. We can form the idea of a golden mountain, and from thence conclude that such a mountain may actually exist. We can form no idea of a mountain without a valley, and therefore regard it as impossible. (*T* 1.2.2.8)

> Whatever can be conceiv'd by a clear and distinct idea necessarily implies the possibility of existence ... (*T* 1.2.4.11)

> 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* 1.3.6.5)

> Whatever is clearly conceiv'd may exist; and whatever is clearly conceiv'd, after any manner, may exist after the same manner. ... whatever we conceive is possible ... 'tis an evident principle, *that whatever we can imagine, is possible*. (*T* 1.4.5.5, 10, 35)

The importance of the principle for Hume can be illustrated by the very wide range of examples to which he applies it. He is apparently quite happy to infer from conceivability to possibility in respect of the existence of a golden mountain (*T* 1.2.2.8), real extension consisting of indivisible parts (*T* 1.2.2.9), the impact of billiard balls and other objects (*T* 1.3.9.10, *A* 11, *E* 4.10), the loss of activity of matter or spirit (*T* 1.4.5.35), the rising or non-rising of the sun (*E* 4.2), the behaviour of trees in winter and summer (*E* 4.18), the non-existence of various beings (*E* 12.28), and matter's having an inherent principle of order or motion (*D* 2.14, 8.4). More generally, he insists on the conceivability of any object whatever coming into existence without a cause (*T* 1.3.3.3), and extends the Principle to every cause and effect relationship:[65]

> Any thing may produce any thing. Creation, annihilation, motion, reason, volition; all these may arise from one another, or from any other object we can imagine. (*T* 1.3.15.1, cf. 1.4.5.30, 1.4.5.32)

> The mind can always conceive any effect to follow from any cause, and indeed any event to follow upon another: whatever we conceive is possible, at least in a metaphysical sense ... (*A* 11, cf. *E* 12.28–9)

This last quotation usefully reminds us that the principle is intended only to reveal *possibility* "in a metaphysical sense"—what is often referred to as *absolute*, *conceptual*, or *broad logical* possibility—rather than *physical* or *causal* possibility. Hume recognises both notions, and there is real potential for confusion here, because his references to "possibility" are most often to *absolute* possibility, whereas his references to "necessity" (especially in the parts of his works that concern his philosophy of induction and causation) are most often to *causal* necessity.[66] In what follows, however, I shall invariably use these modal terms in an absolute sense, unless explicitly qualified.

Hume refers to the Conceivability Principle as "an establish'd maxim in metaphysics", and indeed it appears explicitly in the work of Descartes and Berkeley (amongst others),

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[65] Kail (2007: 96) claims that Hume "must" limit the application of his Conceivability Principle to "sensory experiences or *impressions*", on the ground that only impressions have the "adequacy" that would allow an inference to be made from something's appearance to its real modal structure. The host of examples listed here (as in Millican 2009: 681) shows clearly that Kail's interpretation cannot be right, and indeed suggests that Hume would deny any absolute modal structure to things beyond what is revealed by his Conceivability Principle. See also note 76 below.

[66] Hence it can seem that the standard equivalence between *possibly*(*not*(*P*)) and *not*(*necessarily*(*P*)) fails for Hume. In fact it does not, as his arguments show (e.g. *T* 1.3.3.3 and 1.3.7.3 in the case of absolute modality; *T* 1.3.6.14, 2.2.2.27, and *E* 8.4 in the case of causal modality). The two types of modality can often be mixed, as when we pursue the (absolute) logical implications of what we take to be (causally) necessary laws. Perhaps the most explicit example of this in Hume's work is his discussion of applied mathematics at *E* 4.13, mentioned in §3 above. There are also many cases where he clearly denies the possibility of forming certain kinds of idea, based on the logical implications of the Copy Principle, which he argues for (*T* 1.1.1.8–9, *E* 2.6–7) as a matter of fact: a causal rather than absolute necessity about the human mind; see for instance *T* 1.2.6.8, 1.3.14.6, 1.3.14.22, 1.4.5.19–21, 1.4.6.2, and *E* 7.8. More controversial is his dismissal of the (causal) possibility of miracles at *E* 10.27—see Millican (2011: §§10, 15).

and at least implicitly in Locke.[67] The appeal of the principle is obvious enough, especially on an imagist view of thinking, since conceiving or imagining a state of affairs is then equated with "picturing it" in the mind, and only what is possible—it seems plausible to say—can be clearly and distinctly depicted. For example it is impossible to "picture" a triangle with four sides, or a mountain (i.e. an upward slope) without a valley (i.e. a downward slope).[68] It might be objected that pictures have been created of "impossible objects", such as Maurits Escher's famous staircase which seems to go forever upwards whilst returning to the same place. But these are evidently not "clear and distinct" depictions, because they represent what purport to be three-dimensional objects through a two-dimensional projection. If an architect proposed to erect such a structure on the basis of an Escher print, he might reasonably be asked to depict it more clearly and distinctly, by means of a series of diagrams in different orientations (from above, the front, the sides etc.) which by focusing on complementary two-dimensional "views" would be able to represent each of them clearly and—as Locke would say—more "adequately". Indeed such examples can thus be used to argue *in favour* of the Conceivability Principle, by raising the pertinent question: *how else* might we conclude that some architectural design was conceptually possible, *if not* by such precise depiction? Isn't that exactly how we would go about establishing the modal difference between an Escher staircase (where the effort at such depiction would inevitably fail) and a normal staircase (where it could succeed)?[69]

Not surprisingly, the most common objections to the Conceivability Principle arise where imagist depiction is out of the question, such as in the famous example of Goldbach's Conjecture:

> *Every even number greater than 2 can be expressed as the sum of two prime numbers.*

We do not (currently) know whether this conjecture is true or false—every even number so far tested conforms to it, but no general proof has been discovered (it might even be that the conjecture is in fact true, and yet that no proof is possible). We can apparently *conceive* what it would be for Goldbach's Conjecture to be true, and also what it would be for the conjecture to be false. But since it is an arithmetical statement, it must, if true, be *necessarily true* or else, if false, *necessarily false*. (For example, that 24 is the sum of 17 and 7, and that 17 and 7 are primes, are not just contingent facts about the way the world happens to

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[67]   Descartes: "It must be noted that possible existence is contained in the concept or idea of everything that we clearly and distinctly understand." (*First Set of Replies*, CSM ii 83); Berkeley: "my conceiving or imagining power does not extend beyond the possibility of real existence or perception" (*Principles* i 5); Locke: "there is no necessary connexion between *Space* and *Solidity*, since we can conceive the one without the other" (*Essay* II xiii 22). At *T* 1.2.2.8, Hume seems to be borrowing phraseology from Descartes, and perhaps from Berkeley also.

[68]   Descartes repeatedly uses a mountain without a valley as an example of a self-contradictory and therefore impossible object, for example in the *Fifth Meditation*, CSM ii 46.

[69]   It is pertinent to ask *why* an impossible situation can easily be described in words, but not easily depicted visually. I suspect the answer is that we would not accept as adequate any visual depiction that was insufficiently clear and explicit, or which purported to represent anything that was not itself visual in nature. The first condition would rule out Escher staircases etc., while the second would rule out diagrammatic representations of contradictory situations. But then, given a clear depiction of a visual situation, the isomorphic structure of the image and the situation depicted (e.g. their spatial topology) would make it impossible for an adequate *image* to be produced of an impossibility. No such isomorphic structure gets in the way of a clear and explicit *verbal description* of an impossibility (e.g. "triangle ABC, lying in a Euclidean plane, has one side that is longer than the sum of the other two sides").

be.) So either Goldbach's Conjecture could not possibly be false, or else it could not possibly be true—either way, since we can apparently conceive of both eventualities, it seems we must allow that conceivability does not always imply possibility.

It is not clear, however, that this argument explodes Hume's Conceivability Principle, even as applied to mathematical conceptualisation. For he could point out that there is a distinction between on the one hand, conceiving in the weak sense of *merely understanding what some proposition means*, and on the other hand, conceiving in the stronger sense of *understanding clearly and distinctly what it would be for that proposition to be true*—only the latter, he might say, requires that one has grasped a genuine possibility. Thus the mathematical dunce can "conceive" in the first sense that $17 + 7 = 26$, but this doesn't show that $17 + 7 = 26$ is a genuine possibility, because the dunce's conception is confused. (Moreover if he tried to depict the statement clearly and distinctly in a diagram, with one-to-one mappings between $17 + 7$ dots on the left, say, and 26 dots on the right, then he would fail.) Likewise, it might be argued, we can only conceive in the weak sense what it would be for Goldbach's Conjecture to be true or false, since we can't conceive clearly and distinctly of its truth—quite obviously given its infinite nature—until we have found a proof, or of its falsehood until we have found a counterexample (i.e. an even number greater than 2 which cannot be expressed as the sum of two primes). Thus only after we have achieved the means of establishing its truth or falsehood will we be able to grasp such a mathematical conjecture sufficiently clearly to "see" its modal status. This answer may or may not be satisfactory in this particular (and notoriously difficult) case, but at any rate Hume never applies his argument from conceivability to such problematic mathematical examples. Instead he confines his attention to relatively straightforward cases where it is far more plausible to claim that we can understand sufficiently clearly what it would be for the proposition in question to be true. *That the sun will not rise tomorrow*, or *that there is a golden mountain*, for example, do seem to be understandable in something like the stronger sense outlined above. It is therefore perhaps quite reasonable to insist that they are *clearly and visibly contingent* (a phrase borrowed from Roger Woolhouse 1972: 150), and hence must be genuine conceptual possibilities. Again, as with the impossible objects, Hume could also try to turn the tables on his critics by asking *how else*—other than through the attempt to conceive clearly and distinctly the envisaged scenario—might one go about establishing a conceptual possibility? Suppose we produce a series of convincing diagrams of a golden mountain, with carefully co-ordinated projections from different angles. Better still, suppose we create a three-dimensional model of such a mountain, or simply imagine a particular *existing* mountain with its entire bulk replaced by gold. Of course such a golden mountain might be *physically* impossible (gold might well be too malleable to support such a mass), but any suggestion that it was *conceptually* impossible—in the face of such clear depiction—might threaten widespread general scepticism about conceptual possibility: if *this* doesn't show a non-actual physical situation to be conceptually possible, then what *could* show it?[70] Our attempts at clear and

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[70] Such scepticism—especially about this sort of example—would not necessarily be inappropriate, though it would be non-Humean. A plausible case can be made for the view that our general understanding of fundamental particles and the physical laws that govern them enters into our conception of what a substance like gold *is* (e.g. that it consists of atoms with 79 protons in the nucleus), and hence that gold cannot coherently be conceived to act in ways contrary to those concepts and laws. This line of argument narrows the gap between physical and conceptual possibility, and takes us close to the discussion of §6.3 below.

distinct depiction in the imagination (supplemented perhaps by physical pictures and models) might well be fallible, but is it not better to rely on these than to abandon entirely the attempt to understand the range and limits of absolute possibility?

