This is an expanded version of a paper with the same title published in *The Routledge Companion to Humility*, edited by M. Alfano, M.P. Lynch, and A. Tanesini, pp. 359-71 (Routledge, 2121). Added here are sections 4.4 (on dispositional monism), 4.5 (on naïve realism), and 5 (on bodies and places), as well as two appendices.

HUMEAN HUMILITY AND ITS CONTEMPORARY ECHOES

My source for the doctrine I call Humean Humility is section 1.4.4 of Hume's *Treatise of Human Nature*, the section in which he gives his critique of "the modern philosophy." Hume contends that the world according to the modern philosophy—a world with primary qualities but no secondary qualities—is a world of which we can form no conception. There are echoes of Hume's premises (if not his conclusion) in two contemporary foci of philosophical attention: Russellian Monism, which agrees with Hume that there would be something defective in a world without anything like the traditional secondaries, but unlike Hume, goes on to attribute such qualities to the world, and Ramseyan Humility, which agrees with Hume that there must be more to any conceivable world than just structure with no underlying intrinsic or nonrelational properties, then goes on to argue that we could never know what these intrinsic properties are. In what follows, I examine all three views, as well as the merits of several possible lines of reply to them, including causal structuralism and dispositional monism.

1. Hume's critique of the modern philosophy

Hume's critique occurs in Book 1, Part 4, Section 4 of the *Treatise of Human Nature* (T 1.4.4), mainly in paragraphs 3 through 10 (T 1.4.4.3-10). I invite anyone who has not read these paragraphs recently to read them now and form their own take before reading mine.

Here is my reconstruction of Hume's argument, along with commentary on each of the premises:

1. There are no colors or other secondary qualities in bodies (paragraphs 3 and 4).

Colors, sounds, and so on are only impressions in the mind, resembling nothing in bodies. This is the first main tenet of the modern philosophy. Some readers may think Hume is assuming it only as a premise for a *reductio ad absurdum*, but Hume rehearses the standard arguments for it and pronounces them "as satisfactory as can possibly be imagin'd" (T 1.4.4.4). For example, the distant mountain looks blue in the haze (it presents me with a blue impression), but when I get close enough to hike on it, I see that it is mostly green (it presents me with green impressions). Since the mountain itself did not change as I approached it, not all my color impressions resemble it, and the modern philosophy concludes that none do.

2. Bodies have no properties but the primary qualities—extension, motion, and solidity (and others that entail one or more of these, such as figure) (paragraph 5).

This is the second main tenet of the modern philosophy, telling us what is left once the secondary qualities are removed.

What is now to be shown is that if there are no secondary qualities in bodies, we cannot conceive of bodies as having primary qualities, either—in which case we cannot conceive of bodies at all (paragraph 6).

We need to distinguish between two things that might be meant by saying such and such is not conceivable. On the one hand, it might mean that we can form no concept of such and such —in Hume's terms, that we have no idea of it. In his philosophy, this is most often the case when we have no impressions from which the idea might be derived (T 1.1.1 and throughout the *Treatise*). On the other hand, it might mean that some state of affairs is inconceivable in the sense that Hume takes to imply the impossibility of it—the sense that figures in his maxims that

what is inconceivable is impossible and what is conceivable is possible (T 1.2.2.8 and many other places in the *Treatise*). It should be clear that something's being inconceivable in the first sense (inconceivability$_1$) need not imply its being inconceivable in the second sense (inconceivability$_2$). A blind man cannot conceive of the color red, but neither he nor we should conclude that it is impossible for there to be red things. To anticipate, Hume's conclusion is going to be that under the modern philosophy, bodies are inconceivable in the first sense. (In Appendix 1, I discuss yet a third sense of inconceivability in Hume.)

3. We can conceive of bodies only if we can conceive of them as having (some of) the properties they actually have.

Hume does not explicitly state this premise, but there is a hint of it in T 1.4.4.10, and it is required for the validity of his argument.[1] The alternative to admitting it, though perhaps not out of the question, would be very strange—it would be to hold that there are things we can conceive of only by putting them in a false light (or by not attributing any properties to them at all).

4. *We can conceive of bodies only if we can conceive of them as having one or more of the primary qualities—motion, extension, solidity.*

This step, presupposed throughout Hume's argument, follows from 2 and 3. He is not forgetting other primary qualities such as shape—shapes are ways of being extended and cannot be conceived without extension.

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[1] Here is what he says in T 1.4.4.10: "To affirm, that we paint them out to ourselves as extended, either resolves all into a false idea, or runs in a circle. Extension must necessarily be consider'd either as colour'd, which is a false idea; or as solid, which brings us back to the first question." He is rejecting the idea that we conceive of bodies as extended by conceiving of them as colored on the ground that color, as applied to bodies, is a "false idea."

In the next several steps of the argument, Hume contends that motion and extension in bodies conceptually presuppose solidity, so that 4 may eventually be strengthened to 'We can conceive of bodies only if we conceive of them as solid.'

5. We can conceive of a body as moving only if we also conceive of it as extended or solid (paragraph 7).

Hume argues for this premise as follows:

> [Motion] is a quality altogether inconceivable alone, and without a reference to some other object. The idea of motion necessarily supposes that of a body moving.[2] Now what is our idea of the moving body, without which motion is incomprehensible? It must resolve itself into the idea of extension or of solidity (T 1.4.4.7).

Why not of color? Because, as the next paragraph reminds us, color is excluded from bodies by the modern philosophy.

6. We can conceive of a body as extended only if we also conceive of it as either colored or solid, that is, conceive of it as colored or conceive of it as solid (paragraph 8).

In support of this premise Hume cites his own analysis of extension, given most explicitly at T 1.2.3.4-5. An extended thing is an array of indivisible points, and if these points are to be more than non-entities and amount to anything through their aggregation, they must be either colored or solid.[3]

7. "Color is excluded from any real existence" (paragraph 8).

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[2] The question may be raised whether the first two sentences of this passage contradict Hume's doctrines elsewhere. He says in T 1.4.3 (in opposition to the ancient philosophy) that every quality can exist and be conceived apart from any other and in T1.4.5 (in opposition the distinction between accidents and substances) that everything can exist by itself. Perhaps there is reconciliation in T 1.1.7, where Hume says between motion and the body moved there is only a distinction of reason, which is to say, no real difference (T 1.1.7.17-18).

[3] Here is a question to be investigated on another occasion: would Hume admit (as Berkeley would not) that there could be a line composed of alternating visible and tangible points?

This is just a reaffirmation of the first tenet of the modern philosophy. Colors belong only to impressions and ideas in our minds, not to any external bodies. The same goes for heat and cold and any other secondary qualities through which we might attempt to get a purchase on the extendedness of bodies.

8. We can conceive of a body as extended only if we also conceive of it as solid (paragraph 8). As Hume puts it, "The reality, therefore, of our idea of extension depends upon the reality of that of solidity, nor can the former be just while the latter is chimerical."

At first glance, it may seem that 8 follows from 6 and 7, perhaps with the help of 3. On closer inspection, however, there is a non sequitur, which I am not sure how to repair. We would need a premise stronger than 3—one implying that we can conceive of a body as colored only if it actually *is* colored. But that is too strong—wouldn't Hume allow that we can *conceive* of bodies as colored, even if the modern philosophy is correct in arguing that they are *not* colored? Alternatively, we could make it a premise that we can conceive of bodies as colored only if it is *possible* for them to colored, adding that the modern philosophy rules out that possibility.[4] But I doubt that Hume credits the argument from independent variability with that much power—it only shows that bodies are not in fact colored, not that they could not be.[5] I leave the proper rationale for 8 as an unsolved problem.

9. We can conceive of bodies only if we conceive of them as solid.

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[4] The following counterpart of the argument from 6 and 7 to 8 is valid in modal logic: (6') N(Bx & Ex → Cx v Sx); (7') N(Bx → ~Cx); therefore, (8') N(Bx & Ex → Sx). (6') would be delivered by 'It is inconceivable$_2$ that a body be extended, yet neither colored nor solid' (a possible reading of 6) together with the principle that what is inconceivable$_2$ is impossible. And together with the converse principle that whatever is impossible is inconceivable$_2$, (8') would deliver 'It is inconceivable$_2$ that a body be extended, yet not solid' (a possible reading of 8). But nothing plausible would deliver (7'), as I point out in the text.

[5] The lead premise in the argument from independent variability—that the impressions (e.g., of color) produced in us by objects sometimes vary while the objects remain unchanged—is contingent.

This follows from 4, 5, and 8. Solidity is a property without which we cannot get any mental grip on what bodies are. Many of the moderns, including Locke, Reid, and Kant, would have agreed with Hume on this point.

We are now ready for the crux of Hume's argument, which comes in paragraph 9. I reproduce the entire paragraph here before continuing with my reconstruction:

> The idea of solidity is that of two objects, which being impell'd by the utmost force, cannot penetrate each other; but still maintain a separate and distinct existence. Solidity, therefore, is perfectly incomprehensible alone, and without the conception of some bodies, which are solid, and maintain this separate and distinct existence. Now what idea have we of these bodies? The ideas of colours, sounds, and other secondary qualities are excluded. The idea of motion depends on that of extension, and the idea of extension on that of solidity. 'Tis impossible, therefore, that the idea of solidity can depend on either of them. For that wou'd be to run in a circle, and make one idea depend on another while at the same time the latter depends on the former. Our modern philosophy, therefore, leaves us no just nor satisfactory idea of solidity; nor consequently of matter. (T 1.4.4.9)

10. There is no way to understand solidity but this: to be solid is to resist penetration by other solid things (paragraph 9).

