

## DISCUSSIONS

# LAW NECESSITARIANISM AND THE IMPORTANCE OF BEING INTUITIVE

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*The counter-intuitive implications of law necessitarianism pose a far more serious threat than its proponents recognize. Law necessitarians are committed to scientific essentialism, the thesis that there are metaphysically necessary truths which can be known only a posteriori. The most frequently cited arguments for this position rely on modal intuitions. Rejection of intuition thus threatens to undermine it. I consider ways in which law necessitarians might try to defend scientific essentialism without invoking intuition. I then consider ways in which law necessitarians who accept the general reliability of intuition might try to explain away the intuitions which conflict with their theory.*

### I. INTRODUCTION

Law necessitarians hold that many, if not all, of the laws of nature are metaphysically necessary.<sup>1</sup> They are typically quite casual about the counter-intuitive implications of the theory, frequently responding to the problem only by pointing out that our modal judgements have been known to be mistaken in related cases, and denying that the fact that the laws *seem* contingent can be used to establish that

<sup>1</sup> Proponents of law necessitarianism include S. Shoemaker, 'Causality and Properties', in P. van Inwagen (ed.), *Time and Cause* (Dordrecht: Reidel, 1980), pp. 109–35, and 'Causal and Metaphysical Necessity', *Pacific Philosophical Quarterly*, 79 (1998), pp. 59–77; C. Swoyer, 'The Nature of Natural Laws', *Australasian Journal of Philosophy*, 60 (1982), pp. 203–23; M. Tweedale, 'Universals and Laws of Nature', *Philosophical Topics* 13 (1982), pp. 25–44, and 'Armstrong on Determinable and Substantial Universals', in R.J. Bogdan (ed.), *D.M. Armstrong* (Dordrecht: Reidel, 1984), pp. 171–89; E. Fales, 'Are Causal Laws Contingent?', in J. Bacon *et al.* (eds), *Ontology, Causality and Mind* (Cambridge UP, 1993), pp. 121–51; C. Elder, 'Laws, Natures, and Contingent Necessities', *Philosophy and Phenomenological Research*, 54 (1994), pp. 649–67, and *Real Natures and Familiar Objects* (MIT Press, 2004); B. Ellis, 'Causal Powers and Laws of Nature', in H. Sankey (ed.), *Causation and the Laws of Nature* (Dordrecht: Kluwer, 1999), pp. 19–34, and 'Causal Laws and Singular Causation', *Philosophy and Phenomenological Research*, 61 (2000), pp. 329–51; C.B. Martin and J. Heil, 'The Ontological Turn', *Midwest Studies in Philosophy*, 23 (1999), pp. 34–60; A. Bird, 'Necessarily, Salt Dissolves in Water', *Analysis*, 61 (2001), pp. 267–74, 'On Whether Some Laws are Necessary', *Analysis*, 62 (2002), pp. 257–70, and 'Strong Necessitarianism: the Nomological Identity of Possible Worlds', *Ratio*, 27 (2004), pp. 256–76.

they are indeed contingent.<sup>2</sup> But the counter-intuitive implications of law necessitarianism pose a far more serious threat than its proponents seem to recognize. This is because law necessitarians are committed to the truth of scientific essentialism – the thesis that there are metaphysically necessary truths which can be known only *a posteriori*.<sup>3</sup> Yet the most frequently cited arguments for scientific essentialism rely crucially on modal intuitions. The casual rejection of intuition thus threatens to undermine any reasons that the law necessitarian could have for supposing that there are *a posteriori* necessities.

Law necessitarianism faces a dilemma. On the first horn of the dilemma, law necessitarians maintain that intuition is an unreliable source of modal knowledge, thereby escaping the apparent contingency objection (i.e., that it is intuitively possible for the laws to have been different); but in doing so, they leave themselves in the dialectically unstable position of not being able to accept the arguments that were used to establish scientific essentialism. On the second horn, law necessitarians accept that intuition is generally reliable, and they embrace scientific essentialism on the basis of the standard intuition-based arguments, but they are now vulnerable to the apparent contingency objection. I shall consider a number of different ways in which law necessitarians might try to occupy the horns of this dilemma. I do not intend to adjudicate the dispute between law necessitarians and contingentists. My intention is rather to show that law necessitarians must take the apparent contingency objection more seriously than they have, and that the dispute over the modal status of the laws of nature must be settled largely on *a priori* grounds.