Hume's use of the Conceivability Principle can, then, plausibly be given at least some initial defence (and there is no space here for going deeper into these philosophical issues),[71] but the lesson of Goldbach's Conjecture remains: Hume ought to be prepared to accept that there are some propositions *P* where neither *P* nor *not(P)* is conceivable in the sense that he takes to imply real possibility. But then, given our ignorance of whether such propositions are (necessarily) true or (necessarily) false, he should not hold that such *lack of conceivability* implies anything either way about their modal status. Hence in particular he should deny the so-called *Inconceivability Principle*, that *inconceivability* implies *impossibility*, and should accordingly accept that there can be propositions which, though inconceivable to us, are nevertheless possible. This brings us back to the question highlighted at the end of the previous section: is Hume really prepared to countenance *matters of fact* that are *not* distinctly conceivable?

Fortunately for this defence of Hume's position, his texts clearly indicate that he does indeed reject the Inconceivability Principle, and is prepared to countenance matters of fact that are not distinctly conceivable.[72] Perhaps the most obvious evidence here is that while he explicitly states the Conceivability Principle numerous times (many of which we have noted above), he *never* explicitly states anything like the Inconceivability Principle, except as limited to the special case where our ideas are "adequate".[73] Likewise, in our analysis above, we have examined carefully the key texts on Hume's Fork, and found that not one of them carries any implication from (Mcd)—*P*'s being a matter of fact—to (Mcc): the distinct conceivability of both *P* and *not(P)*. This uniformity of textual evidence would be extremely surprising if in fact Hume accepted the Inconceivability Principle. The nearest he ever gets to a general endorsement of it is in the final sentence of each of the following two passages, the first of which we have already seen:

> 'Tis an establish'd maxim in metaphysics, *That whatever the mind clearly conceives includes the idea of possible existence*, or, in other words, *that nothing we imagine is absolutely impossible*. We can form the idea of a golden mountain, and from thence conclude that such a mountain may actually exist. We can form no idea of a mountain without a valley, and therefore regard it as impossible. (*T* 1.2.2.8)

> Nothing, at first view, may seem more unbounded than the thought of man, which ... is not even restrained within the limits of nature and reality. To form monsters, and join incongruous shapes and appearances, costs the imagination no more trouble than to conceive the most natural and familiar objects ... What never was seen, or heard of, may yet be conceived; nor is any thing beyond the power of thought, except what implies an absolute contradiction. (*E* 2.4)

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[71] Much has been said—and is still being added even today—on the philosophy of the Conceivability Principle, which is the subject of the useful collection by Gendler and Hawthorne (2002). In their Introduction at pp. 13–26, the editors discuss the ancestry of the principle in Descartes and Hume, and at pp. 55–67 they provide a helpful summary of the papers in the volume.

[72] In the discussion to follow, I shall be generally agreeing with many points made by Tycerium Lightner (1997).

[73] The exception, to be discussed below, is at *T* 1.2.2.1.

But this evidence is extremely weak. In the *Treatise* passage, Hume is clearly *stating* and *illustrating* his Conceivability Principle, which he emphasises in italics before giving two examples, one positive and one negative. The illustration would obviously be incomplete without a negative example, so Hume provides one from the standard repertoire of familiar impossibilities: a mountain (i.e. a slope up) without a valley (i.e. a slope down). This is conveniently uncontroversial because it clearly implies a contradiction, but for that very reason it fails to give any strong indication that inconceivability by itself would entail impossibility (and indeed we have already seen, at the end of §4, evidence that Hume would take this to follow only if a contradiction were implied). The final sentence of the *Enquiry* passage, likewise, does little to support the Inconceivability Principle when seen in context. Here the crucial passages are the first clause—"Nothing, *at first view, may seem* more unbounded than the thought of man . . ."—and the initial sentence of the very next paragraph, immediately following the quoted passage:

> But though our thought seems to possess this unbounded liberty, we shall find, upon a nearer examination, that it is really confined within very narrow limits, and that all this creative power of the mind amounts to no more than the faculty of compounding, transposing, augmenting, or diminishing the materials afforded us by the senses and experience. (*E* 2.5)

In other words, the appearance of unbounded conceivability is misleading, and our thought is actually narrowly confined to the ideas that are copied from our experienced impressions. So far from supporting the Inconceivability Principle, therefore, this passage very strongly suggests that Hume *cannot* accept it.[74] Consistently with this, he soon goes on to point out that there are in fact likely to be ideas that are conceived by other beings, but inconceivable by us:

> A blind man can form no notion of colours; a deaf man of sounds. . . . A man of mild manners can form no idea of inveterate revenge or cruelty; nor can a selfish heart easily conceive the heights of friendship and generosity. It is readily allowed, that other beings may possess many senses of which we can have no conception; because the ideas of them have never been introduced to us, in the only manner, by which an idea can have access to the mind, to wit, by the actual feeling and sensation. (*E* 2.7)

The most familiar example of such an alternative sense, much discussed since Thomas Nagel's famous paper of 1974, would be auditory sonar, which bats apparently experience but to us seems (phenomenologically at least) utterly unimaginable.

More philosophically substantial cases of inconceivable possibilities come in Hume's discussions of the vacuum and of the external world. Regarding the former he says:

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74 The passage leaves open whether our "faculty of compounding" (etc.) ideas might be unlimited. Later in the *Enquiry* Hume appears to resolve this issue: "Nothing is more free than the imagination of man; . . . it has unlimited power of mixing, compounding, separating, and dividing . . . ideas, in all the varieties of fiction and vision." (*E* 5.10). The context, however, suggests some hyperbole, as this is the introductory paragraph to Part 2 of Section 5, designed to motivate the claim that there is an important difference between *fiction* and *belief*. The main point Hume seems to be making is that we can create fictions at will, whereas "we find by daily experience" that the mind is very far from being "able to believe whatever it pleases". Elsewhere he acknowledges that ideas are often obscure and hard to keep precise (e.g. *T* 1.2.3.1, *A* 7, *E* 7.4), which suggests that there are practical limits on our ability to manipulate them.

> 'tis impossible to conceive either a vacuum and extension without matter, or a time, when there was no succession or change in any real existence. (*T* 1.2.4.2, cf. 1.2.5.1)

However he does not proceed to infer impossibility from such inability to conceive. Admittedly this discussion on space and time in Book 1 of the *Treatise* is notoriously obscure, but in a footnote added in the Appendix he is more forthcoming:

> If we carry our enquiry beyond the appearances of objects to the senses, I am afraid, that most of our conclusions will be full of scepticism and uncertainty. Thus if it be ask'd, whether or not the invisible and intangible distance be always full of *body*, or of something that by an improvement of our organs might become visible or tangible, I must acknowledge, that I find no very decisive arguments on either side; tho' I am inclin'd to the contrary opinion, as being more suitable to vulgar and popular notions. If *the Newtonian* philosophy be rightly understood ... Nothing is more suitable to that philosophy, than a modest scepticism to a certain degree, and a fair confession of ignorance in subjects, that exceed all human capacity. (*T* 1.2.5.26 n. 12)

The case of the external world seems a bit clearer. Here Hume says repeatedly and forthrightly that our thoughts are limited by the ideas derived from our impressions, for example:

> We suppose external objects to resemble internal perceptions. ... [The imagination] *borrows all its ideas from some precedent perceptions*. We never can conceive any thing but perceptions, and therefore must make every thing resemble them. (*T* 1.4.2.54)

> Philosophers [who favour a representative theory of perception] arbitrarily invent a new set of perceptions [as the supposed external objects] ... I say, a new set of perceptions: For we may well suppose in general, but 'tis impossible for us distinctly to conceive, objects to be in their nature any thing but exactly the same with perceptions. (*T* 1.4.2.56)

We cannot conceive of anything "specifically different" from our perceptions (*T* 1.2.6.8–9, 1.4.2.2), but Hume does not appeal to such inconceivability to conclude that no such external objects exist. It is true that our attempts to imagine such objects are riddled with confusion, from conundrums about their identity to the impossibility of conceiving their primary qualities as independent of our secondary quality impressions. But despite all this, their existence remains a real possibility:

> It is a question of fact, whether the perceptions of the senses be produced by external objects, resembling them ... (*E* 12.12)

Hence again, apparently, inconceivability does not imply impossibility.[75]

   As mentioned earlier, Hume does appear to accept the Inconceivability Principle within the limited domain of "adequate" ideas:

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[75] Unfortunately there is no such clear statement to this effect in the *Treatise*, so as with the vacuum, there remains some room for doubt as to whether Hume changed his mind on external objects after publishing Book 1. However earlier in the *Treatise*, at *T* 1.3.14.36, Hume states as a corollary to his definitions of cause "that we can never have reason to believe that any object exists, of which we cannot form an idea". As Lightner observes, "This is significantly weaker than saying that inconceivable objects are impossible. If Hume did think that inconceivable objects were impossible, then it is odd that he would bother making this weaker statement about them." (1997: 124).

> Wherever ideas are adequate representations of objects, the relations, contradictions and agreements of the ideas are all applicable to the objects ... The plain consequence is, that whatever *appears* impossible and contradictory upon the comparison of these ideas, must be *really* impossible and contradictory, without any farther excuse or evasion. (*T* 1.2.2.1)

This passage has featured in the New Hume debate, after Peter Kail interpreted it as limiting the Conceivability Principle to adequate ideas. But this is a mistake, and the implied limitation is to the *Inconceivability* Principle.[76] Hume is saying that where ideas are adequate, the "contradictions and agreements" of those ideas—that is, the *necessary* implications (either negative or positive) between them—also apply to the objects. Thus *impossibilities* and *necessities* amongst adequate ideas (but presumably not amongst ideas in general) can legitimately be transferred to the objects.[77] *Possibilities*, it seems, can make this transfer, in accordance with Hume's Conceivability Principle, without any such limitation. Another passage in a similar spirit is at *T* 1.4.5.20, where Hume says that "any conclusion we form concerning the connexion and repugnance of impressions" cannot reliably be transferred to the objects, whereas "whatever conclusions of this kind we form concerning objects, will most certainly be applicable to impressions". Thus valid inferential connexions and "repugnancies" go reliably from the realm of objects to the realm of perceptions but—and Hume twice emphasises this within the paragraph—they do not go reliably in the other direction. Now if such *necessary* relations pass in one direction, then *possible* relations must pass in the other.[78] So Hume is in effect asserting that the Conceivability Principle applies within this context, and denying that the Inconceivability Principle applies there.

Presenting so much textual evidence—all pointing in the same direction—might well seem excessive, were it not that in a recent *Mind* article, Thomas Holden argues vigorously that Hume does in fact accept the Inconceivability Principle. The new idea he brings to this debate is that Hume is committed to "an expressivist account of absolute necessity" (2014: 379), based on a notorious passage in the *Treatise* which

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[76] See Kail (2003), especially pp. 49–50, and (2007a: 94–8); and for criticism, Millican (2007b: §3.3) and (2009: §6). The "New Hume" interpretation standardly asserts, or at least leaves open, that Hume believes in hidden *absolute* necessities that ground causal relations, so that when *A* causes *B*, *A* has some property that—if only we knew about it—would ground an a priori inference to *B*. Strawson (1989: ch. 11) calls this "the AP property", while Kail (2007b: 256) calls it "the reference-fixer for 'power'" or "RFP". Such hidden necessities threaten to violate the Conceivability Principle, because they would imply that some things which Hume insists we can conceive (e.g. *A* occurring without *B* following) would not, in fact, be absolutely possible. Strict violation can be avoided if the hidden necessities are only *contingently* related to the phenomenal *A* and *B* (as hinted by Beebee 2006: 220), but this risks undermining the entire point of postulating such *necessities* at all. Thus the New Hume interpretation looks tenable only if Hume's commitment to the Conceivability Principle is less than complete, as Kail argues. In a similar spirit, John Wright (1983: 103, 106) claims that Hume rejects the Conceivability Principle, but he too conflates it with the Inconceivability Principle, using the term "establish'd maxim in metaphysics" for both (see p. 92 and his index under "metaphysics").