Hume equates solidity with impenetrability: "The idea of solidity is that of two objects, which being impell'd by the utmost force, cannot penetrate each other; but still maintain a separate and distinct existence."[6] The equation was common in Hume's day. For Locke, solidity may have been the categorical basis of impenetrability rather than being the same with it,[7] but it was still a property that could only be understood in terms of impenetrability, which is all Hume's argument requires.

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[6] In T 1.4.4.11, he offers another characterization: "solidity or impenetrability is nothing but an impossibility of annihilation." I explain this odd characterization in Appendix 2.

[7] Locke says he uses the term Solidity "because it carries something more of positive in it, than *Impenetrability*, which is negative, and is, perhaps, more a consequence of *Solidity*, than *Solidity* itself" (1975, 2.4.1, 123).

Hume does not say in the sentence I quoted that to be solid is to be impenetrable by other *solid* things, but he arrives at that further claim in short order. How are we to conceive of the other bodies by which a given body is impenetrable? Not by way of any secondary qualities, since these are excluded from bodies. By way of motion or extension, then? But according to premises 5 and 8, that would require that we conceive of those other bodies as being solid. Thus we can understand solidity only as a relation to other solid things.[8]

11. If 10 is true—if we can understand solidity only in terms of solidity—we do not understand solidity at all.

So what if we can understand solidity only in terms of itself, some may ask at this point—that just shows we are dealing with a primitive concept. Relatedly, there are sometimes small circles of mutually definable concepts, such as the circle containing synonymy and analyticity Quine complains of, where there is no prospect of a definition taking us outside the circle. That does not mean that no concept in the circle is understood; it just means that they are understood only if at least one is understood without any definition. But Hume would deny that that is our situation here. It really is true that we can understand solidity only if we have a prior grasp of body or some other bodily mark, and that we can understand body only if we have a prior grasp of solidity. If that is the case, we do not understand either of them.

Spinoza says some things are conceived through others (for instance, modes in terms of substances) while others are conceived through themselves (notably God). A's being conceived through B is an asymmetrical relation—it excludes B's also being conceived through A. And therefore when he says some things are conceived through themselves, he cannot mean it in a

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[8] Some readers may wonder whether we can circumvent the difficulty by defining two or more bodies as solid if they resist penetration by one another. I take up this suggestion in section 4.2.

literal and positive way. He just means some things are understood, but not through anything else. Hume is claiming that solidity is conceived (if at all) only through other things that are conceived (if at all) only through solidity itself, in which case we cannot really understand either one. All that comes out in the following remark:

> 'Tis impossible, therefore, that the idea of solidity can depend on either of them. For that wou'd be to run in a circle, and make one idea depend on another while at the same time the latter depends on the former. (T 1.4.4.9)

12. "Our modern philosophy, therefore, leaves us no just nor satisfactory idea of solidity; nor consequently of matter" (Paragraph 9).

This is the conclusion I am entitling Humean Humility. It is not the thesis that it is inconceivable$_2$ that there be bodies, but the thesis that we can form no satisfactory conception of what they are.

We should contrast Humility with two other conclusions that Hume sometimes seems to draw, one weaker and one stronger. In announcing his conclusion at the start of the argument, he says that by depriving external objects of their primary qualities, "we reduce ourselves to the opinions of the most extravagant skepticism concerning [external objects]" (T 1.4.4.6). If by skepticism is meant the doctrine that we cannot *know* that external objects exist, this gloss is an understatement. Humean Humility is not a doctrine about what we can know, but about what we can even conceive of or entertain. It is conceptual skepticism rather than epistemic skepticism. Hume offers reasons for epistemic skepticism elsewhere (e.g., in section 12 of the *Enquiry*), but the upshot of 1.4.4 is conceptual skepticism.[9] The next sentence gets his thesis right: "If colours, sounds, tastes, and smells be merely perceptions, nothing we can conceive is possest of

[9] For more on these two varieties of skepticism, both of which Thomas Reid found in Hume, see Van Cleve 2015, 53-56.

a real, continu'd, and independent existence; not even motion, extension and solidity, which are the primary qualities chiefly insisted on" (T 1.4.4.6). Since having a continued and distinct existence is the mark of body in T 1.4.2, he is saying nothing we can conceive of is a body or, in other words, that we cannot conceive of bodies.

The final sentence of the section gives another gloss of his conclusion, this one overstating it:

> When we exclude these sensible qualities there remains nothing in the universe, which has [continu'd and independent existence]. (T 1.4.4.15)

Here he advances beyond skepticism of either variety to nihilism: there are no bodies in the universe.[10] The sentence is probably best taken as exaggeration for dramatic effect.

2. Russellian Monism

There are strong echoes of Hume's 1.4.4 in contemporary philosophy. "How can there be a world in which objects have primary qualities, but no secondary qualities?" ask J.J.C. Smart (1963), D.M. Armstrong (1961), and Simon Blackburn (1993), all seeing the question as a problem for the scientific realism they would otherwise like to defend. Smart and Armstrong credit Berkeley and Hume with having raised the question before them, Smart citing our main Humean text, T 1.4.4, as well as Berkeley's *Principles* 10, in which Berkeley maintains that it is unimaginable

[10] It is a nice question how anyone can be both a conceptual skeptic and a nihilist about something. The combination would not be unique to Hume; compare Quine's insistence that no one understands what analytic statements are and, moreover, there aren't any.

how anything could have extension or figure without also having a color or some other sensible quality.[11, 12]

As Smart and Armstrong develop the problem, a critical aspect of it is that science seems to ascribe to objects relational properties only. Electrons have mass, charge, and spin, says Smart, and these are all relations—"What is the electron in itself?" (72). And Armstrong says, "If we look at the properties of physical objects that physicists are prepared to allow them such as mass, electric charge, or momentum, these show a distressing tendency to dissolve into relations that one object has to another" (1968, 74-75). But if something has relational properties, must it not have intrinsic properties, too?

Blackburn raises a distinct but similar problem. In his case, the problem is that science ascribes to objects nothing but dispositional properties—"dispositional properties all the way down" (255). But if things have dispositional properties, must they not also have categorical properties to ground the dispositions? The concern looms that the worldview of science is at best incomplete and at worse inconceivable.

None of these authors believes that the problem they raise is insoluble. They believe either that a world of nothing but relations or dispositions is possible after all or, if not, that purely physical properties can fill the apparent gaps. But some recent authors have not been so sanguine. Under the banner 'Russellian Monism,' they advocate a cluster of views I enumerate as follows, guided by Alter and Nagasawa 2015b:

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[11] Berkeley 1975, 80. Smart rejects Warnock's thought that you could imagine an invisible man by imagining a tray full of drinks moving around as though carried by an invisible man. To do that, you would still have to give the *drinks* some color—you can't imagine everything in a scene as devoid of secondary qualities (73).

[12] Also citable in this connection is Leibniz: "I do not think that substance is constituted by extension alone . . . . something must always be assumed which is continuous or diffused, such as the white in milk, the color, ductility, and weight in gold, and resistance in matter" (Letter to De Volder of April 1699 in Leibniz 1969 **PAGE).**

(1) Physics tells us only about the structural properties of the world. It ascribes no properties to fundamental things except relational and dispositional properties.

(2) Nothing can have relational and dispositional properties alone. Things with relational properties must also have intrinsic properties, and things with dispositional properties must also have categorical properties.

(3) Therefore, there must be properties of things unknown to physics. Because they are unknown to physics, they are sometimes called *inscrutables*, even though on some views we are acquainted with some of these very properties in our own conscious experience.

Tenet (1) is defended in various of the writings of Bertrand Russell from 1927 on, which is part of the reason why Russellian Monism is so called.[13] It is defended by many philosophers of science today under the name 'epistemic structural realism' (Ladyman 2016).

The twin tenets in (2), though contested, are defended by many metaphysicians. There is a tendency in discussions of our topic to roll them together: dispositional properties get equated with relational properties and categorical properties with intrinsic properties. The equations are mistaken. There are relations that are not dispositions, even if they imply dispositions: I am seated at my desk, and that is something that is occurring right now. Conversely, there are dispositions that are not relational; sugar has the disposition to dissolve in water, and that might be true even of a cube of sugar that was the only thing in the universe. Moreover, the thesis that dispositions must have a categorical basis is sometimes equated with the thesis that a disposition must have an intrinsic basis, and that equation is also mistaken. An object might be visible right

[13] See Russell 1927 and the excerpts from Russell in Alter and Nagasawa 2015a.

now because it is placed against a dark background and bathed in bright light—to say that is to ground a disposition in categoricals, but not in intrinsics.

The dependence of dispositions on categoricals is typically held as a thesis of grounding: any disposition of a thing must be grounded in a categorical property, as the disposition to roll if released on a hill is grounded in roundness. The dependence of relations on intrinsic properties could also be advanced as a thesis of grounding, as it was by Leibniz (relations reducing to qualities of the relata), but it need not be. One could hold that the relata of any relation must have intrinsic properties just because everything must have them—no concrete thing can have relational properties only.

If tenets (1) and (2) are both admitted, (3) is the almost inevitable result:[14] there must be properties unknown to physics. What might they be? Alter and Nagasawa canvass four candidates. (a) They might be phenomenal properties or qualia, such as we experience in seeing a splash of red or hearing the F above middle C. (b) They might be proto-phenomenal properties, properties that are not themselves phenomenal, but are capable of compounding somehow into phenomenal properties. (c) They might be properties that are neither mental nor physical, but neutral. (d) They might be physical properties of a special sort, unknown to physics but physical nonetheless.