## II. ARGUING FOR SCIENTIFIC ESSENTIALISM

In so far as they are not making the wild claim that the laws can be known *a priori*, law necessitarians are committed to scientific essentialism. But why should anyone accept scientific essentialism? For one thing, if a proposition could not have failed to be true, why should there have to be any kind of empirical investigation in order to determine that it is true in this world? It is natural (even if ultimately mistaken) to suppose that the function of empirical investigation is to rule out possibilities; but if a proposition is necessary, there simply are no other possibilities to rule out!<sup>4</sup> Furthermore, scientific essentialism carries with it a number of problems, not least the troublesome anti-individualist result that ‘meaning ain’t in the head’.<sup>5</sup> So if we are to accept scientific essentialism, there had better be a good reason.

<sup>2</sup> E.g., Shoemaker, ‘Causality and Properties’, pp. 131–2, and ‘Causal and Metaphysical Necessity’, pp. 72–5; Swyer, pp. 209–10; Ellis, ‘Causal Powers’, p. 29, and ‘Causal Laws’, p. 337; Bird, ‘Necessarily, Salt Dissolves in Water’, p. 274, and ‘On Whether Some Laws are Necessary’, p. 258.

<sup>3</sup> Here I follow George Bealer’s original use of ‘scientific essentialism’, which is neutral with respect to which *a posteriori* claims are necessary: see G. Bealer, ‘The Philosophical Limits of Scientific Essentialism’, *Philosophical Perspectives*, 1 (1987), pp. 289–365, at p. 291. Contrast Ellis, ‘Causal Powers’, p. 20.

<sup>4</sup> See P. Tichý, ‘Kripke on Necessity *A Posteriori*’, *Philosophical Studies*, 43 (1983), pp. 225–41.

<sup>5</sup> See H. Putnam, ‘The Meaning of “Meaning”’, repr. in his *Mind, Language and Reality* (Cambridge UP, 1975), pp. 215–71.

I am convinced that there *is* good reason to accept scientific essentialism, namely, Kripke's demonstration that members of natural kinds have certain of their micro-physical features essentially. However, Kripke's argument that (for instance) water necessarily contains H<sub>2</sub>O is just that *we would not say* that something is water unless it contains H<sub>2</sub>O:

If there were a substance ... which had a completely different atomic structure from that of water, but resembled water in [its macroscopic properties], would we say that some water wasn't H<sub>2</sub>O? I think not. We would say instead that just as there is a fool's gold there could be a fool's water; a substance which ... would not in fact be water.<sup>6</sup>

But why care about 'what we would say'? Why is this a good argument? It can only be because these are intuition reports, and intuition is good evidence as to what is or is not possible. Consequently this argument is available only to those who accept that intuition is reliable evidence; those who think that intuition is unreliable will have to find some other reason for accepting scientific essentialism.<sup>7</sup> This dialectical requirement seems to have been neglected by many law necessitarians, who help themselves to Kripke's arguments for scientific essentialism with one hand while disparaging traditional *a priori* methods with the other.<sup>8</sup>

It will be useful for what follows to set out a representative example of the sort of apparent contingency that law necessitarians will be required to explain away. Many people (even many law necessitarians) report having the intuition that there could have been electrons with a charge that is ever so slightly different from that of actual electrons. (This is not to say that it is intuitively possible for electrons to have had just any charge whatsoever nor that it is possible for any existing electrons to have had, or to come to have, a different charge.) It is a law of nature that the presence of an electron causes all other electrons at distance  $r$  to be repelled with a force of  $2.3 \times 10^{-28}/r^2$  newtons (the result of plugging the actual charge of electrons,  $-1.6 \times 10^{-19}$  coulombs, into Coulomb's law  $F = kpq/r^2$ , where  $p$  and  $q$  are the charges of the interacting particles and  $k$  is  $9 \times 10^9 \text{ Nm}^2/\text{c}^2$ ). But were electrons to have a different charge, of (say)  $-1.7 \times 10^{-19}$  coulombs, the law governing their interaction would be different: they would exert a force on one another of  $2.6 \times 10^{-28}/r^2$  newtons (the result of plugging this counterfactual charge into Coulomb's law). Since, intuitively, it is possible for there to be electrons with this charge, it would likewise be possible for it to be this other law which governs their behaviour. Hence the aforementioned law would be contingent.

(Several law necessitarian authors defend only the restricted thesis that the actual laws obtain in all worlds that contain the same kinds of things as our world.