[77] Note here that asserting a necessary implication from *P* to *Q* is equivalent to asserting the impossibility of (*P* & ¬*Q*), so necessity and impossibility go together. Note also that even if the passage is taken to encompass *both* necessities *and* possibilities, it need not suggest any limitation of the Conceivability Principle, for in that case it would simply be saying that when ideas are adequate (and presumably not otherwise), the implications run in *both* directions.

[78] For example, if a repugnancy between *P* and *Q* amongst objects implies their repugnancy also amongst perceptions, then the possibility of (*P* & *Q*) amongst perceptions—and hence *P* and Q *not* being repugnant there—contrapositively implies the possibility of (*P* & *Q*) amongst objects also.

suggests that "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" (*T* 1.3.14.23). Most commentators, myself included (2009: 675 n. 40), have seen this as something of an aberration on Hume's part, or as a loose remark about the *origin of our idea* of mathematical necessity, rather than about its nature. But Holden develops it into a theory which *equates* absolute necessities with limitations of (idealised) human conceivability, and which thus implies that Hume must accept *both* the Conceivability and Inconceivability Principles. Holden's article is ingenious and interesting, but has to lean very heavily on the "key text" at *T* 1.2.2.8 for lack of other clear textual support (pp. 388, 391–3).[79] And he gives a very tendentious response to Lightner's urging of the same "obvious evidence" from which my own argument started above:

> Lightner (1997) ... adds that "If Hume did accept the Inconceivability Principle, one would think that in the twenty-four or more instances of his stating or using the Conceivability Principle, he would have made clear that the inference goes both ways" (p. 115). But ... if Hume holds that the conceivability principle and the inconceivability principle are equivalent (as the mind-dependent interpretation would have it, and as T 1.2.2.8 suggests), then there would be no need to repeatedly state "both" principles, since they are really one and the same. (Holden 2014: 393 n. 15)

On Holden's Humean theory, both the Conceivability and Inconceivability Principles are implied by the equivalence between absolute modality and limits on human conceivability, but this does *not* make them "really one and the same": there is a clear and fundamental difference between the claim that *P* implies *Q* and the claim that *Q* implies *P*, even if they have a common foundation. Moreover if Hume did mistakenly conflate the two directions of implication, then it would be a remarkable coincidence—extending over thirty or so texts—that he *never* states the unrestricted principle in the "inconceivability" direction, and *never* implies any restrictions in the "conceivability" direction.

There are also strong independent reasons for rejecting Holden's interpretation, of which perhaps the most fundamental are these. First, even on his account, Hume acknowledges an objective correlate to the mental limitations that characterise absolute necessity. Just as our attributions of causal necessity track objective constant conjunctions, so our attributions of absolute necessity seem to track relations that "obtain simply in virtue of the intrinsic representational or semantic content of those ideas" (p. 398; see also pp. 379–80). But then such "relations of ideas" themselves provide an adequate basis for the metaphysics of absolute modality: Holden's conceivability-dependent interpretation becomes otiose, and the passage

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[79] *T* 1.2.2.8 cannot bear this weight, and not only because it fails to imply a general commitment to the Inconceivability Principle, as explained earlier. It also seems to be carelessly written, with Hume giving two versions of the "establish'd maxim" which are not apparently equivalent, one of these involving an "idea of possible existence" which looks extremely dubious on his own principles (e.g. *T* 1.2.6.4, though he might have chosen this phrase to echo Descartes, cf. note 67 above). Moreover the Inconceivability Principle could not properly be described as "establish'd": it is never stated clearly by his most prominent predecessors, and is probably not believed by them. Thus Descartes seems to consider the union of soul and body to be beyond our conception (e.g. CSM iii 227–8); Locke repeatedly stresses the limits of our ideas (e.g. *Essay* II xxiii 16, 23–32; IV iii 23–7); while Berkeley denies that we can imagine or form an idea of a spirit and, like Locke, acknowledges that other creatures will have ideas that we do not (e.g. *Principles* i 81; *Dialogues* 232).

at *T* 1.3.14.23 is most naturally taken to be a sketch of how we come to feel the necessity of relations of ideas (and hence acquire modal ideas about them), rather than a claim about the nature of that necessity.[80] Secondly, Holden's interpretation requires an account of what we are saying when we voice statements of absolute necessity, and he himself finds absurd the idea that such statements "just *are* covert claims ... about the human mind's inability to conceive". To fill this gap, he proposes an "expressivist approach" whereby "when we pronounce that a certain proposition is absolutely necessary we are giving voice to a non-representational attitude—most likely, the *prescriptive* attitude of insisting that the proposition in question ... be treated as a non-negotiable element in our systems of belief" (p. 403, cf. pp. 383, 406). But this looks suspiciously anachronistic; and unlike the parallel move in the case of causal necessity (where Hume explicitly equates our impression with the making of an inference, so that an attitudinal quasi-realism appears relatively plausible),[81] there is nothing whatever in Hume's texts to support it.

To sum up, then, we have found no significant evidence at all that Hume accepts the Inconceivability Principle, and plenty of evidence that he rejects it, as indeed he should if his position is to avoid refutation by examples such as Goldbach's Conjecture. Thus the answer to the question raised at the end of §4—whether on Hume's principles, all matters of fact are distinctly conceivable—is negative. Though distinct conceivability remains a sufficient criterion of possibility, therefore, it is not a necessary condition, and the two components of our original (Mc) criterion must remain separated:

(Mcd) *P* can be distinctly conceived to be true or to be false;

(Mcc) Neither *P*'s truth, nor its falsehood, implies a contradiction.

(Mcd) implies (Mcc) and therefore also (as discussed earlier) the other criteria—M(p), M(a), and M(d)—which ensure that *P* is a matter of fact. But (Mcd) is not implied by (Mcc), and hence is a stronger condition than any of these other criteria.[82]

6. Some Problem Cases for Hume's Fork

We have now put together a fairly comprehensive picture of the interrelations between an important family of Humean concepts, partially revealed in the *Treatise* and then perfected in the *Enquiry* with the statement of Hume's Fork. *Relations of ideas*, as the name implies, can be known a priori, simply by inspecting the nature and internal relations between our ideas, and hence they are capable of being "either intuitively or demonstratively certain". Their denial implies a contradiction, and hence is impossible, so they are also necessary

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[80] Holden (p. 398) distinguishes between the necessity of *non-modal* propositions (such as "Two times two equals four") and the truth of *modal* propositions (such as "It is absolutely necessary than two times two equals four"), when defending Hume from the charge of psychologism. But where a proposition concerns unchangeable relations between the content of ideas (as in arithmetic, for example), truth coincides with necessity, and the very name that Hume gives to the category of "relations of ideas" indicates clearly that he recognises this point.

[81] See Millican (2007b: §3.5) for a sketch of this sort of quasi-realist approach to causal necessity, and §2.5 (especially note 26) for the suggestion that Hume's "impression of necessary connexion" is best interpreted as reflexive awareness of making a customary inference.

[82] This has the nice consequence that "conceivability" can coherently be interpreted as *actual* conceivability by a particular human. So unlike Holden, we have no need to resort to an *idealised* notion that raises further difficulties of its own (not least: how are we to know whether something is ideally conceivable, except by actually conceiving it?).

truths. Since nothing that implies a contradiction can be distinctly conceived, moreover, our inability to conceive of a proposition's falsehood gives (fallible) evidence that it is indeed a relation of ideas. *Matters of fact*, by contrast, can be known (if at all) only a posteriori—by consulting experience—because they do not concern just the internal relations between our ideas, but rather how those ideas go together in the actual world. For this reason every matter of fact is contingent, there can be no internal contradiction in supposing any matter of fact to be otherwise, and it follows that no matter of fact can be demonstrated (which would involve showing its denial to be self-contradictory). Distinct conceivability provides a reliable criterion of possibility, and hence any proposition whose truth and falsehood are *both* distinctly conceivable must be a matter of fact. However there are matters of fact beyond our conception, which are inconceivable to us because we lack the requisite competence, faculties, or ideas from experience.

In stark contrast to the tensions and confusions in the initial *Treatise* account of relations and its associated Dichotomy, the broad lines of this picture seem clear and fairly persuasive, and it should perhaps be no surprise that it became elevated to the status of orthodoxy within analytic philosophy for most of the twentieth century (as, for example, in the writings of Ayer and Flew). But although Hume's Fork does seem initially straightforward, there are many propositions that are more difficult to classify, and can thus be seen as presenting objections to it. Some of these, as we shall see, naturally suggest modest refinements or clarifications of Hume's logical categories; others—to which we move in §7 below—present more of a threat to the distinction as a whole.

6.1. Current Awareness, and Hume's Notion of Apriority

One kind of problem case is exemplified by Descartes' famous *Cogito* statement "I am thinking" (*Meditations*: CSM 18), which is tricky because although my state of thinking is to me both certain and "discoverable by the mere operation of thought" (which makes it seem like a *relation of ideas*), it is not a necessary truth and its falsehood implies no contradiction: I might have been dead by now, or unconscious, or never have existed (which makes it seem like a *matter of fact*). There are also countless more specific examples in this spirit, focusing on my first-personal awareness of my own "ideas". Some of these involve particular truths about my current state of mind, such as the proposition that I am now thinking about the number 64, or wishing that I were out in the sunshine. These again seem to be "discoverable by the mere operation of thought", though they also seem to be knowable only through experience and plainly contingent. Here the problem is that thinking (whether contemplating, perceiving, or feeling) is *itself* a form of experience, and so in these cases, where I actively reflect on my own thinking, my thought serves *both* as "observed data" *and* as "intellectual judgement". Such reflexivity should perhaps be recognised as a special case, for example by drawing a distinction between two different notions of the a priori, one *pure* and one *awareness-informed*. It is interesting to note, therefore, that Hume himself—in the person of Philo—hints at a very similar distinction in his *Dialogues concerning Natural Religion*:

> 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* 2.12–13)

The first paragraph illustrates the standard pure notion of apriority, 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 (assuming that "has seen" stands proxy for sensation in general). The second paragraph illustrates the more relaxed awareness-informed notion, according to which a proposition counts as a priori if it can be known without appeal to any experience *beyond current awareness* (and hence without any appeal to memory as opposed to sensation or reflection).