Option (a) verges on panpsychism, a view often thought extravagant, but taken seriously by some contemporary philosophers, including David Chalmers (1996, 297-99) and Galen Strawson (2019). Whether it would really be panpsychism depends in part on the relation of qualia to

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[14] But not logically inevitable unless (1) is read strongly as implying that physics ascribes no intrinsic and no categorical properties to things. It must be read as excluding the possibility, allowed by the twin tenets in (2), that every dispositional property is grounded in a categorical relational property and every relational property in an intrinsic dispositional property in an endlessly alternating downward sequence.

consciousness. If qualia are either modifications of conscious states or items that exist only as objects of conscious states, then consciousness would have to be present at a very fundamental level. An advantage sometimes claimed for this possibility is that it not only provides us with the intrinsic properties missing from the worldview of physics, but makes it easier to comprehend how consciousness could arise in complex organisms—it is already present in some form in the basic building blocks.[15]

Option (b), protophenomenal properties, is advanced by Chalmers (1996, 127 and 154). It is hard to say much about it until it is more explicitly worked out. Suffice it to say that to the extent the protophenomenal is like the phenomenal, we have option (a), and to the extent that it is unlike the phenomenal, we reproduce the problem of how phenomenality can arise in complex organisms.[16] To the extent that the protophenomenals are either neutral or physical, we have option (c) or (d).

Option (c), neutral properties, has some overlap with the view Russell espoused under the name 'neutral monism'. He said that the properties we are aware of in introspection are by themselves neither mental nor physical, but are properties some constellations of which constitute minds and other constellations of which constitute matter. This is one more reason why Russellian Monism is so called, but it need not be developed in this direction.

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[15] My own favorite argument for panpsychism proceeds from the need for simple substances to have intrinsic properties rather than from the need to solve the mind-body problem. It is an argument attributed by Kant to Leibniz and reconstructed in Van Cleve 1988.

Russell claimed that the only intrinsic properties we are aware of are properties of our own percepts, which invites the speculation that similar properties are the intrinsic properties missing in the physicist's description of the world. But Russell never made this any more than a speculation.

[16] This is what is known in the panpsychism literature as the "combination problem." It is adumbrated in Van Cleve 1990.

On option (d), the inscrutables are physical properties, but properties of a special sort unknown to physics. This has been advocated by Derk Pereboom among others (Pereboom 2015).

Finally, there could be mixes of the options. For example, fundamental entities could have some intrinsic physical properties and some intrinsic mental properties—dualism writ small. Russellian Monism need not be a form of monism.

It should now be clear in what ways Russellian monism is and is not an echo of Hume. "The modern philosophy" and modern physics both describe a world that has primary or structural qualities only, and Hume and the Russellian Monists both say *nothing can be conceived as being like that*. For Hume, this is a case of inconceivability$_1$: we can form no conception of the modern philosopher's world, no "just idea." For the Russellian Monists, it is a case of inconceivability$_2$: we cannot see how a world could exist merely as described by science—all relation and no quality, all disposition and no basis, all form and no filling—or perhaps more strongly, we positively see that things could not be that way. The Russellian Monists fix the problem by positing properties not found in physics textbooks—perhaps phenomenal properties, akin to the secondary qualities Hume says are not there; perhaps inscrutable physical properties, of which Hume would say we have no idea because no relevant impression.

3. Ramseyan Humility

Rae Langton (1998) has offered a new reading of Kant's thesis that we have no knowledge of things in themselves. According to her, the thesis does not mean there is a special class of things behind the scenes about which we know nothing; rather, it means we have no knowledge of the intrinsic properties of the things we encounter every day—no knowledge of how they are "in

themselves." This is the thesis she calls Kantian Humility. David Lewis has taken over the thesis Langton attributes to Kant, given a new argument for it, and given it a new name: Ramseyan Humility (2009).

In the thesis "we have no knowledge of the intrinsic properties of bodies" there is an apparent echo of Hume, but there are two differences worth noting. First, in one way Lewis's thesis is more modest. As noted above, the skepticism affirmed by Hume is *conceptual* skepticism—we cannot even form a good conception of what bodies might be. The skepticism affirmed by Lewis is *epistemic* skepticism—he allows that we can conceive of various intrinsic properties of bodies, but argues that we cannot know which of these properties are actually instantiated. Second, in another way Lewis's thesis is more radical. Hume allows that we can know the intrinsic properties of *some* things—for example, the colors and shapes of our own impressions. But Lewis maintains that "humility spreads," making us ignorant even of the intrinsic properties of our own qualia.[17] I shall not be concerned with the more radical side of Lewis's view here.

Lewis's argument for Ramseyan Humility consists of three premises—the Ramsey premise (as I call it), combinatorialism, and quidditism.

To state the first premise, we must briefly review Ramsey's method for dealing with theoretical terms, which I shall do with a made-up example of a simple theory for explaining the tastes of apple and lemon juice. The theory may be written like this:

> Lemon juice contains negative particles, and whatever contains negative particles is sour; apple juice contains positive particles, and whatever contains positive particles is sweet.

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[17] Lewis's thesis is also more radical than Langton's insofar as it implies that in many cases we cannot know which of several candidate *relations*—not just which of several intrinsic properties—is instantiated by things.

The theory contains observational terms, such as ‘lemon juice’ and ‘sour,’ which we understand because we are acquainted with the things or properties they stand for. It also contains theoretical terms, such as ‘positive particle’, which stand for things or properties we are not acquainted with. How, then, are we to understand the theory? Ramsey proposed that we replace all the theoretical terms by variables and then write out the existential generalization of the resulting formula with respect to every variable, as follows:

> ∃F∃G(Lemon juice contains Fs, and whatever contains Fs is sour; apple juice contains Gs, and whatever contains Gs is sweet).

Gone now are the theoretical terms. We can understand the resulting formula—the Ramsey sentence for the theory—if we understand the observational terms plus logic.[18]

Now for Lewis’s Ramsey premise. It is provable that a theory and its Ramsey sentence have all the same observational consequences; it is a corollary that two theories with the same Ramsey sentence have all the same observational consequences. Lewis assumes that any evidence we have for a theory must consist in its record of predictive success—in its observational consequences that come out true—and hence that no amount of observation will tell us whether a given theory or another theory with the same Ramsey sentence is true.[19] This is the epistemological premise in his argument, which combines with the other two premises to yield Humility as the conclusion.[20]

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[18] The original presentation is Ramsey 1931; a good exposition is Psillos 2004. One of the artificialities of my toy example is that there is no sentence in the theory saying how the theoretical entities or properties are related to each other; to remedy that, we could add one saying (for instance) that at certain distances, positives attract negatives.

[19] For discussion of epistemological strategies that would let us know that one of the theories rather than the other is true despite their observational equivalence, see Schaffer 2004 (pro) and Locke 2009 (contra).

[20] Some authors see Ramsey sentences as a way of articulating the “structure” that according to Russell is all that physics can tell us. See Psillos 2004 for critical discussion.

The second premise in Lewis's argument is combinatorialism. This is the principle that if the elements (including the properties and relations) in any possible situation are taken apart and rearranged (for example, one n-place relation switched with another), the result is again a possible situation. As applied to our toy theory, it implies that if the original was possible, so is the proposition expressed by

> Lemon juice contains positive particles, and whatever contains positive particles is sour; apple juice contains negative particles, and whatever contains negative particles is sweet.

To get from the original to the above, we have simply permuted the terms 'positive particle' and 'negative particle'—or as Lewis also says, permuted the properties themselves in the realization of the original theory.[21] As Lewis notes, combinatorialism implies that the laws of nature are contingent. If it were necessary that positive particles make for sweetness, our permuted theory would not express a possibility.

The third premise is quidditism. Quidditism tells us that the result of permuting properties is not only a possibility, but a possibility distinct from the one we started with. "Two different possibilities can differ just by a permutation of fundamental properties" (209). The import of this will be better appreciated when we consider below certain structuralist views that deny it. It can also be appreciated by its analogy with haecceitism—the view that you can permute the

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[21] There is a sense-destroying typo in the version of Lewis's article in Braddon-Mitchell and Nola. On p. 208, the fourth sentence of the second paragraph of section 4 should read as follows: "And the laws of nature governing **F2** in the permutation will be just the same as the laws governing F1 originally (more precisely, the laws governing F2 vis á vis F1 in the permutation will be the same as those governing F1 vis á vis F2 originally); and vice versa." My bold F2 replaces the incorrect F1.

individuals in a situation and get a distinct possibility. (In the original situation it is Socrates who is bald and snub-nosed; in the new it is Plato.).[22]

We can now see how the three premises come together to yield Ramseyan Humility. By combinatorialism, the properties of being positive and negative could change places. By quidditism, if they did, the result would be a possibility distinct from what we started with. And by the Ramsey premise, we could never know that one rather than the other of these possibilities was actual. This is one of countless cases in which we could not know which intrinsic properties are possessed by the particles composing this or that thing or stuff.

How Humean are Lewis's premises? The combinatorial premise has strong Humean credentials; indeed, Lewis presents it as a development of Hume's dictum that there can be no necessary connections among distinct existences. As for quidditism, Hume would agree if the permuted properties were observable properties, but in Lewis's argument they are theoretical properties, in which case the question may not arise for Hume. Insofar as the properties are theoretical, Hume would say they are properties of which we have no idea because no relevant impressions.[23] What, finally, of the Ramsey premise? It is in the spirit of Hume's empiricism to say that if two theories have all the same observational consequences, we cannot know that one

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[22] As it happens, Lewis denies haecceitism despite accepting quidditism; he devotes several paragraphs of his 2009 article to defending the asymmetrical treatment of properties and individuals. Plantinga discusses a view like haecceitism under the heading "Does Ramsification destroy information?" (1974, 99-101); he means Ramsification with respect to individuals rather than properties.