<sup>6</sup> S. Kripke, *Naming and Necessity* (Harvard UP, 1980), p. 128. There is a widespread misconception that the rigidity of 'water' plays a substantive role in Kripke's argument that water necessarily contains H<sub>2</sub>O. See §III below for a discussion of a possible non-intuition-based argument from rigidity.

<sup>7</sup> See A. Sidelle, 'On the Metaphysical Contingency of Causal Laws', in T.S. Gendler and J. Hawthorne (eds), *Conceivability and Possibility* (Oxford UP, 2002), pp. 309–36, at p. 311.

<sup>8</sup> Here I have in mind Shoemaker, 'Causality and Properties', p. 124, and 'Causal and Metaphysical Necessity', pp. 61, 74; Swoyer, p. 210; Bird, 'Necessarily, Salt Dissolves in Water', pp. 267, 270, and 'On Whether Some Laws are Necessary', p. 258.

Depending on how fine-grainedly one understands ‘same kinds’, the law in question may or may not fall outside the scope of this restricted thesis. Supposing that it does, this of course does not excuse the law necessitarian from having to explain away any other apparent contingencies that come out necessary on this weaker law-necessitarian thesis.)

### III. FIRST HORN: INTUITION IS UNRELIABLE

Proponents of law necessitarianism frequently dispute the reliability of imagination and conceivability as tests for possibility, and this suggests that they might opt for the first horn of the dilemma, maintaining that intuition is likewise an unreliable means of determining what is or is not possible.<sup>9</sup> The law necessitarian who chooses this horn must provide some alternative defence of scientific essentialism, for as I have pointed out, one cannot appeal to Kripke’s arguments while at the same time denying the evidential status of intuition. I shall consider a variety of ways in which one might try to establish scientific essentialism without appeal to intuition.

*Rigidity, Identity, and Direct Reference.* The law necessitarian who wishes to occupy this horn of the dilemma might suggest that in order to establish scientific essentialism, one need only establish the truth of theoretical identity sentences (e.g., ‘water = H<sub>2</sub>O’) in which the identity sign is flanked by rigid designators. But even supposing that the machinery of rigid designation can be extended to general terms like ‘water’ and ‘electron’,<sup>10</sup> how is one to determine which are rigid and which are not? An expression is rigid if and only if it denotes its actual referent(s) (if it denotes anything) with respect to all worlds. Does ‘electron’ denote, with respect to all worlds, all and only the electrons in those worlds? This question cannot be answered without first settling (i) what (if anything) ‘electron’ denotes with respect to worlds containing electron-sized particles with a charge of  $-1.7 \times 10^{-19}$  coulombs, and (ii) what (if anything) is an electron in such worlds. And these questions in turn cannot be answered without consulting our modal intuitions.

Likewise, law necessitarians who reject the evidential force of intuition may not appeal to a direct reference theory of proper names or natural kinds in defence of scientific essentialism. The standard Kripkean arguments which are invoked in support of direct reference theory are themselves intuition-based – on the intuition that Aristotle might not have been the teacher of Alexander, that Hesperus might not have been the first star visible in the evening, and so forth – and there are (as far as I know) no non-intuition-based arguments for direct reference theory. (Were direct

<sup>9</sup> See fn. 2 above. I shall not dwell upon the differences between imaginability, conceivability and intuition, as this issue has received detailed treatment elsewhere: see, e.g., P. Tidman, ‘Conceivability as a Test for Possibility’, *American Philosophical Quarterly*, 31 (1994), pp. 297–309; Bealer, ‘Modal Epistemology and the Rationalist Renaissance’, in Gendler and Hawthorne (eds), *Conceivability and Possibility*, pp. 71–125, at pp. 73–7. I focus on intuition because this is what it is that drives the Kripkean arguments for scientific essentialism and poses the most serious threat to law necessitarianism.

<sup>10</sup> Scott Soames, in his *Beyond Rigidity* (Oxford UP, 2002), pp. 241–63, argues that the notion of rigidity cannot sensibly be applied to natural-kind terms.

reference theory not backed by these powerful intuitive considerations, it would probably be unable to bear the weight of its implausible commitments with regard to belief ascription and *a priori* knowledge.)