Although it is now common to recognise a range of such notions,[83] clearly Hume's conception of a "relation of ideas" requires something like *pure* apriority, since only this goes along with *necessity* (and inconceivability of the contrary). It might therefore seem to pose an objection to his Fork that he sometimes appears to be thinking instead in terms of what I have called *awareness-informed* apriority, for example:

> ... the knowledge of [cause and effect] is not, in any instance, attained by reasonings *à priori*; but arises entirely from experience... Let an object be presented to a man of ever so strong natural reason and abilities; if that object be entirely new to him, he will not be able, by the most accurate examination of its sensible qualities, to discover any of its causes or effects. (*E* 4.6)

> In a word, then, every effect is a distinct event from its cause. It could not, therefore, be discovered in the cause, and the first invention or conception of it, *à priori*, must be entirely arbitrary. (*E* 4.11)

But this objection is not serious, because here Hume is concerned with inference from observed to unobserved, asking what can (or cannot) be inferred "a priori" from current awareness of some "object" (or event).[84] And in precisely these sorts of cases, the distinction between our two notions of apriority virtually disappears, because current sensory awareness of the object is then "given" in the premise of the inference, extending the boundaries of "pure" apriority so that the two notions match.[85] We can therefore understand Hume as fundamentally operating with the pure notion of apriority here, just as he does when discussing the a priori limits of causation:[86]

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[83]   See for example Boghossian and Peacocke (2000): 2–3.

[84]   Other cases are at *A* 26, *E* 7.15 n. 13, 7.29 n. 17, 10.8 and 10.10 n. 22, but most are in Section 4 of the *Enquiry* (paragraphs 6, 7, 9, 10, 11, and 13). *A* 11 is similar, assuming that "reason" here means something like *a priori* reason.

[85]   This does not mean, of course, that Hume is prepared to take for granted our *interpretation* of our current sensory awareness. Whether my bread-like sensations, for example, are genuinely caused by a nourishing food can perfectly well be subject to doubt (cf. *E* 4.16, 21).

[86]   Other passages like those that follow are at *T* 1.4.5.35, 3.1.1.24, and *E* 12.29 n. 35. This understanding of Hume represents a change of mind from my (2002: §4.1), which interpreted his argument concerning induction in terms of awareness-informed apriority. At the time, I took him to be operating with a *perceptual* view of reason (see my 2012a: §3.2 for the corrective), and gave less weight to consistency with his Fork.

to consider the matter *a priori*, any thing may produce any thing ... (*T* 1.4.5.30)

May I not clearly and distinctly conceive [that things' effects 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* 4.18)

If we reason *à priori*, any thing may appear able to produce any thing. (*E* 12.29)

Nor is this picture significantly affected by Hume's occasionally speaking in a very different manner, as when he refers to passions or behaviour that "*a priori* ... can reasonably be expected" to arise in various circumstances (*T* 2.2.2.6–7, cf. 3.2.12.4). Such use of "a priori"—applying to such things as causal prediction of human reactions—is very different from pure apriority, but he is obviously speaking loosely here, as corroborated by what he says elsewhere about a commonly drawn distinction between "reason" and "experience":

Nothing is more usual than for writers ... to distinguish between *reason* and *experience*, and to suppose, that these species of argumentation are entirely different from each other. The former are taken for the mere result of our intellectual faculties, which, by considering *à priori* the nature of things, and examining the effects, that must follow from their operation, establish particular principles of science and philosophy. The latter are supposed to be derived entirely from sense and observation, by which we learn what has actually resulted from the operation of particular objects, and are thence able to infer, what will, for the future, result from them. (*E* 5.5 n. 8)

Having explained this common usage, Hume quickly dismisses it as "erroneous, at least superficial". For even the principles attributed to *reason* in this sense are ultimately based on experience; what distinguishes them is just that they "cannot be established without some process of thought, and some reflection on what we have observed". So likewise, when Hume draws on his general knowledge of humanity to assess "*a priori* [what] emotion ... can reasonably be expected" in some circumstances, it is very clear that he is using the term "a priori" in what he knows to be a loose and "erroneous" way. None of this conflicts with our seeing Hume's "official" concept of apriority as essentially the same as the conventional pure notion, which is what seems to be required for maintaining his Fork. In this sense, accordingly, my awareness of my own existence—and of my own thoughts and feelings—is *not* a priori, but lies within the domain of "matter of fact".[87]

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[87]   Houston Smit (2010) argues that Hume adopts a traditional "from-grounds" notion of the a priori which requires seeing *why* a proposition is true, "by appeal to the ground that makes it true" (p. 314). *The Art of Thinking* of 1662 (a work mentioned by Hume at *A* 4) explains such a notion "in passing": "proving effects by their causes ... is called an *a priori* proof [whereas] demonstrating causes by their effects ... is called an *a posteriori* proof" (Arnauld and Nicole, 1662: 233). We have already seen reason to think that Hume would view this distinction as "erroneous, at least superficial" (*E* 5.5 n. 8), and he would also presumably consider it a mistake to posit a fundamental divide between reasoning from cause-to-effect and from effect-to-cause, which he classifies together (e.g. *T* 1.3.9.12, 1.3.14.22, 1.4.4.1). But the issue is not quite so straightforward, because Smit sees Hume as mainly using a very *strong* variant of the notion, which "requires seeing the necessity with which the ground determines its consequence" (p. 319), and as he applies this to Hume's arguments, it comes to look almost indistinguishable from apriority in the modern sense. Indeed if the connections with demonstrability and impossibility of the contrary are to be maintained, it is hard to see how the two notions can avoid coinciding (an issue Smit does not discuss). So even if Hume was initially influenced by a "from-grounds" notion, I believe his mature philosophy is best understood in terms of the modern notion, and I am not persuaded by Smit that any of Hume's arguments require a "from-grounds" alternative.

6.2. The Relations of Phenomenal Ideas

Another set of problem cases for Hume's Fork involves general truths about the phenomenal qualities of sensory "ideas" (ideas that on Humean principles can of course be acquired only from sensory experience). Suppose, for example, that I look up whilst hiking in the mountains and experience both a bright yellow sensation (from the sun) and an adjacent dark grey one (from a rock). I then make the judgement that *that* colour (the yellow) is brighter than *that* colour (the dark grey). It seems to be a necessary truth about *those* colour sensations that they are related in this way—the yellow could not remain what it is whilst ceasing to be brighter than the dark grey. Moreover this judgement seems to be one that I reach "intuitively" and with complete certainty "by the mere operation of thought", simply appealing to my knowledge of the relevant ideas, and I cannot conceive of the relative brightness of the two colours being other than it is. So far, then, criteria (Ra) and (Rd) tell strongly in favour of its being a relation of ideas, as do (Mp) and (Mcd). However an element of doubt might be raised by there being no obvious *contradiction* in the judgement's failing to apply, and also the apparent contingency of the sensation types' existence: if there were no sentient beings, then they would not exist.[88] Another example of the same kind, this time Hume's own, comes from the Appendix to the *Treatise*: "*Blue* and *green* are different simple ideas, but are more resembling than *blue* and *scarlet*" (*T* 1.1.7.7 n. 5).[89] Suppose I form the proposition that "Blue resembles green more than scarlet": is this a *relation of ideas*, as that term itself would seem to imply? Or is it a matter of fact, because we can conceive without apparent contradiction of a situation in which those colours would never have existed?

Although Hume himself does not discuss his Fork in relation to these sorts of examples, it seems that general truths about the phenomenal properties of "ideas" should count as *relations of ideas*, notwithstanding the contingency of their existence. The point here is that Humean relations of ideas involving general terms are in any case essentially hypothetical. As we have seen, they are "discoverable by the mere operation of thought, *without dependence on what is any where existent in the universe. Though there never were a circle or triangle in nature*, the truths, demonstrated by EUCLID, would for ever retain their certainty and evidence." (*E* 4.1, my emphasis). So when I discover that Pythagoras's Theorem is true, this reveals a property which *anything that corresponds to my idea* of a right-angled triangle must have; it does not prove that any such things exist

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[88] In the *Treatise*, Hume notoriously suggests that "all our perceptions are … distinct and separable, … and may exist separately, and have no need of any thing else to support their existence" (*T* 1.4.5.5, cf. 1.4.5.24, 1.4.6.3, *Appendix* 12–14). But given Hume's analysis of the self as a bundle of perceptions, *Appendix* 16 seems to hold on to the principle that perception implies a sentient being, even if constituted only by the one perception: "We can conceive a thinking being … reduc'd even below the life of an oyster … to have only one perception, as of thirst or hunger". Quite apart from all this, however, I expect that the nominalist Hume would in any case consider perceptions to be contingent existences, both as tokens and types.

[89] Hume presents this example as showing that "even different simple ideas may have a similarity or resemblance to each other; nor is it necessary, that the point or circumstance of resemblance shou'd be distinct or separable from that in which they differ". His recognition of this point—which puts some significant pressure on his Separability Principle—was apparently prompted by a letter from Francis Hutcheson, to which Hume alludes in a response of 16th March 1740 (*HL* i 39).

"in nature".[90] In the same way, when I grasp that yellow is brighter than dark grey, this reveals a relation which must hold between any such colour perceptions, and that relation is a general necessity, which will remain true even in a situation where no such perceptions are actually occurring.

One might doubt, however, whether it is appropriate to describe the denial of such phenomenal judgements as *contradictory*. In post-Fregean logic and philosophy, we standardly mean by a "contradiction" either a proposition having the logical form $(P \land \neg P)$ or, more loosely, a proposition from which such an explicit formal contradiction can be swiftly deduced. Hume himself usually talks in ways consistent with this, frequently referring to propositions as *implying* a contradiction and even once—at *T* 1.3.9.10—as implying "a formal contradiction".[91] He also, as we have seen, explicitly links such contradictoriness (of the contrary) with *intuitive or demonstrative certainty* (e.g. *T* 1.3.3.3, 1.3.9.10; *A* 11, 18; *E* 4.2, 4.18, 12.28), and includes within the province of intuition those *resemblances*, *contrarieties*, and relative *degrees in quality* between ideas which "at first strike the eye, or rather the mind" (*T* 1.3.1.2). On this basis, yellow's being brighter than dark grey has to count as intuitively certain, and hence its denial as "implying a contradiction". But in fact this is not seriously problematic, given that anything which follows intuitively from a proposition is implied by it, so that denying an intuitive truth does indeed imply a contradiction.[92] Thus we preserve the equivalence between Hume's various criteria, though there is perhaps some price to be paid in this loosening of the notion of a "contradiction",[93] while deeper exploration into the modality of relations between phenomenal sensations looks potentially murky. The very fact that they are phenomenal makes it hard to articulate—or even to understand clearly—how we can be so confident of some of their properties and relationships: for example, that nothing can be both uniformly yellow, and dark grey, at the same time. It might seem totally evident to us that a part of our visual field which looks like

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[90] Locke's account of our knowledge of universal truths is also hypothetical in this way, informing us about *whatever things may correspond to our ideas* (without guaranteeing that there are any): "... our Knowledge follows the Nature of our *Ideas*. If the *Ideas* are abstract, whose agreement or disagreement we perceive, our Knowledge is universal. For what is known of such general *Ideas*, will be true of every particular thing, in whom ... that abstract *Idea* is to be found: and what is once known of such *Ideas*, will be ... for ever true." (*Essay* IV iii 31). He makes the same point when explaining the nature of general reasoning: "Every Man's Reasoning and Knowledge, is only about the *Ideas* existing in his own Mind, which are truly ... particular Existences: and our Knowledge and Reasoning about other Things, is only as they correspond with those our particular *Ideas*. So that the Perception of the Agreement, or Disagreement of our particular *Ideas*, is the whole and utmost of all our Knowledge. Universality is but accidental to it, and consists only in this, That the particular *Ideas*, about which it is, are such, as more than one particular Thing can correspond with, and be represented by." (IV xvii 8; cf. III v 14, III vi 4–6; IV iv 5–9, IV vi 4, 16). An excellent discussion of Locke's theory is provided by Ayers (1991), vol. 1 ch. 27; see especially pp. 249–50.