[23] Ramsey's goal in "Theories" was to show how to understand theoretical terms (see Psillos 2004 for confirmation), and so was Lewis's in "How to Define Theoretical Terms," where he defines them by definite descriptions built from Ramsey sentences. Defining terms by means of definite descriptions is a legitimate way of understanding terms by Lewis's lights, but probably not by Hume's. When Hume conjectures that we could get the idea of the missing shade of blue through a description like *the shade intermediate between B37 and B39*, that is only because he thinks the description would enable us to conjure up an image of the missing shade; if we could not do that, he would think the description by itself is of no avail. But this point is controversial these days, as some proponents of "the new Hume" say that Hume allows for a modicum of understanding by means of "relative notions," which are akin to knowledge by description. See Flage 2000 for further discussion.

rather than the other is true; but that may only be because Hume would not allow any content to a theory over and above its observational consequences.

The main point of affinity between Lewis and Hume is that they both make assumptions that would be challenged by proponents of structuralism, one of the alternatives to be examined in the next section.

4. Responses to Humean Humility, Russellian Monism, and Ramseyan Humility

A crucial premise in the argument for Humean Humility is the contention that if there are certain concepts that cannot be understood except in terms of each other—body and solidity in his case, but the issue arises for others—then they cannot be understood at all. In this section I discuss several challenges to this contention, all involving strategies for understanding concepts despite their interdependence or perhaps even in virtue of it. Some of the strategies may overlap others or be special cases of them.

4.1. Holistic understanding.

According to a traditional argument for the existence of self-evident beliefs (by which I mean justified beliefs that do not inherit their justification from that of other beliefs), when we inquire what justifies a belief, what justifies the justifier, and so on, there are only four possibilities: the series goes on forever, it runs around in a circle, it stops with items that are unjustified, or it stops with items that are self-evident. If the first three options are regarded as untenable, it follows that no beliefs are justified unless some beliefs are self-evident.

A response on the part of some coherence theorists is that the "run around in a circle" alternative has been two narrowly and simplistically conceived. It has taken justification to be *linear* (A is justified by B, which is in turn justified by C, which is in turn justified by D, . . . , which in turn justified by A). But instead it should be regarded as *holistic*: A is justified by B and C and various other items in one's system of beliefs; B is justified by A and D and various other items; more generally, each item is justified not by any single other item but by some combination of them. A web of mutual support of this sort is supposed not to incur the objection to simple circularity.

We might adopt a similar model to defend the idea of holistic understanding—a coherence theory of concepts, as it is sometimes called. We understand concept F in terms of concepts G and H among others, G in terms of F and K, and so on; we understand each by knowing its relation to the rest. To make this work in the case of concern to Hume, we might have to add a few more concepts to body and solidity. As is sometimes waggishly said, what is wrong with some circles is simply that they are too small.

The holistic strategy may sound promising, but in the end I think it is no better off than the more simple-minded strategy. We may see this by restating its claims in terms of the relation of partial grounding. To say that P is partly grounded in Q is to say that for some item R, P is wholly grounded in Q and R. Restating the coherence theory above in these terms, we have it that our understanding of F is partly grounded in our understanding of G and that our understanding of G is partly grounded in our understanding of F. But nearly all contemporary theorists of grounding take as one of its axiomatic properties that it is *strongly asymmetrical*, in the sense that not only can two things not be wholly grounded in each other, but neither can two

things even be *partially* grounded in each other (see, e.g., Rosen 2010, 115-116). Understanding solidity and body each just partly in terms of the other would in that case be out of the question.[24]

4.2. Reid's definition of straightness

Thomas Reid, though a pioneer of non-Euclidean geometry in his work on visual space, tried over a period of years to vindicate Euclid by showing that the parallel postulate of Euclidean geometry is provable from the other postulates. He thought the thing ought to be doable if we used a better definition than Euclid's of straightness. Here is one of his own definitions crafted for the purpose:

> D1. Right line is that which cannot meet another Right line in more points than one, otherwise they perfectly coincide, and are one and the same.[25]

This definition turned out to be inadequate for the job, but that is not my topic. As Reid acknowledged, his definition is not of the standard form for definitions. In the standard form, we would say 'L1 is straight iff ___'. In this form, we say 'L1 and L2 are both straight iff ___'.

Can we use a similar strategy to define solidity? If we did, we would say

> D2. B1 and B2 are both solid iff neither one can penetrate the other.

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[24] Proponents of holistic justification may say that it is not the case that a given item in the web is justified partly because another item is *justified*—rather, the entire lot is justified at one stroke because they stand to one another in various logical relations that can be specified in nonepistemic terms. Similarly, a proponent of holistic understanding might say that S's understanding of various items in a network is not partly grounded in her *understanding* of others, but happens at one stroke once S sees that F, G, H and the rest have such-and-such logical or causal relations to one another. But there is a problem with that suggestion: seeing that certain concepts or properties are related in a certain way presupposes that one already understands the concepts. We must suppose that F, G, and H are purely syntactic items whose relations we can apprehend even if we do not know what they mean—knowledge of meaning then supervening on such apprehension—or we must take the "seeing" to be some sort of nonintentional attitude that does not require having understanding of content—understanding of content then supervening on such nonintentional attitudes. In the first case, perhaps you see all the inferences you can make among a batch of uninterpreted formulas; thereupon you know what each one means. In the second case, perhaps you don't "see" anything, but you *do s*omething; perhaps you make (because you have been programmed to make) all the inferences just referred to. But I doubt that in either case we have a sufficient condition for knowing what the symbols mean.

[25] Quoted in Wood 1998, p. 31.

Hume's complaint was that solidity in one body could be understood only in terms of solidity in another, making for a circular definition. In this definition, we seem to be circumventing that difficulty by defining the joint solidity of two bodies; there is no need to mention solidity on the right.

It is a consequence of Reid's definition that if two lines intersect in more than one point, they cannot both be straight; at least one of them must be curved. But Reid's definition will not tell us *which* line is curved, and to that extent it may be regarded as not giving us a full understanding of straightness. Similarly, it is a consequence of D2 that if two items interpenetrate, at least one of them must not be solid.[26] But D2 will not tell us *which* of two interpenetrating things fails to be solid, and to that extent it does not give us a full understanding of solidity.

4.3. Causal structuralism

In an influential article, Sidney Shoemaker has advanced the view that properties are individuated by the causal powers they bestow on their bearers (1980). The Shoemaker view, dubbed causal structuralism by John Hawthorne (2006), can be developed in a way that challenges Humean Humility, Russellian Monism, and Ramseyan Humility all three.

Here is one of Shoemaker's formulations of his view:

> What makes a property the property it is, what determines its identity, is its potential for contributing to the causal powers of the things that have it. This means, among other things, that if under all possible circumstances properties X and Y make the same contribution to the causal powers of the things that have them, X and Y are the same property. (Shoemaker, 212)

[26] What manner of thing might the nonsolid item be? Two possibilities (to be discussed below in section 5) are Newtonian places and extended souls.

He goes on to claim the following consequences for his view: the causal potentialities of a property are essential to it; properties having the same causal potentialities are identical; causal laws hold necessarily when they hold at all.

Shoemaker's view is antithetical to two of the premises in Lewis's argument for Ramseyan Humility. The combinatorial premise says that if a world is possible in which chilling water hardens it and heating water vaporizes it, so is a world in which heating and chilling have the opposite effects. This is not so if causal laws are necessary. The quidditism premise says that when you permute certain pairs of properties, you get a possibility distinct from the possibility you started with. This is not so if properties are individuated by their causal roles; if P plays a certain causal role at one time and Q plays it at another, Q and P are the same property.[27]

Shoemaker's view is also antithetical to the case for Russellian Monism. The Russellian Monist insists that things must have intrinsic properties and therefore posits properties not yet known to physics. As pointed out in Langton and Lewis (1998), Shoemaker's view greatly reduces the number of intrinsic properties. One might think initially that the property of being an ellipsoidal star is intrinsic. But if the laws of nature are necessary truths, and if they permit a star to be ellipsoidal only if it orbits another star, then no star could be ellipsoidal unless there were another star. This would violate one of Langton and Lewis's conditions for being an intrinsic property, namely, that a solitary thing could have it. Shoemaker's view arguably also implies the stronger result that there are *no* intrinsic properties. This result follows if we use one of Langton's further conditions for an intrinsic property: an intrinsic property is one that a thing could have even in the absence of laws (Langton, 119). Thus if sugar would no longer dissolve

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[27] Actually, it is sometimes unclear to me whether causal structuralism contradicts combinatorialism, quidditism, or both. What is absolutely clear, however, is that causal structuralism contradicts the conjunction of them.

in water if certain laws were suspended, its water-solubility is not an intrinsic property. By this standard, no properties are intrinsic for Shoemaker, since none could be had in the absence of laws. Properties *make* the laws.[28]

The respects in which Shoemaker is at odds with Ramseyan Humility and Russellian Monism are also respects in which he is at odds with Hume. Hume takes causal laws to be contingent, and he thinks an impression could be red or round even if it existed all by itself.[29]

Shoemaker is also opposed to Hume in another way, which will be easier to appreciate if we first consider an objection to causal structuralism by Hawthorne along with Shoemaker's reply to it.

Hawthorne's objection is that causal structuralism identifies properties that should be recognized as distinct. To see this, let us first state causal structuralism by reference to Ramsey sentences. Let causal laws be written in the form *AnB*, meaning that having property A nomologically necessitates having property B. Now take the conjunction of all the laws and construct its Ramsey sentence: replace all property constants by variables and form the existential generalization that contains quantifiers for each of these variables. Finally, define each property as the property that satisfies the open sentence that results if you delete "its" quantifier (that is, the quantifier containing the variable that replaced the constant for that property). In effect, this is to define each property as the property that plays a certain causal or nomic role. It is a consequence of this style of definition that each property bears the causal

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[28] If Shoemaker made the Aristotelian assumption that properties exist only if instantiated, they would also fail the first test for intrinsicality, namely, that P is intrinsic only if something x could have P even if no individual beyond x existed. If it is essential to the property of being a proton that protons attract electrons, then the property of being a proton could not exist unless the property of being an electron existed, which implies together with the Aristotelian assumption that nothing could be a proton unless there were electrons.

[29] Given Hume's nominalism, though, it would not be quite right to say that he believes there are intrinsic properties.

relations it does to all other properties essentially: if A did not nomically necessitate B, A and B would not be the properties they are.

Suppose now that there is a world containing just four properties, A, B, C, and D, related by just three law, AnC, BnC, and (A&B)nD. Here A and B must be regarded as distinct properties, for as Hawthorne notes, "Their coinstantiation has different effects (the addition of D to the world) than is produced by either being instantiated alone" (224). But A and B have the same definition in terms of Ramsey sentences. A is defined as the property F such that ∃G∃H∃K[FnH & GnH & (F&G)nK]. B is defined as the property G such that ∃F∃H∃K[FnH & GnH & (F&G)nK]. By rewrite of bound variables, the second definiens is equivalent to 'the property F such that ∃G∃H∃K[GnH & FnH & (G&F)nK]', which is equivalent to the first definiens by commutation of conjuncts. So the two definitions define the same property,[30] and structuralism identifies properties that are intuitively distinct.

In a postscript to his article, Hawthorne notes that Shoemaker has said in reply that he had not envisioned defining properties in terms of Ramsey sentences in the manner described above. Instead, he proposes defining them as follows: Do not replace *all* property constants in the book of laws by variables, but only the constant A, the one you wish to define; in other words, do not go all the way to a Ramsey sentence, but stop with a "Shoemaker sentence." Then say 'A is the property V (a variable) such that VnC, BnC, and (V&B)nD. This does not merely say that A is the property that necessitates C and, along with some C necessitator, necessitates D; that would

[30] It is not necessary to maintain here the general intensionalist thesis that logically equivalent definitions always define the same property. It is only necessary to maintain that definitions equivalent by rewrite of bound variables and commutation of conjuncts define the same property. '∃y(x is the parent of y & x is male)' defines the same property of x as' ∃z(x is male & x is the parent of z)'—namely, the property of being a father.

be equally true of B. It says that A is the property that necessitates C and, *along with B*, necessitates D. That is not true of B, so the distinction between A and B has been upheld.

But notice at what cost. If we defined B in the same manner, we would say that B is the property V such that AnC, VnC, and (A&V)nD—defining B in terms of A. We are defining A as the property that (among other things) couples with B to produce D, and we are defining B as the property that (among other things) couples with A to produce D. By mentioning the properties in the definientia by name rather than simply referring to them by quantified variables, we are committing a circularity—precisely the circularity thoroughly Ramsified functional definitions are supposed to avoid. It is also precisely analogous to the circularity Hume complains of in the attempt to define solidity in terms of bodies and bodies in terms of solidity.[31]

So we need to come to grips with the question whether defining each of two properties in terms of the other is a vice. It must be conceded that such definitions considered simply as identities might be totally true—for instance, A might indeed be the property that couples with B to produce D while B is the property that couples with A to produce D. But given the larger purposes the definitions are meant to subserve, the circularity does turn out to be vicious.

In Hume's case, the definitions are essential routes to our understanding of the concepts defined. If we understand what bodies are, it is because we understand what solidity is, and if we understand what solidity is, it is because we understand what bodies are. It follows that we do not understand either concept. If we did, we would understand each because we understand the other, which violates the asymmetry of 'because'.

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[31] Above I characterized Hume's circle as defining solidity in terms of solidity, but this small circle follows from the larger circle (solidity in terms of bodies and bodies in terms of solidity) by transitivity.

In Shoemaker's case, the definitions are supposed to tell us what "makes a property the property it is." They are meant not merely to give us necessary truths about properties, but to give the essence of these properties in a more than merely modal sense—essence in a sense that might be spelled out by saying the property is the property it is *because* it is related thus and so to other properties. There is that 'because' again, which must needs be asymmetrical. So the circularity Shoemaker proposes, like the one Hume exposes, turns out to be vicious, and Hume's case for Humility stands against the challenge from Shoemaker.

4.4. Dispositional monism

Another view has gained adherents of late that would pose challenges as causal structuralism does to all three of Humean Humility, Russellian Monism, and Ramseyan Humility. It is defended by Alexander Bird under the title 'dispositional monism', and it is Bird's version I discuss here (Bird 2007).

To state Bird's view, we begin with two definitions. A property P is a *power* (or has a dispositional essence) iff there is a stimulus property S and a manifestation property M such that it is essential to P that anything that possesses P thereby possesses the disposition to manifest M in response to stimulus S (514). By contrast, P is *categorical* iff P has no dispositional essence; it confers dispositions on its possessors only by courtesy of contingent laws of nature (514). I shall sometimes refer to the dispositions conferred by properties on their possessors as dispositions of the properties themselves, as Bird often does, too.

Two "isms" may now be characterized. *Dispositional essentialism* is the view that some properties have dispositional essences; *dispositional monism* is the view that all properties do (515). Bird opposes dispositional monism to *quidditism*, which he characterizes as the view that

properties have primitive identities, taking this to imply the possibility of properties' switching their powers (515). The similarity to Lewis's quidditism will be obvious. Like causal structuralism, dispositional monism makes all laws of nature metaphysically necessary, at least if powers are the lawmakers for all laws.

To have a good foil for Hume, I am going to attribute to Bird a further assumption not explicit in the definitions given so far. (Later I will consider a less extreme way of understanding his view.) The assumption is this: a property is *exhausted* by its S-M dispositions; it is nothing in addition to them. There are several reasons for thinking this is in fact his view. First, he distinguishes his view from that of C.B. Martin, who holds that all properties have both a dispositional and a qualitative side.[32] Second, he tells us that according to dispositional essentialism, "the essence of a property is given by some dispositional characterization in terms of stimulus and manifestation conditions" (516). I find it telling that he says "*the* essence," not just an essential component, and "given by," not just "entailed by." In the same vein, he says, "Dispositional monism is the view that all there is to (the identity of) any property is a matter of its second-order relations to other properties" (527). Finally, under the assumption that a property is exhausted by its dispositions, the paper would earn its title: "The Regress of Pure Powers." He never says what 'pure' means, but a good guess is that a pure power is a property that is nothing but a power.

Since it says *all* properties, including stimulus and manifestation properties, have dispositional essences, Bird's view generates either an infinite regress or a circle, akin to the circle criticized by Hume in 1.4.4. The bulk of his paper is devoted to showing that the regress is

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[32] This consideration is not quite decisive, for as we see when we get to the second interpretation of Bird, he could hold that every property has a qualitative side that is necessarily bound up with its dispositions.

not vicious. He considers three features that other philosophers have found problematic about the regress: that it would make it impossible to know what properties things have, that it would deprive properties of all content or actuality, and that it would make the identity of any property depend on its relation to other properties in such a way as to leave its identity indeterminate. Hume's problem with the modern philosophy is not the first of these, but it may be assimilable to the second or the third. I shall say a bit about the second before discussing the third at length.

Bird gives several quotations giving voice to the "no content" objection, of which the pithiest is this from Foster, quoted on p. 520: "In the last analysis, there is nothing which the powers are powers to do."[33] I like to illustrate the difficulty by analogy with a problem that arises for Leibniz's thesis that every monad mirrors the universe. On some readings, Leibniz says that every state of any monad is nothing but a reflection of the states of other monads. That would be fine if there were nonreflective states to get things going, but not otherwise. Put a candle between two facing mirrors and you get reflections unto infinity—no problem; but put nothing between them and both mirrors remain blank.

I turn now to the third objection, the identity objection. Bird takes the best spokesman for it to be E.J. Lowe, who puts it as follows: "*no property can get its identity fixed*, because each property owes its identity to another" (quoted on p. 523). The question raised by this objection, Bird says, is whether the following thesis can be true:

S. The identity and distinctness of the elements of a set *e* of entities supervene on the instantiations of some relation R (or set of relations {R*i*}) on the elements of *e*.

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[33] In a similar vein, Keith Campbell writes as follows about Boscovichian theories of matter, which characterize material points as points that repel other material points: "We seem to be caught in a regress or circle, forever unable to say what these things are which have an effect on each other. . . . When one point moves another, all that has been shifted is a power to shift powers to shift . . . But powers to shift *what*?" (1976, 93).

That question in turn is equivalent to the question whether the following thesis is true:

> S*. The identity and distinctness of the vertices [or nodes] of a graph can supervene on the structure of that graph

where the structure of a graph is just the pattern of its edges. Bird says that is a simple question of graph theory, and that the answer is affirmative.[34]

Bird notes that the structure of a graph does not in all cases determine the identity of its nodes, but it does in some. Here is a case in which it does not:

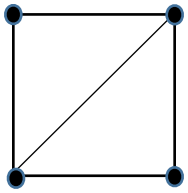
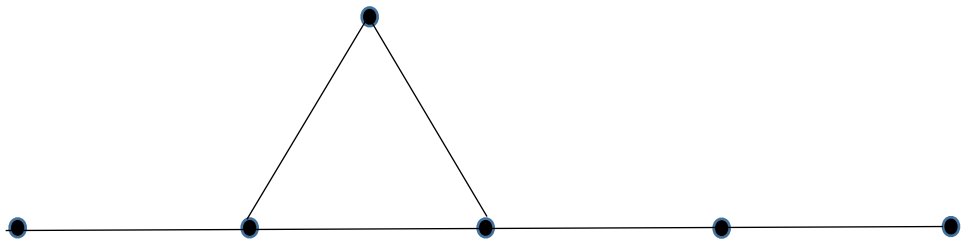


Figure 1

One could give a structural description of the upper right vertex by saying it is a point lying at the end of each of two sides and one diagonal. But that description applies equally well to the lower left vertex; it does not uniquely specify any vertex. Bird makes the point by noting that if the entire figure were rotated 180 degrees, its structure would remain the same, but a different point would now lie in the upper right corner.