[91] For other examples from the *Treatise* and *Enquiry*, see *T* 1.1.7.4, 1.2.2.9, 1.2.4.11, 1.3.3.3, 1.4.7.7, 2.3.1.18; *T App.* 13; *A* 11, 18; *E* 2.4, 4.2, 4.18, 5.11, 12.28. At *T* 1.1.7.4 he talks of a proposition's implying "the flattest of all contradictions, *viz.* that 'tis possible for the same thing both to be and not to be" (*T* 1.1.7.4). This suggests that he considers contradictoriness to come in degrees of "flatness"—not all contradictions, therefore, take the form $(P \land \neg P)$.

[92] If P is intuitively true, then $\neg P$ will intuitively imply $(P \land \neg P)$, which is indeed a formal contradiction.

[93] In the *Treatise*, Hume frequently conjoins talk of "contradiction" and "absurdity", mostly treating them as equivalent (but see also note 63 above). In the *Enquiry*, by contrast, contradiction and absurdity are connected only at *E* 12.18–20 (including n. 34), while absurdity is often interpreted more loosely (e.g. *E* 1.17, 8.32, 10.16, 10.19, 10.22, 12.2). Both the *Abstract* and *Enquiry* are very explicit that "wherever a demonstration takes place, the contrary ... implies a contradiction" (*A* 11, cf. *T* 1.3.3.3, 1.3.9.10; *A* 18; *E* 4.2, 4.18, 12.28).

this cannot at the same time look like *that*—and we might even apply the word "contradiction" to the conjunction of the two—but words fail us in trying to spell this out with any rigour. So even if Hume's Fork survives the attendant problems, we might well regret the loss of the simpler, more formal understanding of a contradiction from which we started.

6.3. Quinean Quibbles

A quite different range of problem cases for Hume's Fork arises most prominently in connection with scientific claims. Take for example the proposition "*Hydrogen has an atomic number of 1*". On the one hand, it was a scientific discovery that hydrogen has one proton in its nucleus. But on the other hand, this is now arguably the defining characteristic of hydrogen: an atom with more protons wouldn't be called "hydrogen", however it behaved. So the proposition started out looking like a matter of fact, but seems to have become a relation of ideas. Or consider Newton's Second Law, "*Force equals mass times acceleration*", which apparently purports to state a universal matter of fact. But is it perhaps a relation of ideas? After all, force is measured in units of mass times acceleration, so this law might appear to be a *definition* of force rather than a generalisation about the way things behave. To get unambiguously factual implications, we must combine it with something like the Third Law, "*Action and reaction are equal and opposite*", which now tells us that in deep space (beyond the reach of gravity or other forces) the mass of a rocket times its acceleration will be equal and opposite to the mass of its exhaust gases times their acceleration. Yet even here there are complications, because an object's mass is not directly perceivable, and so can be assessed only from its behaviour (in particular, its acceleration when acted upon by a force).

The lesson to be drawn from examples like these is that when we are dealing with theoretical concepts, particularly those embedded deep within scientific theories and which thus have a wide range of interlocking relationships with other concepts, it can be very unclear which of these relationships count as "definitions" and which as "matters of fact". Usually a theory *as a whole* will have relatively clear factual implications, but it may be impossible to isolate the factual implications of any individual statement within that theory, because each statement impinges on experience only when combined with others. Hume's simple distinction is straightforwardly applicable to theoretical concepts, therefore, only when they have a clear independent definition or a relatively direct link with experience. Since it took more than 200 years after the publication of his *Enquiry* for this point to be widely appreciated, thanks to the work of Willard Van Orman Quine,[94] it is not surprising that Hume's own—very cursory—comments on such theoretical concepts and scientific laws (notably at *E* 4.13, 7.25 n. 16, and 7.29 n. 17) show no awareness of their potential implications for his "Fork". But what is, perhaps, surprising is that this Quinean objection can be helpful to Hume in answering awkward questions about the status of some of his own suspiciously aprioristic arguments for matters of fact (and perhaps even about the status of his Fork itself —see note 122 below). At *T* 2.3.3, for example, he famously urges the apparently causal claim that "reason alone can never produce any action, or give rise to volition" (*T* 2.3.3.4) on the basis of what look like conceptual arguments. One might well suspect that Hume is *confusing* conceptual and causal claims here (cf. my 2012b: 122), but Blackburn (2008: 57–9) defends him by applying a broadly Quinean treatment to the famous argument.

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[94]   Quine (1953) famously expresses scepticism about the analytic/synthetic distinction.

7. Analyticity, Apriority, and Necessity

We have seen that Hume's Fork encounters some potential complications in particular special cases involving first-personal awareness of our own current "ideas", relations between phenomenal sensations, and complex scientific theories. Much more could be said on all of these, but rather than pursue such special difficulties, let us turn to a more general and fundamental family of objections, arising from the multitude of criteria that Hume's Fork attempts to combine.

Our discussion in §§4–5 above revealed four reliable Humean differentia between *relations of ideas* and *matters of fact*. And having established (Mcc) as a logical criterion independent of psychological conceivability, this now clearly belongs with the demonstrability criterion:

Logical (or Semantic) Criteria

(Rd/Md)   Relations of ideas are *intuitively or demonstratively certain*, whereas matters of fact *cannot be demonstrated to be true or to be false*.

(Mcc)   Relations of ideas *cannot be false on pain of contradiction*, whereas matters of fact *can be either true or false, without contradiction*.

A proposition is demonstrable—according to Hume—when its denial implies a contradiction, so these two criteria (with "contradiction" suitably interpreted) are intended to be equivalent. Both concern what can be inferred from a given proposition, a *logical* matter which depends on the "ideas" concerned, or as we would now say, the relevant terms' *meaning*. Hence they might also be described as *semantic* criteria. The other two criteria are respectively epistemological and metaphysical:

Epistemological Criterion

(Ra/Ma)   Relations of ideas are *discoverable a priori, by the mere operation of thought*, whereas matters of fact *can only be discovered (if at all) through experience*.

Metaphysical Criterion

(Mp)   Relations of ideas are *necessarily true*, whereas matters of fact are *contingent* (i.e. both possibly true and possibly false).

Thus Hume's Fork implicitly conflates at least three distinctions—one logical or semantic, one epistemological, and one metaphysical—which might well be expected to come apart. Within contemporary analytic philosophy, these three distinctions are now very familiar under the following names, though how exactly they are best to be understood remains a matter of controversy.

> *Analytic/Synthetic*
> A proposition is *analytic* if its truth follows purely from the meanings of the terms that it contains (hence its denial implies a contradiction); *synthetic* if its truth depends on facts about the world, and not just on meanings (hence it can be denied without contradiction).

A priori/A posteriori

A proposition is *a priori* if it can be known to be true without consulting experience; *a posteriori* if it can be known only by consulting experience.

Necessary/Contingent

A proposition is *necessary* (necessarily true) if it could not possibly be false (i.e. its negation is impossible); *contingent* if it is neither necessarily true nor necessarily false.

Here I have chosen definitions that fit relatively easily into the Humean mould, so as to consider how far his framework can plausibly be preserved in the face of the various objections to be discussed.

7.1. A Kripkean Objection

The best-known alleged mismatch between these distinctions in contemporary philosophy derives from the work of Saul Kripke, who famously claimed to identify propositions that are necessary a posteriori (such as that Hesperus is Phosphorus) or contingent a priori (such as that the standard metre bar is one metre long). The latter category relies on the contentious claim that reference-fixing stipulations—e.g. "I hereby stipulate that the length of this bar is one metre"—can count as a priori.[95] So let us focus here on the necessary a posteriori, which is less controversial. To take the standard example, ancient Greeks gave the name "Hesperus" to the "Evening Star", and "Phosphorus" to the "Morning Star"; but these "stars" were later discovered to be the same object, known to us as the planet Venus. Many contemporary philosophers would agree that the identity "Hesperus is Phosphorus" expresses a truth which is (weakly) necessary—true in any possible world in which the object concerned (i.e. Venus) exists—while the actual truth of "Hesperus is Phosphorus" was clearly a discovery of empirical astronomy. And this apparently challenges Hume's Fork, by exhibiting a proposition which would be judged to be a "matter of fact" by criteria (Ma) and (Md), but a "relation of ideas" by criterion (Mp). It would also challenge Hume's Conceivability Principle, given that the falsehood of "Hesperus is Phosphorus", though *ex hypothesi* impossible, seems to be conceivable: we can coherently imagine that astronomers have been deceiving us regarding the identity of what appear to us as the Morning Star and the Evening Star.[96] Along with such identities, Kripke also claimed that objects' origin and composition can be necessary a posteriori. Take, for example, the proposition "Venus is composed of rock", which arguably ascribes an *essential* property: in any counterfactual scenario, an object that was not composed of rock could not correctly be identified with the planet Venus (even if it looked the same and orbited in the same path).[97] Yet it was clearly an empirical discovery that Venus is composed of rock rather than Aristotelian aether, and

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[95] For a useful discussion that questions the contingent a priori on this basis, see Casullo (2003: 205–9).

[96] Kail (2007a: 94) presents the example of Hesperus and Phosphorus as casting doubt on Hume's commitment to the Conceivability Principle, at least as applying to objects *in re*, by illustrating that "Without some restrictions in place, the imagination cannot with any plausibility be thought to entitle one to knowledge of metaphysical modality". Millican (2009: 678, 683–4) objects that appeal to such examples in the interpretation of Hume is anachronistic, and argues against Kail that Hume is fully committed to the Conceivability Principle. See also notes 65 and 76 above.

[97] Kripke's *Naming and Necessity* (1980: 113–15) gives the example of a wooden table that could not but consist of the wood from which it was made (as opposed to ice, say).

again, it is not inconceivable that astronomers have been deceiving us all these years, or that Venus is really a metal alien spacecraft cunningly designed to appear as a rocky planet. Thus we have another proposition which is, we believe, (weakly) necessary, but nevertheless known only empirically and even potentially subject to doubt. So again a wedge seems to be driven between the various criteria for Hume's Fork.