In Figure 2, by contrast, each node is identified by its place in the structure:



[34] For the graph-theoretic reconstrual of the question he credits Dipert 1997.

Figure 2

Only one node in this structure (the leftmost one) is a node terminating just one edge and lying one step away from a vertex of a triangle; only one node is a triangle vertex with no edges leading from it except for sides of the triangle; and so on. Every node is uniquely specified by its place in the structure.

So is Bird right in claiming, contrary to Lowe, that items can have their identities determined simply by their relations among one another? It is true that in Figure 2, each point is the only point playing a certain structural role. But we can imagine other configurations like Figure 2 in which different points play the same roles. If we label the points in Figure 2 from left to right as a, b, c, d, e and the topmost point as f, then a world is possible in which b and f have changed places—or in which a similar structure is composed of entirely different points g through l. And that means that Bird has not illustrated his contention—that an item's relations to other items in a set can serve as a *transworld* identity condition for it (515). It is not true that anything in any world occupying the role of apex in a figure like Figure 2 must be point f.

Perhaps I am misunderstanding Bird's notion of structure, for he says things that imply he would deny that switching b and f would preserve structure. He says the structure of a graph is given by the pattern of all its edge relations—which nodes are connected to which others (528). Let's suppose that edge relations are represented by pairs of vertices; then the structure of the graph in Figure 2 would be given by the pairs (a,b), (b,c), (c,d), (d,e), (b,f), and (f,c).[35] If we

[35] These are not ordered pairs, for Bird has not yet introduced the condition that edge relations be directed.

switched b with f, the pair (a,b) would no longer be in the structure. It is arguable now that structure does determine the identity of each node, even across worlds.[36]

But look what we are doing! It is comparable to what is done in the move from Ramsey sentences to Shoemaker sentences in the attempt to define a given property—we are defining properties by their relations to other named properties, not simply by giving their places in a structural description. In effect, we are identifying properties or points by their relations to already identified properties or points.[37] We are not defending the possibility that identity may be determined by a network of relations among not-yet-identified relata.[38]

Bird's main point may be that there is nothing wrong with doing what Shoemaker does—and indeed there is no reason why a batch of Shoemaker sentences could not all be true. But it could not be claimed that they give a pattern of relations in which the identities of a group of properties are *grounded.*

The graphs we have considered so far illustrate the ways in which structure may or may not determine the identities of nodes, but they are not adequate for diagramming Bird's overall theory of powers. They do not accommodate directed relations, such as power P's being manifested in M but not vice versa, or three-term relations, such as P's being a disposition to give rise to M under stimulus S. To represent these and other features of property networks, Bird

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[36] The same was not true in Figure 1, where switching the two diagonal-terminating vertices would leave all pairs the same.

[37] In the terminology of McTaggart, we are giving each property an *exclusive* description (one applying to it alone), but not a *sufficient* description (an exclusive description in qualitative terms, not incorporating any reference to particular properties) (1921, chapter 11). (I am adapting what McTaggart says about substances to properties.)

[38] To reinforce this point, consider an attempt to Ramsify the definition or unique specification of a point in Figure 2. We may say "a is the point x such that for some points y, z, u, v, and w, x is directly joined to y, y is directly connected to z, etc., and no other pairs in the set are directly joined." But if a and b switched places, the same specification would now be satisfied by b. To get an exclusive description, we must say "a is the point that is directly joined to **b**," etc., Shoemaker style.

introduces several new graphing conventions. I call attention now to one scenario he diagrams and regards as possible, but which I regard as problematic. His Figure 10, which I do not reproduce here, diagrams a situation I would describe as follows (after labelling the top vertex in the triangle as A, the bottom left as B, and the bottom right C): A is the disposition to C when B; B is the disposition to A when C; and C is the disposition to A when B.

This scenario raises for me two puzzles. First, how can a disposition be triggered by a mere disposition? Bird's scheme seems to be one in which everything is potency and nothing is act—perhaps that was part of the "not enough actuality" objection. Second, the scheme also appears to be one in which there are molecular propositions, but no atomic propositions. A is the property of being such that if B, then C—that is, of being such that if (C → A), then (B → A)—that is, of being such that if ([B → A] → [B → C]), then ([C → A] → [B → A])—and so it goes *ad infinitum*. Every property unfolds into further properties (or sometimes into compound properties including itself again) in what seems to me an impossible way; I take it as axiomatic that the relation "is a proposition composed of propositions . . . and ___" is well-founded. Given that the arrows stand for nomic necessitation, we also get another strange result, namely, that the holding of some necessitation relations necessitates the holding of others.

In view of these difficulties, I propose to consider another interpretation of Bird, as promised above. I have been assuming so far that pure powers are exhausted by the dispositions they confer on their bearers—that there is nothing more to them than that. But there are some indications that Bird believes there *is* something more. I mention three.

First, Bird contrasts squareness with fragility. He says one can grasp what squareness is without associating any disposition with it, which makes it unlike fragility (514).

Second, he says powers are not reducible to counterfactuals (521).

Third, he says, "The pure powers view does not imply that all first-order properties are relational . . . . Rather, it asserts that . . . powers may have relational essences but none the less be intrinsic to their possessors" (528-29).

Perhaps the following gloss offered by Hawthorne of Shoemaker's amended view is applicable to the Bird of these remarks, whom I shall call Bird 2: "There are quiddities, though one can get a necessary and sufficient condition for being a particular quiddity in terms of its causal relations to other quiddities" (376). Of course, there would not be quiddities if quiddities are by definition capable of switching causal roles, but there would something to a property that goes beyond its causal role.

Shapes may be a case in point. Being round entails and is entailed by being disposed to roll downhill when released,[39] but it might be hyperintensionally distinct from that disposition, as suggested by Bird's remark that one can grasp a shape property without associating any disposition with it.

Or consider colors. Bird says, "Dispositional monism is the view that all there is to (the identity of) any property is a matter of its second-order relations to other properties" (527), which I quoted above in support of my initial interpretation of Bird. But this passage may be compatible with the Hawthorne gloss—"all there is" might mean not "there is nothing more," but "there is nothing not entailed by." Orange has a certain intrinsic nature, which is entailed by its

[39] Does the disposition really entail roundness? Eggs and wooden blocks also roll downhill when released. But perhaps this is not so if we construe rolling more narrowly to exclude wobbling and tumbling.

being (among other things) midway between red and yellow.[40] Such relations among properties do not exhaust their natures, for they reveal or bestow an intrinsic nature on some properties only if others already have an intrinsic nature. And if some colors are what they are in virtue of their natures rather than their relations, the same is arguably true of all. It would be weird if red alone were the intrinsic anchor for everything else in the spectrum.

For Bird, of course, it is not only relations like 'darker than' that entail and are entailed by the natures of colors. The same is true of nomic relations, such as *soothes the soul* and *makes bulls charge*.

To sum up, we have considered two versions of dispositional monism, which I shall call Bird 1 and Bird 2. According to both, a property's relations to other properties, especially the powers or dispositions it confers to do this when that, are essential to and determinative of it. According to Bird 1, this is because there is nothing to a property but such dispositions. According to Bird 2, there is something more, but it entails and is entailed by these dispositions. Analogy: if a fly and a bee are trapped in a spider's web in such a way that they cannot trade places, this might be because each insect is nothing more than an intersection of strands, or it might be because each insect is a substantial something of which the intersecting strands form part of the essence.

I now consider the bearing of Bird 1 and Bird 2 on our three doctrines.

The key tenet of Russellian Monism is that although physics tells us only of the relational and dispositional properties of things, there must be more to things than this—they must have intrinsic properties and categorical properties. Bird 1 challenges the key tenet, countenancing

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[40] Relations such as 'midway between' and 'darker than' are relations of the sort Hume says cannot change without a change in their relata (T 1.3.1.1). We are now adding the converse—the relata cannot change without a change in the relations. In saying these things, we take no stand on whether the qualities ground the relations or vice versa. It might be more in the spirit of Bird's view to say that the relations ground the qualities.

after all the possibility that structure might be all there is. Bird 2, however, is completely consistent with Russellian Monism. Bird 2 is even consistent with the panpsychist variety of Russellian Monism, in which some of the intrinsic properties are psychical.

A key tenet of Ramseyan Humility is the conjunction of combinatorialism with quidditism—there are pairs of intrinsic properties that could be swapped with each other so as to yield a new possible state of things. Bird 1 and Bird 2 both challenge this conjunctive claim. Perhaps it is possible to factor the challenge, dispositional essentialism questioning that switches are possible and dispositional monism saying that even if they were, the result of the swap would be the same as what you started with.

A key premise of Humean Humility is that if we can understand two properties only in terms of their relations to each other, we do not really understand either one. Bird 1 can be seen as challenging this premise, at least if we make certain assumptions about the relation of understanding to content and identity. Bird 1 allows that two or more properties can each have their identities in virtue of their relations to one another; if knowing these relations gave us knowledge of the identities, and if that in turn were sufficient for understanding or having ideas of the properties, Bird 1 would undercut Hume's premise. Moreover, if to understand a property is to understand its content, then Bird 1's reply to the "no content" objection would remove a problem with understanding things by their mutual relations.