7.2. *"The Objects of Human Reason or Enquiry"*

How might we respond on Hume's behalf? Note, first, that he need not reject the Kripkean examples outright, for although it is commonly assumed that his general anti-metaphysical stance would preclude any essentialist claims, in fact he repeatedly attributes *essences*—understood as *defining characteristics*—to a wide range of things, from chance and necessity to belief, beauty, virtue, and wit.[98] Admittedly, none of these is a concrete particular, and allowing essences of individuals might be harder for Hume to stomach, potentially conflicting with his apparently sceptical discussions of physical objects and selves. But let us here put such concerns to one side, because interpretation of these discussions is notoriously controversial, and it is also unclear how far Hume maintained such views after the *Treatise*. In any case, his opposition to essences or substantial forms of the Aristotelian variety (as expressed at *T* 1.4.3.6) is entirely consistent with acknowledging the relatively inoffensive criteria of identity that underlie Kripkean essences of origin and composition. These can be accepted on the basis that we can make no sense of counterfactually identifying some object as Venus (for instance) except by means of a common history that counterfactually diverges at some point. We can imagine a possible world in which Venus is occupied by aliens and gradually transformed into a rocky spacecraft (though if the rock were to be replaced by alien matter, we would probably consider that Venus had been destroyed). But in a possible world where no such planet ever existed in the first place, an alien spacecraft— whatever its composition—*could not be identified with Venus*, even if it came to occupy the same orbit and to appear in the familiar way. That, at least, is the story, and it provides a plausible account of how such necessities can be accommodated within a modally modest worldview. This is all reasonably close in spirit to the kinds of essences that Hume is happy to acknowledge, tied to criteria of definition and identification rather than any supposed insight into ultimate form.[99]

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[98]   Alanen, for instance, expresses puzzlement based on the common assumption: "it is rather peculiar that [Hume] should talk about essences or 'the very being' of anything at all, given his general commitment not to pronounce himself on the inner natures or essences of things ... 'Essence' here [*T* 2.1.5.4] certainly cannot mean necessary *and* sufficient conditions ..." (2006: 187). But as Merivale (2009: §2.2) points out in response to her, Hume specifies the "very essence" of many things in many places: beauty and deformity at *T* 2.1.8.2 (cf. *P* 2.18); belief at *T* 1.4.2.24; cause and effect at *T* 1.4.5.33; chance at *T* 1.3.11.12; connexion or power at *T* 1.3.14.16; (causal) necessity at *T* 2.3.1.10, 2.3.2.2, *E* 8.22 n. 18 and 8.25 n. 19 (cf. *T* 1.3.14.22); (natural) relation at *T* 1.4.2.34 (cf. 1.4.6.16); riches at *T* 2.1.10.10 and *M* 6.33; vice and virtue at *T* 2.1.7.4-5; and wit at T 2.1.7.7 and *P* 2.16.

[99]   On this sort of account, Kripkean essences are known by "intuitions" about how we would identify and track objects in counterfactual scenarios. But there is room for debate about such intuitions, which cannot always be decided by appeal to standard linguistic practices. Consider, for example, the situation of a man *S* who is doubtful of his own parentage and who is speculating about a counterfactual scenario in which the person currently occupying exactly his position had different parents from those he actually has. "Intuitions" about identity of origin would dictate that this counterfactual scenario concerns someone other than *S*, but *S* himself is very unlikely to be convinced: he will take himself to be speculating about a situation in which *he* would have had different parents. In such a case, it seems very natural to trace a person's identity backwards through time from the current point rather than forwards from their origin, and it is not clear that this can properly be called *mistaken*, even though it is contrary to our usual forward-tracking practice (which naturally leads to the assignment of necessity of origin).

Suppose, then, that Hume were to accept the Kripkean necessities: would this force him to abandon his Fork? Perhaps surprisingly, it would not, because a careful analysis of what those necessities involve reveals that they are somewhat different from Hume's "objects of human reason and enquiry". To see this, consider the supposedly necessary truths *that Hesperus is composed of rock* and *that Phosphorus is composed of rock*, and let us ask: *Are these one and the same "truth", or different "truths"?* In a sense, they do seem to be identical, because they attribute the same property to the very same object, and it is in virtue of this same property's essentiality to that same object that they are judged to be necessary. But in another sense, they seem to be different "truths", because someone unaware of their co-reference could coherently believe one without believing the other, and they thus express different Fregean "thoughts".[100] Both of these notions of "truth identity", though clearly distinct, seem legitimate and potentially useful. So glib talk of "truths" turns out to be an invitation to muddle and confusion, hiding complications that need to be teased out with care and precision. Now is not the time to investigate these issues in detail, but suffice it to say that we should at the very least distinguish the type of "de re proposition" (to coin a term) to which we attribute *de re* necessity—such as *that Venus/Hesperus/ Phosphorus is made of rock*—from the type of "thought" (or whatever) in terms of which we individuate beliefs. The *de re proposition*, identified in terms of the objects involved and the properties ascribed, can then harmlessly be considered as transparently "containing" the relevant objects, in the sense that its identity is tied to those objects.[101] But this need not imply that a corresponding *thought* or *belief* has to be individuated in the same way, for it is plausible that any thought of an object must involve some mediating "mode of presentation", "representation", or "aspect" through which that object is apprehended, and which will typically be crucial to understanding the psychological and epistemological significance of that thought.[102] Hence for someone who is unaware that Hesperus and Phosphorus are one and the same, "Hesperus is made of rock" and "Phosphorus is made of rock" will express *different*

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[100] Note that here and subsequently I am understanding the notion of thought in an *internalist* manner, to capture the proposition as understood from the thinker's perspective, independently of the external situation. This is strongly suggested by Frege's treatment of a thought as the *Sinn*—that is, the mode of presentation—of a sentence, and is also obviously appropriate to the highly subjectivist Humean framework which takes a thought to be composed of ideas.

[101] Such propositions are commonly called "Russellian" propositions (since McDowell 1984, and for a relevant recent example see Williamson 2006: 2–3). However this term seems somewhat infelicitous given Bertrand Russell's own view of ordinary proper names as disguised definite descriptions, which he takes to imply that propositions involving such names have the corresponding descriptions, rather than the objects themselves, as constituents.

[102] In two recent general discussions of these issues, Frege's term "mode of presentation" is preferred by Schiffer (2008) and "representation" by Richard (2006: 193), but "aspect" usefully combines the advantages of specificity and brevity. It is a deep and difficult question how such aspects are to be characterised and individuated, one that Frege somewhat trivialised by choosing straightforward examples such as the Morning Star and the Evening Star, which present themselves in only one paradigm way. Objects and organisms that appear to us in a far wider range of contexts, with ample possibilities of misidentification, offer far more of a challenge. In what follows, I shall ignore such complications, and take for granted that something like the Fregean notion of a shared and objective "mode of presentation" is tenable. For serious doubts about this, however, see Millican (1990: §V), which follows Dennett (1982) in speaking of more person-specific "notional objects".

thoughts or beliefs, despite their both corresponding (in fact) to the same de re proposition.[103]

All this might seem a long way from Hume's concerns, but its upshot is to deflect the Kripkean attack on his Fork. For the "relations of ideas" and "matters of fact" that Hume considers—his "objects of human reason and enquiry"—are composed of *ideas*, and as such, they map far more easily onto what I have called *thoughts* than onto *de re propositions*.[104] Hence the sort of necessity applicable to them is not the *de re* necessity that Kripke identifies, but instead a conceptual necessity that comes close to *apriority*. A de re proposition—individuated in terms of the objects concerned and the properties ascribed—is naturally considered *necessarily true* if its identity conditions are such as to imply its truth. Thus the de re proposition expressed by "Venus is made of rock" turns out to be de re necessary if, and only if, Venus is necessarily rocky.[105] A thought, likewise, should be deemed *necessarily true* if its identity conditions imply its truth. But since a thought is individuated in terms of the ideas and modes of presentation involved, rather than the objects, its appropriate form of necessity turns out to be rather different. In the idiolect of someone who associates "Hesperus" with one mode of presentation, and "Phosphorus" with another, the sentence "Hesperus is Phosphorus" is not *necessarily true in this sense*, even though it expresses (unbeknown to him) a de re proposition that is *de re necessary*. Or to take another example, suppose that I dub the number of stars in the Universe "Starnum", intended as a name that refers "rigidly" *to that very number, whatever it might be*,[106] and suppose that (unbeknown to me) it is 10^{22}. I then utter the sentence "There are Starnum stars", thus expressing (unbeknown to me) the true—but contingent—de re proposition *that there are 10^{22} stars*. But the *thought* I express, individuated not in terms of the referent, but rather my understanding of the name "Starnum", is *conceptually* necessary, in the sense that its truth is guaranteed by the nature of the ideas that it involves: *this very thought* could not but be true.[107] Or to put this

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[103]   There is an analogy here between reference to an object and expression of a (de re) proposition. Just as we can refer to a single object using a variety of referring expressions (e.g. "Venus, "Hesperus", "Phosphorus"), each potentially associated with a different *aspect*, so we can express a single de re proposition using a variety of sentences, each associated with a different *thought*. The picture thus suggested is somewhat Fregean, except that it goes more naturally with seeing a de re proposition—rather than a truth value—as the Fregean Reference (i.e. *Bedeutung*) of a sentence, and also allows thoughts to be relative to the individual thinker, rather than "objective" as Frege insisted.

[104]   We have already noted twice, in §1 and §3 above, that Hume has a tendency—at least in the *Treatise*—to blur the distinction between ideas and objects, which would in turn blur the distinction drawn here, between *thoughts* and *de re propositions*. This defence of his Fork against Kripkean attacks requires greater precision on these matters than he himself showed, but that is hardly surprising given his lack of sophistication in regard to the theory of reference.

[105]   We can here ignore complications regarding Venus's potential non-existence, since *weak* necessity is enough for present purposes.

[106]   The notion of *rigid designation* comes, of course, from Kripke (e.g. 1980: 48–9), and would have been quite alien to Hume.

[107]   It might be tempting to talk of "*de dicto*" necessity here, but this traditional term does not quite capture the intended sense, because it suggests the consideration of a proposition as expressed in words as opposed to thought. Better would be a term such as "*de aspectu*", so as to highlight the intended focus on these propositions, *individuated in terms of aspects, modes of presentation, or appearance to the mind*, rather than either objects and properties (*de re*), or words (*de dicto*). Many thanks to Christopher Shields for suggesting this term.

slightly differently, the way in which I conceive of Starnum—my thought about it—is such as to identify it as the number of the stars; hence the thought I express by "There are Starnum stars" could not conceivably be false (even though the de re proposition to which it corresponds is contingent). In short, if it is the necessity of thoughts, rather than of de re propositions, that Hume has in mind, then its connection with conceivability is not threatened by these sorts of examples. So the centrality that he gives to the Conceivability Principle (as well as his emphasis on ideas as the vehicles of thought) strongly confirms that this is indeed how we should interpret his views on absolute necessity.

7.3. Thoughts and Words

This approach thus defuses the Kripkean objections to Hume's conflation of the criteria associated with necessity and apriority. But it remains unclear whether what I have called *conceptual necessity*—the necessity of thoughts as implied by the nature of the "ideas" that constitute them—will also match closely to that other modern notion associated with Humean relations of ideas, namely *analyticity*. This notion has traditionally been understood as involving "truth in virtue of meaning",[108] and the standard contrast is with propositions whose truth is dependent on "the way the world is" or "the facts of experience" (cf. Ayer in footnote 2 above). As before, however, it is pertinent to consider the nature of the "truths" or "propositions" involved here, which turn out to be neither *de re propositions* nor *thoughts*. For if they are to be bearers of *meaning*, then since it is *language* that is paradigmatically meaningful, it seems most appropriate to consider *sentences* (considered as bearers of meaning rather than merely as strings of characters) as the relevant candidates for analyticity.