Bird 2 does not constitute a similar challenge to Hume, since the quiddity it allows at the core of any property might be something we can grasp without having to conceive the other properties with which it is necessarily connected. But in claiming that the intrinsic core necessarily brings with it certain causal relationships, Bird 2 does contradict two other fundamental tenets of

Hume's philosophy—that whatever is conceivable is possible, and that in consequence of this, all causal relationships are contingent. Who is right on this score is something I do not try to settle here.

In sum, Bird 1 calls into question all three of the doctrines under discussion in this paper, but we have found Bird 1 to be a dubious doctrine. Bird 2, which is the more plausible of the two, calls Ramseyan Humility into question, but leaves Humean Humility and Russellian Monism untouched. Humean Humility and Russellian Monism are not contradicted by any plausible version of dispositional monism.

4.5. Naïve realism

If a world in which bodies have none but the primary qualities is inconceivable, why not deal with the difficulty by attributing secondary qualities to bodies after all? That is the naïve realist's way—grass is green, stones are hard, and snow is cold.[41] In fact, the first time I read 1.4.4, I thought that was the conclusion Hume was insinuating—that we should give up the modern philosophy in favor of the views of the vulgar. But going against this reading is his declaration that the arguments for the modern philosophy are "as satisfactory as can possibly be imagin'd" (T 1.4.4.4).

Early Armstrong (1961) also responded to the conundrums of the scientific world view by suggesting that colors and perhaps other secondary qualities might be the intrinsic properties missing from the scientific world view. On this suggestion, Pereboom comments: "But the idea that these are the missing absolute intrinsic properties does not seem plausible, mainly for the

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[41] This is how Russell epitomizes naïve realism in Russell 1940, p. 13. When they call grass green, naïve realists do not mean that it reflects light waves that give us green qualia; they mean that it is *sensuously* green—as green as any quale.

Naïve realism in this sense is distinct from direct realism, though often combined with it. Direct realists say we perceive external things directly, not just by way of sensing sense data or other proxies.

reason that they have been dismissed from our scientific picture of reality since the seventeenth century" (313).

Well, what are the reasons for this dismissal? Here is Berkeley's statement of the style of argument Hume approves of, giving a list of phenomena very like those Hume gives at 1.4.2.45 and 1.4.4.3:

> The point will be past all doubt, if you consider, that in case colors were real properties or affections inherent in external bodies, they could admit of no alteration, without some change wrought in the very bodies themselves: but is it not evident from what has been said, that upon the use of microscopes, upon a change happening in the humors of the eye, or a variation of distance, without any manner of real alteration in the thing itself, the colors of any object are either changed, or totally disappear? Nay, all other circumstances remaining the same, change but the situation of some objects, and they shall present different colors to the eye. (First Dialogue between Hylas and Philonous, 1975, 147)

The implied conclusion (and the point that is supposed to be put past all doubt) is that colors are not properties inherent in external bodies.

One possible reply is that the only conclusion that follows from the premises is that colors are not inherent in external bodies *alone.* They could be "accidents with a leg in each of two subjects," that is, relations between bodies and perceivers. Such is the line taken by Thomas Reid in the case of some attributes, such as visible magnitude, which he took to be a relation between objects and the position of the perceiver's eye (Van Cleve, 65-69). It is also a view entertained about colors by C.D. Broad under the name "the Theory of Multiple Inherence" (1925, 160ff.). But this reply just gives us further relations, though now relations with perceivers or perspectives as one relatum; it would not help in the project of uncovering the intrinsic properties of matter.

Another possible reply—and one more deserving of the name naïve realism—is to say that the mountain that looks blue from afar and green close up is really green all along. There are privileged distances or conditions under which things are seen as having their true colors. This is the suggestion Berkeley dismisses with the following supposedly rhetorical question from Philonous:

> I would fain know farther from you, what certain distance and position of the object, what peculiar texture and formation of the eye, what degree or kind of light is necessary for ascertaining that true colour, and distinguishing it from apparent ones (1975, 176).

Hume takes a different tack with the naïve realist. In his version of the argument, we reach the intermediate conclusion that not *all* the impressions produced in us by an object—the blue ones produced at a distance, say, as well as the green ones produced close up—can resemble some quality in the unchanging object itself. We then proceed to the final conclusion with the help of a lemma:

> Now from like effects we presume like causes. Many of the impressions of colour, sound, etc., are confest to be nothing but internal existences, and to arise from causes, which no way resemble them. These impressions are in appearance nothing different from the other impressions of colours, sound, etc. We conclude, therefore, that they are all of them, deriv'd from a like origin. (T 1.4.4.4)

From like causes, we get like effects is analytic for Hume, following from his first definition of cause (T 1.3.14.31). Its converse, *like effects have like causes*, is not analytic, but it is nonetheless one of Hume's "rules by which to judge of causes and effects" (T 1.3.15.4). It is a rule that must be stated carefully if it is not to have absurd consequences. Bananas are like apples in being fruits, but they are not produced by apple seeds. I believe it would be hard to set a level of generic resemblance in effects that requires a comparable level of resemblance in their causes.

Hume's argument presupposes that we do not perceive external things or qualities directly; we only perceive internal impressions, which we presume to be caused by external things resembling them.[42] He then points out that there are many cases in which we get impressions with incompatible qualities from an object we suppose constant—I get blue impressions when still far away from the mountain and green ones when close up; the mango tastes sweet to me and sour or no way at all to the diseased person, and so on. It follows that not all the impressions produced by an object resemble it. But all these impressions are at some level "in appearance nothing different" from each other; they are like enough that we can apply the rule that like effects have like causes, warranting the conclusion that if some of the impressions have causes that do not resemble them, the same must be true of all.

It will be apparent that Hume's argument requires a delicate balancing act. The impressions it concerns must be different enough that not all of them resemble their external cause, but like enough that if some of them fail to resemble their external cause, so do all.

I have three comments about the argument.

First, there is a gap in it. For all it shows, there might be external things that are blue and green and sweet and sour—so long as these things are not involved in causal chains leading to impressions with these qualities.

Second, the same argument could be given to show that external things do not possess any of the primary qualities, either. The tennis court that produces a rectangular impression to a person overhead produces a trapezoidal impression to a person viewing it from behind the baseline, despite no change in the court. This is a point for which Berkeley is famous, and Hume knew

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[42] One of his few arguments against the direct perception of external things occurs in the *Enquiry Concerning Human Understanding*, section 12.1 (p. 104 in 1977).

about it. But he does not press the point at all. His complaint about the modern philosophy is not that it inconsistently retains primary qualities while banishing secondary qualities, but that it promotes a view of the external world that we cannot comprehend.

Third, and most damagingly, the argument would prove things that Hume is far from wanting to hold. Consider the sensation as of pain in one's hand produced in someone whose arm has been amputated, but who still experiences a phantom limb. His pain is caused by nerve impulses coming from somewhere other than his hand.[43] I might have a pain that feels just the same way, but which is produced in my case (may we not assume?) by events in my hand. By Hume's principle that like effects have like causes, however, we may *not* assume that; since the amputee's pain is not caused by anything in his hand, my pain is not caused by anything in my hand. More drastically, since hallucinators sometimes have impressions with no extra-bodily causes whatever, then to the extent that all of our impressions are in some generic way like those of the hallucinator, none of them can have causes lying outside our own brains.

Hume is famously a skeptic about any inference we draw from internal impressions to external causes.[44] But he does not declare that *there are no* external causes. His position is agnosticism, not atheism. But an atheist is what he must be if he accepts the principle that like effects have like causes.

In sum, the argument for banishing secondary qualities from the external world is *not* "as satisfactory as can possibly be imagin'd." Attributing naïve colors or something analogous to

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[43] Where do they come from? According to the explanation of phantom pain discovered by V.S. Ramachandran, the extra-cortical nerve cause of pain felt in an amputated hand lies not in the stump (as Descartes conjectured), but in the subject's face and jaw! (Ramachandran and Blakeslee 1998).

[44] See T 1.4.2.47 and *Enquiry*, section 12.1 (p. 105 in 1977).

them to external things remains a way of remedying the defects in the scientific conception of the world—a way quite in the spirit of Russellian Monism.

5. Bodies and Places

The Humean problematic for providing an adequate conception of bodies is sometimes put in the form of a challenge: tell us how a body differs from empty space! After all, both are extended, so what besides extension is requisite for bodies? Descartes's answer is *nothing*—to be a body is simply to be extended, so there is no distinction between matter and space. As an easy corollary, a vacuum is impossible.[45] But non-Cartesians need to find a further differentiating feature, and they often insist on impenetrability.

Their answer cannot stop there. Bodies are not absolutely impenetrable, or penetrable by nothing whatsoever, since they are penetrable by places—that is what happens when a body occupies a place. It penetrates the place, and the penetration is mutual.[46]

The obvious corrective is to say that bodies are the things that cannot penetrate *each other*—a body is something that resists penetration by other bodies. But that answer immediately draws the reproach of Hume and the contemporary Humeans we have discussed above, like Campbell:

> When one point moves another, all that has been shifted is a power to shift powers to shift.... But powers to shift *what*? (Campbell, 93).

If we can understand what bodies are only in terms of their relation to bodies, we cannot understand the notion at all.[47]

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[45] *Principles of Philosophy*, Part 2, sections 16-18; pp. 195-97 in 1988.

[46] In the philosophy of Henry More, bodies are also penetrated by souls, which are extended but otherwise immaterial entities; see Davidson 2018 for further exposition. I suppose anyone who believes a statue is distinct from the clay of which it is composed also believes that bodies are penetrable by alien entities of a sort.

[47] Here is one more example to make the case: characterizing bodies as things impenetrable by bodies is like characterizing pink eye as something that gives other people pink eye, with no mention even of the pink!

The appearance of circularity can be mitigated if we phrase our definition as follows, echoing Reid from section 4.2 on straight lines: x and y are both bodies iff x and y cannot penetrate each other. But that definition still fails to state a condition uniquely satisfied by bodies, since it is likewise true that two *places* cannot penetrate each other.

Why is it impossible for two places to penetrate each other? A first answer is that one place cannot move into the place of another because places cannot move at all. That answer is not dispositive, though, since it leaves open the possibility that two places might *always* have occupied the same place without either of them having moved to do so. A better answer is provided by the dictum that a place is its own place. That is, if x is a place occupying place y, then x *is* y. This dictum explains at one stroke why places cannot move and why there cannot be two of them in the same place. Since motion is change of place, a place could move only by changing its identity, which nothing can do. And if x and z were places both occupying place y, x and z would each be identical with y and thus with each other—so you never get two places in the same place.

So how now are we to distinguish bodies from places, given that both are impenetrable by other things of their own kind? We could begin with the following Ramsey sentence, embodying some of the key things we know about bodies and places:[48]

> ∃F∃G(Fs are mutually impenetrable & Gs are mutually impenetrable & Fs and Gs are mutually penetrable & every F occupies a G distinct from itself & every G occupies itself and nothing else).

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[48] I have not "Ramsified out" every relation in this sentence, leaving the relations of occupancy and penetrability there in their own guises, but being more thoroughgoing about it would only exacerbate the problems I am about to raise.

We could then go on to define bodies as the items playing the F role in the formula above and places as the items playing the G role. That is,

> Being a body =df the property F such that ∃G(Fs are mutually impenetrable & Gs are mutually impenetrable & Fs and Gs are mutually penetrable & every F occupies a G distinct from itself & every G occupies itself and nothing else).
>
> Being a place =df the property G such that ∃F(Fs are mutually impenetrable & Gs are mutually impenetrable, & Fs and Gs are mutually penetrable & every F occupies a G distinct from itself & every G occupies itself and nothing else)

For short, bodies are the other-(kind)-occupying mutual impenetrables and places are the self-occupying mutual impenetrables. To this we could add as a further differentiating feature that bodies can move (undergo change of place) while places cannot.

A more realistic Ramsey sentence for bodies and places would relate the F and G property variables to constants for observable properties as well, enabling the sentence to be confirmed by finding true its observable consequences. At this point we must stop and ask whether the fuller theory would be susceptible to Lewis's argument for Ramseyan Humility. I cannot see why not. For could we not envision a permutation under which bodies and places switch roles, bodies now being the self-occupying receptacles of foreign entities and places being the things that occupy those receptacles? And would this permutation not be distinct from what we started with? Yet it would have the same empirical consequences as the original, and so by Lewis's argument we could not know that one rather than the other of the possibilities obtained. We could not know whether it is bodies that occupy places or vice versa.

I said above that Humean Humility is a form of conceptual skepticism, a thesis about our inability to form an adequate conception of what bodies are, whereas Lewis's Ramseyan Humility is a form of knowledge skepticism, a thesis about our inability to know which

properties play the roles specified in our theories. I cannot help feeling, though, that if Lewis's epistemic skepticism were correct, our grasp on what bodies and places are would be diminished.

6. Conclusion

"If the world is as described by the modern philosophy (or in a way not going beyond what physics has to tell us), we cannot conceive of it." I side with Hume and the Russellian Monists —and against causal structuralists and dispositional monists—in affirming that conditional statement. But having affirmed it, should we go on to affirm the antecedent or deny it? Here I side with the Russellian Monists against Hume—the world cannot be merely as described by physics; its constituents must have some intrinsic properties. Perhaps these intrinsic properties are analogous to colors as naïvely conceived, Hume's arguments to the contrary notwithstanding. As for Ramseyan Humility, I have defended it against causal structuralists and dispositional monists, but raised doubts concerning its implications for the difference between bodies and places.

APPENDIX 1: A THIRD SENSE OF CONCEIVABILITY AND INCONCEIVABILITY

I said in the text that Hume has one notion of conceivability and inconceivability that applies just to single ideas (I can conceive of the color red; a blind person cannot) and another that applies to propositions or relations of ideas and is a test of their possibility or impossibility (I can conceive of there being a golden mountain, and I conclude to the possibility of it; I cannot conceive of there being a mountain with no adjacent valley, and I conclude to the impossibility of it). I now

call attention to a third notion of conceivability and inconceivability, which Hume unfortunately does not distinguish from the second.

The distinction may be illustrated by an excursus into Descartes. Descartes's argument for mind-body dualism starts from the premise that he can conceive of his mind apart from his body, or of his existing apart from his body's existing. The phrase "I can conceive of A without B" is ambiguous. It can mean either

(1) I can conceive of A without conceiving of B

or

(2) I can conceive of the combination A-without-B, i.e., A & ~B.

Arnauld took Descartes to be arguing from a premise like (1), perhaps 'I can conceive that I exist without conceiving that my body exists.' He then objected that from this premise, it does not follow that I could exist even though my body did not. He offered this counterexample: someone might clearly and distinctly perceive that a given triangle is a right triangle (perhaps because he sees that it is inscribed in a semicircle) without clearly and distinctly perceiving that its hypotenuse is equal to the sum of the squares of its other two sides; but this surely does not show that a right triangle might fail to obey the Pythagorean theorem.

Here is the best thing Descartes said in reply:

> True, that triangle may indeed be apprehended although there is no thought of the ratio prevailing between the squares on the base and sides; but we can never think that this ratio must be denied. It is quite otherwise in the case of the mind where, not only do we understand that it exists apart from the body, but also that all the attributes of body may be denied of it. (Descartes 1911, 102).

Descartes is saying that Arnauld has misconstrued his starting point, which is of form (2) rather than form (1). Arnauld's counterexample is a counterexample to a possibility conclusion drawn

from (1), but Descartes's actual argument is an argument to a possibility conclusion drawn from (2). To that, Descartes says, there is no similar counterexample. I have explained all this at greater length in Van Cleve 1983.

Similar points apply to the *in*conceivability of A without B. It could mean that no one can conceive of there being a case of (A & ~B), or it could mean that no one can conceive of A without also conceiving of B. One might call the first single-occurrence pattern (the verb 'conceive' appearing only once) and the second the double-occurrence pattern (the verb 'conceiving' appearing twice).

Now when Hume speaks of the conceivability or not of one thing apart from another, what does he mean? Unfortunately, he is not sensitive to the distinction; his language sometimes follows one pattern, sometimes the other, and his arguments sometimes use one where the other is what he needs. For example, consider Hume's argument in T 1.3.3.3 that it cannot be a necessary or demonstrable truth that every event has a cause—in other words, that it is possible that some event happens without any cause. What he needs as a premise is that he can conceive of an event E's occurring without any cause, that is, he can conceive that (E occurs & no cause C of E occurs). That is the single-occurrence pattern. What he offers as a premise instead is something with the double-occurrence pattern: that for any C, he can conceive of E's occurring without conceiving of C's occurring. That does not show that E might happen without C, let alone that E might happen without any cause at all.

In T 1.4.4, however, it is a good and essential thing that Hume is operating with the double-occurrence pattern. It would not be enough for him to claim

We cannot conceive that anything is a body without its being solid

and

We cannot conceive that anything is solid without its excluding other bodies

That would only show that *bodies are solid* and *solid things exclude other bodies* are both necessary truths. He needs to use, and does use, the double-occurrence pattern:

We cannot conceive of anything as a body except by conceiving of it as solid

and

We cannot conceive of anything as solid except by conceiving of it as excluding other bodies.

With the asymmetry presumption noted in the text, those claims yield Humean Humility—we cannot really conceive of bodies at all.

APPENDIX 2: IMPENETRABILITY AS THE IMPOSSIBILITY OF ANNHIHILATION

T 1.4.4.11 gives a supplementary argument for Hume's premise that to conceive of something as impenetrable, one must have some manner of conceiving the other bodies by which the thing is impenetrable. It involves the equation "impenetrability is nothing, but an impossibility of annihilation," which at first seems quite puzzling. To explain the equation, we must go back (as Hume directs us) to 1.2.4, in particular to paragraphs 4-7.

There Hume considers the following objection to his indivisible minima, which are supposed to form extended things by their contiguity: if two such came to touch, each would touch the other in every part of its being, which is to say they would penetrate each other. Hume claims to answer the objection "by substituting a juster idea of penetration" (T 1.2.4.5). Suppose we see a red dot approach a blue dot. As soon as it touches the blue dot, it begins to disappear, as in an

eclipse. We may think that it has penetrated the blue dot, maintaining its identity within the boundaries of the blue dot. But what has really happened, says Hume, is that the red dot has been annihilated. That is his "juster idea" of penetration—it is the annihilation of one body upon its approach to another.

What is confusing is that Hume calls this a "juster idea" of penetration when it is not an idea of penetration at all. It is an account of what is really going on when there *appears* to be penetration, Hume being convinced that real penetration never happens. Calling the new phenomenon penetration, he can then say two minima need not interpenetrate when they come to touch each other because neither need be annihilated as it approaches the other. In my view, the original objection—that partless entities could not touch without penetrating in the *real* sense—remains unanswered.

Anyhow, we can now see where the puzzling equation at 1.4.4.11 comes from. According to 1.2.4.5, a thing is penetrated (in Hume's supposedly "juster" sense) when things that approach it get annihilated; therefore, a thing is impenetrable when it is impossible for things that approach it to be annihilated. That is the sense in which impenetrability is the impossibility of annihilation.

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