Hume follows Locke (e.g. *Essay* III ii 1–3, III iv 6) in taking the meaning of words to be determined by the corresponding ideas,[109] thus generally equating the meaning of a sentence with the thought that it expresses. But even if we leave aside the point—familiar at least since Ludwig Wittgenstein and J. L. Austin—that language can be used for many speech-acts other than the expression of thoughts using declarative sentences, there are several problems here. First, if ideas are presumed to be subjectively introspectible, as

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[108] However there is a standard objection to this characterisation of analyticity, namely, that appeal to meaning can at best explain why a particular sentence expresses the corresponding proposition, and cannot—except in the case of a simple definition—explain what makes that proposition true. Thus it might plausibly be a "truth of meaning" that a bachelor is by definition an unmarried man, but the drawing of any inference from this definition—e.g. that *all happy bachelors are happy men*, or that *if any bachelor is a philosopher, then some philosopher is unmarried*—requires the application of logical reasoning, not just an appeal to meaning. Likewise, even if 2 is defined as the sum 1+1, and 3 as the sum 2+1, it remains a mathematical (rather than merely definitional) truth that 1+3 = 2+2. For this sort of reason, an analytic truth has more satisfactorily been understood as one whose truth *is necessarily implied by* the meanings of the terms, without appeal to any empirical contingency, though of course this still leaves plenty of room for discussion about what kind of "necessary implication" is involved here (e.g. a priori, or conceptual, or logical).

[109] Hume assumes that meaning is determined by ideas (e.g. *T* 1.3.7.3; *E* 2.9), but mostly comments on this when absence of an idea threatens lack of meaning (e.g. *T* 1.1.6.1, 1.3.14.27, 1.4.3.10, 1.4.5.6; *E* 7.26). His theory in the *Treatise* goes beyond Locke's in providing a more sophisticated treatment of general ideas (explained in *T* 1.1.7), and also emphasises the existence of "fictions", which Hume generally seems to regard negatively while at the same time giving them a significant role in our thinking (e.g. *T* 1.2.4.24; 1.4.2.29, 35–6, 42–3, 52; 1.4.6.6–7).

Hume usually seems to take for granted,[110] then they will inevitably differ between individuals, implying a variability in word meaning that is at least problematic for common understanding of a language.[111] Secondly, much of our language use involves words for which we have no clear "ideas" at all, where we take advantage of—and defer to—other's understanding to provide content for what we say. Hilary Putnam famously drew attention to this phenomenon of "the division of linguistic labour", giving examples of pairs of terms whose subjective "concepts" might well be indistinguishable for a non-expert (such as aluminium versus molybdenum, or elm versus beech tree), but whose reference we nevertheless take to be quite different.[112] Thirdly, even if we suppose that my understanding of the relevant words is entirely reliable, or that we are content to focus on my personal idiolect without any element of deference to others' semantic authority, a gap can still open up between the apparent conceptual necessity of my thoughts and the analyticity of the sentences through which I express them. For example, when out walking I might say "That man is very still", when pointing to what is, unbeknown to me, a rock that happens to look rather like a man. In such a context, the sentence "That man is a man" would fail to be true (and hence it cannot be analytic), even though it might seem to express a conceptually necessary "relation of ideas" between my concept of the object (which I take to be a man) and my concept of manhood.[113] This raises the general question of how far the properties we ascribe to particular things should be included within our "ideas" of them. Some of these properties will be expressible in words, but not guaranteed to apply (e.g. manhood in the case of the rock); others may be epistemologically more secure (e.g. the visual look of the rock), but derived from sensory presentations that are at best only vaguely expressible using words. Such considerations, especially when combined with the quest for an indubitable foundation for knowledge in the face of scepticism, can naturally lead towards the sort of semantic-epistemological atomism that Bertrand Russell inherited from Hume, aspiring to analyse the concepts that compose our

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110   As at *T* 1.4.2.7: "For since all actions and sensations of the mind are known to us by consciousness, they must necessarily appear in every particular what they are, and be what they appear. Every thing that enters the mind, being in *reality* a perception, 'tis impossible any thing shou'd to *feeling* appear different." Hume is here thinking more of impressions than ideas, but he points out elsewhere the implication of his Copy Principle that "the ideas, which are copy'd from [impressions], must be of the same nature" (*T* 1.3.1.7, cf. 1.1.7.5, 1.3.7.5). There is, however, some tension between the transparency of ideas to introspection and the quest to clarify or refine them by seeking the original impression, which Hume rather downplays by blaming any unclarity on our failure to keep ideas "steady and precise" (*T* 1.3.1.7, and cf. note 74 above).

111   Suppose, for example, that storms in my experience have always involved wind, so that windiness enters into the very identity of my concept of a storm (but not, perhaps, into yours). Suppose I now form the thought that storms are always windy: from an internalist view, this seems to be a "relation of ideas" for me (but not, perhaps, for you).

112   See Putnam (1975: 225–9). That paper also introduced the "Twin Earth" thought experiment, and was highly influential in promoting linguistic externalism, expressed memorably and forcefully on p. 227: "Cut the pie any way you like, 'meanings' just ain't in the *head*!".

113   All the more so if we follow Hume's theory of "abstract or general ideas" of *Treatise* 1.1.7, and take my understanding of "man" to involve a customary association between the word and a *revival set* (in the terminology of Garrett 1997: 24) which might, presumably, come to include my perception of the rock as a member; that is, as one of the perceptions that springs to mind when I think "man", and therefore (arguably) becomes constitutive of my concept. Elsewhere in this paper I have ignored the complications that would arise from this theory, partly because it plays little explicit role in Hume's own treatment of the relevant topics, even in the *Treatise* (thus suggesting he had not thought it through in detail), and partly because it is entirely absent from the *Enquiry*, except for a hint at *E* 12.20 n. 34.

thoughts in terms of "sense-data", and ultimately reducing sense-data to immediate perceptual simples. A more limited—but apparently more plausible—response would be to give up on any attempt to analyse atomistically the rich, holistic, non-linguistic thoughts that we have about the concrete particulars of our experience, and to focus instead on thoughts of the strict Fregean kind, compositionally constructed through disciplined rules of language from distinctly understood and consistent "senses". Thus interpretatively confined, it looks as though any genuine "relation of ideas" (i.e. any Fregean thought that expresses a transparently reliable connection between the senses concerned) will inevitably correspond to a sentence in the thinker's idiolect that cannot but express a truth. So if such well-defined "senses" are to be found, then within this restricted vocabulary and repertoire of linguistically structured thoughts, we might reasonably hope to find an exact correspondence between analyticity, apriority, and conceptual necessity. Something like this approach might appeal especially to advocates of the "language of thought" hypothesis promoted by Jerry Fodor, who has indeed recently looked to Hume for inspiration.[114]

7.4. Probability and Incompleteness

In addition to these problems raised by recent Philosophy of Language, there are at least two others that arise from Epistemology and the Philosophy of Mathematics, reflecting recent developments that cast further doubt on the equivalence of Hume's various criteria. First, he consistently takes for granted that a priori evidence must be intuitive or demonstrative in force—thus implying conceptual *necessity*—and cannot be merely probable.[115] Most philosophers, indeed, have made this same assumption, to the extent that "a priori" and "a priori certain" have generally been regarded as equivalent. But it is not obvious that this is correct, and there is plenty of room for debate about the possibility of *fallible* a priori justification, or a priori grasp of probabilistic relations (as explored by thinkers in the "Logical" tradition of probability, such as John Maynard Keynes, Harold Jeffreys, and Rudolf Carnap).[116] If either possibility is fulfilled, then criteria (Ra) and (Ma)—based on discoverability "by the mere operation of thought"—will diverge from the other criteria unless we restrict this to discoverability a priori *with certainty*. But perhaps such a restriction will seem a relatively small price to pay to maintain the overall account.

Secondly, the famous results of twentieth-century Philosophy of Mathematics associated with Kurt Gödel, Alonzo Church, and Alan Turing cast doubt on Hume's assumption that whatever is conceptually necessary must *ipso facto* be intuitively or demonstratively provable (or explicitly contradictory to deny). If we assume that any arithmetical truth is conceptually necessary, as Hume presumably would agree, then Gödel's First Incompleteness Theorem tells us that any consistent formalisation of "demonstrative provability"—in terms of given axioms and inference rules—will inevitably leave "gaps" in the form of

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[114]   As in his 2003 book, *Hume Variations*. Fodor himself, however, is a conceptual atomist, sceptical about the analytic/synthetic distinction except as arising from identities of conceptual atoms—see Fodor and Lepore (2006).

[115]   See for example *T* 1.3.6.1, 1.3.11.2, 2.3.3.2; *A* 11; *E* 4.18–19.

[116]   Casullo (2003: ch. 3) gives a very useful discussion of fallible a priori justification, considering recent work in this spirit by Pollock (1974), Edidin (1984), BonJour (1985), Hale (1987) and Summerfield (1991). The quest for a priori probability goes back much further and has attracted a wider range of thinkers, typically associated with attempts to vindicate some form of the Principle of Indifference or comparable principles of symmetry. For a discussion of attempts to apply a priori probability to the Humean problem of induction, see Millican (1996: 103–237).

conceptually necessary truths that are not thus demonstratively provable. Even worse, Church and Turing went on to show that we cannot devise a universal decision procedure to establish definitively whether any given proposition is demonstratively provable or not —so we cannot even reliably identify the exceptional cases in which Hume's criteria for a relation of ideas fail to agree. Hume himself naturally failed to anticipate these surprising results, but so of course did everyone else for the best part of two centuries. And although they cast a shadow over his Fork, they cast one equally over some conventional assumptions about the modern distinctions that descended from it.

8. Conclusion: the Enduring Value of Hume's Fork

The last few sections have raised more questions than they have answered about the ultimate defensibility of Hume's Fork, and we certainly cannot conclude here that Hume was successful in attempting to divide all the "objects of human reason or enquiry" into his two simple classes of *relations of ideas* and *matters of fact*. Nevertheless, it is striking how fruitful this discussion has been in terms of the centrality and significance of the issues thus raised, involving so many prominent twentieth-century names: Quine, Kripke, Frege, Wittgenstein, Austin, Putnam, Russell, Fodor, Keynes, Jeffreys, Carnap, Gödel, Church, and Turing. Equally striking, in this respect, is the contrast between Hume's Fork and his theory of relations from the *Treatise*, which as we saw in §3 above makes gratuitous assumptions and elementary blunders that enable it to be refuted conclusively by a few choice counterexamples. The theory encapsulated in Hume's Fork reaches a quite different level of philosophical significance: it might ultimately fail, but the difficulties it faces are interesting, complex, and deep, raising serious and illuminating issues in Epistemology and in the Philosophy of Language, Logic, and Mathematics.

Moreover it is worth noting in particular that none of the difficulties that we have encountered has undermined the central thrust of Hume's Fork, namely, *that a thought cannot both possess the certainty that comes from being known a priori through ideas alone, while also at the same time conveying substantial factual knowledge of the empirical world*. Even if we take on board Quine's now familiar point, that sometimes it might be impossible to disentangle the "conceptual" and "factual" elements within a complex theory, it still remains the case that the application of that theory to reality is ultimately a matter of fact that cannot be established a priori. Nor is this fundamental message affected by the developments in the theory of reference due to Kripke, Putnam and others, whose impact—as we saw in §7.2 and §7.3 above—is to put greater distance between thoughts and the sentences that express them. For even if I can voice a *sentence* such as "There are Starnum stars" which is guaranteed by reference-fixing stipulations to express an empirical truth, I cannot know *which* empirical truth that is—in such a way as to think or express it in standard numerical terms, or to draw observational consequences from it—unless I know independently how many stars there are.[117]

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[117]   This general moral becomes much easier to see and express within an atomistic empiricist framework such as Hume's, in which it just appears *obvious*—given the Conceivability Principle—that no pattern of past impressions and ideas can possibly guarantee, with absolute a priori certainty, the occurrence of some future pattern of impressions and ideas (cf. Gendler and Hawthorne 2002: 21, who suggest that "we can extract from Hume something like a 'cut and paste' story about possibility"). Unfortunately this obvious point becomes far harder to articulate within a more sophisticated framework that allows for the rich complexity of our relationship with the world, especially when language is taken into account.

Thus Hume's Fork remains a valuable check on our intellectual consistency in cases where conceptual and factual considerations tend to blur. Suppose—to take a topical example—that an economist, inclined by the characteristic thinking of his discipline towards psychological egoism, makes the claim that we universally act so as to maximise our perceived "utility". When challenged over some apparently altruistic behaviour—a woman volunteering to nurse the victims of an earthquake, say—his response is to assert that the apparently selfless outcome must, after all, be something that the woman desires, and hence a component of her own utility. She might appear to be acting for others, but in reality she is just seeking the satisfaction of her own desires, and hence maximising her own personal benefit, just as much as any avaricious financier. Such nonsense can be very effectively countered with a thrust of Hume's Fork: *Is the claim that we act so as to maximise our utility supposed to be a relation of ideas, or a matter of fact?* If it is a relation of ideas, then "utility" is simply being used to mean whatever is the target of our actions, in which case it cannot *also* mean personal benefit: there is no *contradiction*, after all, in our desiring someone else's benefit for its own sake (as any parent knows).[118] If, on the other hand, the claim is a matter of fact, then it can only be decided by empirical investigation, and whether the nurse who helps earthquake victims is motivated by self-interest or by genuine altruism is a matter of her psychology, not something that can be determined a priori by the tautologous observation that she desires what she desires.

Hume's Fork thus retains its cutting edge, challenging any attempt to achieve a priori knowledge of matters of fact. This challenge was evident to one of his early readers, with profound implications for the development of philosophy, when Immanuel Kant identified as the fundamental question of metaphysics: "How are *a priori* synthetic judgments possible?" (*Critique*: B 19).[119] Kant's primary purpose in his metaphysical works is precisely to oppose Hume's implicit equation between the analytic and the a priori, by justifying and explaining how some (synthetic) facts about the world can be known independently of experience. Kant appreciates the force of Hume's claim that this is impossible, but he has no doubt that it *is* possible, because he believes there to be clearly established examples of synthetic a priori knowledge, for example the truths of arithmetic and Euclidean geometry, the basic principles of Newtonian physics, and the causal maxim that "every alteration must have a cause".[120] His explanation of this possibility is complex and subtle, but his key strategy for bridging Hume's divide is *transcendental idealism*, appealing to the idea that the knowing mind itself conditions the phenomenal world—the spatial and temporal world of our experience—in such a way as to make that experience possible. Hence we can know a priori that the phenomenal world will be conditioned accordingly:

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118   Except, Quine might insist, within the context of a theory which presupposes that the target of our actions is always our anticipated personal benefit and which defines its terms accordingly; but then it is a matter of fact whether that theory applies to real human beings, and straightforward observation shows that it does not. Hume's *Treatise* evinces strong tendencies towards egoism, but by 1751—probably as a result of Butler's influence (Hume 1748: 177)—he was launching a full-scale attack on the "selfish hypothesis" in what is now Appendix 2 of the second *Enquiry*.

119   Kant's familiarity with Hume came mainly from the *Enquiry*, and there is evidence that he was reading it very soon after the publication of a German translation in 1755—see Kuehn (1983: 179–80) for details.

120   See for example *Critique*: B 4–5, B 14–18, B 232; *Prolegomena*: §2, §4, §15. The *Foundations* builds on the *Critique*, endeavouring to derive the fundamental principles of Newtonian physics on the same a priori basis.

If intuition must conform to the constitution of the objects, I do not see how we could know anything of the latter *a priori*; but if the object (as object of the senses) must conform to the constitution of our faculty of intuition, I have no difficulty in conceiving such a possibility. (*Critique*: B xvii)

How, then, can there exist in the mind an outer intuition which precedes the objects themselves, and in which the concept of these objects can be determined *a priori*? Manifestly, not otherwise than in so far as the intuition has its seat in the subject only, as the formal character of the subject ... Our explanation is thus the only explanation that makes intelligible the *possibility* of geometry, as a body of *a priori* synthetic knowledge. (*Critique*: B 41, cf. *Prolegomena*: §11)

Experience consists in the synthetic connection of appearances (perceptions) in a consciousness, so far as this connection is necessary. Hence pure concepts of the understanding are those under which all perceptions must first be subsumed, before they can be used for judgements of experience, in which the synthetic unity of perceptions is represented as necessary and universally valid ... Hence these pure concepts of the understanding are the principles *a priori* of possible experience. Now the principles of possible experience are at the same time universal laws of nature, which can be known *a priori*. And thus the problem ... *How is pure natural science possible?* is solved. (*Prolegomena*: §§22–3)

However Hume's Fork is not so easily evaded, and Kant is too complacent in presuming that apriority in the genetic sense of having "its seat in the subject only"— that is, contributed by the knowing mind—provides a relatively straightforward route to apriority in the more usual epistemic sense. It is one thing to claim that our minds must condition the world we experience; it is quite another to claim that we can know a priori in what way our minds must do this. Hence even if Kant is right to see space, for example, as a mind-dependent form of sensibility, he cannot justify his claim to synthetic a priori knowledge of the Euclidean geometry of that phenomenal space, unless he is able to prove a priori that Euclidean geometry must necessarily govern whatever form our sensibility takes. So having started with the problem of how we can achieve synthetic a priori knowledge of the physical world, Kant ends up replacing it with the equally difficult problem of how we can achieve synthetic a priori knowledge of the workings of our mind. Mere empirical psychology obviously cannot provide this, and any would-be "transcendental psychology" remains an aspiration rather than an achievement, unless Kant can find some way to justify its supposed synthetic a priori status. Had he faced up squarely to this problem, rather than taking for granted that the synthetic apriority of mathematics required such a transcendental account as the ground of its possibility, then Kant might have been given pause by Hume's comments, in *Enquiry* Section 7, on the mysteriousness of our mental activity:

... do we pretend to be acquainted with the nature of the human soul and the nature of an idea, or the aptitude of the one to produce the other? ... the manner, in which this operation is performed; the power, by which it is produced; is entirely beyond our comprehension. ... The command of the mind over itself is limited ... and these limits are not known by reason, or any acquaintance with the nature of cause and effect; but only by experience and observation, as in all other natural events ... (*E* 7.17–18)

Hume is quite clear that the operations of the mind are matters of fact, knowable—if at all—only through experience. It follows that explaining the facts of the physical world in terms of facts about the mind, even if philosophically insightful and appropriate, does nothing whatever to explain how those facts can be conceptually necessary or epistemologically a priori, and hence utterly fails to cross the great divide represented by his Fork.

Perhaps the single most important and abiding message from Hume's philosophy is this insistence that matters of fact about the world of causally interacting things—from planets and billiard balls to animals, humans, and gods—can be known (if at all) *only* through experience. This message is encapsulated in his Fork and remains as pertinent today as when he wrote it. Over that time his philosophy has enjoyed mixed fortunes, being eclipsed by Kant and his idealist successors throughout the nineteenth century, then revived in the early twentieth century by Russell and the logical positivists such as Ayer. Religious motives undoubtedly played a role here, with Hume's scepticism anxiously disparaged while Christian belief was the norm, and his reputation correspondingly flourishing as traditional dogmas crumbled. But of his core philosophical doctrines, his Fork—with its implicit denial that any matter of fact can be known a priori—has a good claim to being the single best exemplar of his influence. Kant's impressively sophisticated (while pleasantly reassuring) response kept it at bay until the revolutionary scientific developments of Relativity and Quantum Mechanics forced a realisation that most of the key propositions that he had taken to be clear examples of the synthetic a priori were not only a posteriori but even probably false![121] Thus Hume's central principle, that facts about the world can be known only through experience, was strikingly vindicated: armchair metaphysics, no matter how sophisticated and convincing, is ultimately trumped by empirical test.[122] This helps to explain the enthusiasm with which the logical positivists —strongly motivated by a desire to make sense of the new science and to debunk metaphysics—took up his Fork as their standard, combining it with a verifiability criterion of meaningfulness that likewise claimed a Humean pedigree (though distorting his philosophy in the process).[123] But Hume's Fork outlasted verificationism, informing philosophical orthodoxy at least until the time of Quine and Kripke.[124] Since then it has been

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[121]   Einstein's theories of Relativity imply that both the axioms of Euclid's geometry and Newton's laws of mechanics are mere approximations to the truth, while the conventional interpretation of the theory of Quantum Mechanics implies that at its deepest level, the world is non-deterministic (so not every event has a sufficient antecedent cause).

[122]   This historical sketch naturally raises the old chestnut regarding the status of Hume's Fork itself: is this "central principle" a relation of ideas, or a matter of fact? I am inclined to consider it a conceptual truth, established by philosophical argument, and hence a relation of ideas. But there would be no obvious contradiction in seeing it as a matter of fact, which we discover *a posteriori* and which could have been false if we had turned out to have the sort of godlike rational insight considered counterfactually by Philo in the *Dialogues* at *D* 9.10. Another, more subtle, possibility is to interpret the claim as part of a holistic theory whose presupposition is that we have no such supernatural faculty—it would then become a Quinean amalgam, rather than falling neatly into either of Hume's categories. Thus the question of its status need be no serious embarrassment on any of these accounts, and it does not run into the familiar problems of its twentieth-century cousin, the verification principle, which is harder to place coherently because it claims to rule on *meaningfulness*.

[123]   Even though it shares a similar empiricist spirit, Hume's Copy Principle applies to individual ideas, and hence should be sharply distinguished from verifiability, which is a test on sentences or propositions.

[124]   Forbes (1997) traces the contemporary debate about essentialism to Kripke and Putnam (§2, p. 517), set against the background of "our received notions about the grounds of necessity ... the traditional view, which receives its paradigm formulation in Hume's writings", and which claims that "whatever necessities there are, are to be explained in terms of 'relations of ideas'." (§4, p. 529).

under a cloud, for reasons we have explored above, which indeed show that Hume's rather simplistic distinction between "relations of ideas" and "matters of fact" requires at least significant refinement. But nevertheless our discussion has indicated that these attacks on his position leave his core principle, *that substantial facts about the empirical world can be known only through experience*, fundamentally unscathed.[125] Admittedly Hume has not proved this, but the repeated failures of attempts to circumvent it tell a powerful message, and at least establish it as a serious hurdle for any would-be a priori metaphysician. Most current philosophers, indeed, so far from attempting to challenge the principle, would probably consider it unremarkable and even "obvious". But that in itself is a mark of Hume's achievement, showing the extent to which the spirit of his Fork has infused our philosophical "common sense".

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[125] This is not to deny that there are complications in spelling out what exactly is meant by a "substantial fact" and by "the empirical world", nor that relevant problems remain, particularly in respect of mathematics (whose mysterious status has continued to puzzle and inspire philosophers). As with note 117 above, Hume's core message is much easier to express within a framework that focuses on inference from past *experience* to future *experience*: then the point is that a priori, we cannot know what to expect for the future, but must rely on extrapolation from past experience.

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