*Natural-Kind Identities.* The related suggestion, that in order to establish scientific essentialism one need only establish the truth of theoretical identity sentences involving natural-kind terms, faces a similar problem. If 'natural kinds' (which, after all, is a term of art) is taken to mean kinds that *by definition* have their microphysical properties essentially, then one has only postponed the original question, for on the indicated reading of 'natural kinds', how is one to tell which kinds are *natural* kinds, if not by intuition? On the other hand, one might adopt some non-tendentious reading of 'natural kinds' on which they are (say) those kinds whose members share a particular chemical constitution, or 'objective' kinds 'which exist in nature independently of our classificatory systems',<sup>11</sup> or fundamental physical kinds. But in that case there appears to be no way to tell *which* (if any) of its features a natural kind has essentially, apart from consulting one's intuitions. Thus this strategy cannot help the law necessitarian who denies that intuition is generally reliable.

*Division of Linguistic Labour.* Alternatively, a law necessitarian might, on the basis of Putnam's thesis that there is a division of linguistic labour, argue that one must always defer to the relevant experts, and that it is their judgements (not our intuitions) which determine what does and does not count as an electron. There are a number of problems with this strategy. First, Putnam's arguments for the division of linguistic labour themselves rely heavily upon twin-earth intuitions (see Putnam, pp. 226–7). Secondly, expertise with respect to one aspect of a topic (e.g., the physical properties of electrons) does not always generalize to all aspects of that topic (e.g., the modal properties of electrons). Finally, there is no guarantee that, upon discovering some  $-1.7$ s in the particle accelerator, physicists would be inclined to say 'These aren't electrons at all', as opposed to 'These electrons have a deviant charge'. This being so, the law necessitarian who opts for this strategy runs the risk that the experts may rule in favour of the contingentist.

*Nature of Scientific Endeavour.* Finally, some law necessitarians contend that scientific essentialism should be accepted, independently of any evidence from intuition, because scientific endeavour is best understood as an investigation into the *essential* features of things.<sup>12</sup> This line of reasoning, however, draws all its force from the ambiguity of 'essential'. Science does indeed seek out the fundamental, intrinsic, explanatorily basic – and in this sense essential – features of its objects. But this has no direct bearing on the question at issue, namely, whether these fundamental properties are essential properties in the philosophically loaded sense of being properties that their bearers *could not have failed to have had*.<sup>13</sup>

<sup>11</sup> See Ellis, 'Causal Laws and Singular Causation', p. 334.

<sup>12</sup> See B. Ellis and C. Lierse, 'Dispositional Essentialism', *Australasian Journal of Philosophy*, 72 (1994), pp. 27–45, at p. 43.

<sup>13</sup> Elder develops a novel non-intuition-based strategy for establishing scientific essentialism (see his *Real Natures and Familiar Objects*, ch. 2), but it cannot help the law necessitarian: as his strategy for establishing scientific essentialism *presupposes* the truth of law necessitarianism, it cannot then be invoked in a defence of law necessitarianism.

## IV. SECOND HORN: INTUITION IS RELIABLE

The law necessitarian who opts for the second horn of the dilemma accepts that intuition is a generally reliable guide to what is and what is not metaphysically possible. This sort of law necessitarian may make use of Kripke's intuition-based arguments in defending scientific essentialism, but need not accept that intuition is infallible, and may take there to be special reason to distrust the intuitions that tell against law necessitarianism. What reasons might one have for rejecting these intuitions in particular?

There are two sorts of strategies that the law necessitarian might employ on this horn. The first is to attempt to explain away the apparent contingency of individual laws case by case. The second is to identify some means by which all of the contingency intuitions can be dealt with *en masse*. I shall consider four ways in which the necessitarian might employ the second strategy, and I shall show all four to be problematic. This leaves open the possibility that one or more of these strategies can be used to deflate contingentist intuitions in various particular cases.

*Epistemic and Metaphysical Possibility.* Kripke (pp. 103–5) argued persuasively that we sometimes confuse intuitions of epistemic possibility with intuitions of metaphysical possibility. Many who initially reported having the intuition that it could have turned out that water lacked hydrogen found it plausible that they had been misreporting a (veridical) intuition to the effect that one could have been in a phenomenologically indistinguishable situation in which some water-like substance lacked hydrogen. Some law necessitarians have suggested that when one reports having intuitions to the effect that the laws might have been different, here too one is mistaking intuitions about epistemic possibility for intuitions about metaphysical possibility.<sup>14</sup>

But this manoeuvre must be wielded in a principled way. Surely it is metaphysically (not just epistemically) possible for, say, food and teeth to have been differently constituted. To avoid over-generalization, this manoeuvre must be restricted to those cases that are relevantly similar to the case of water. For instance, as in the case of water and gold (but not in the case of food and teeth), it should be genuinely plausible upon closer inspection that we had been confusing metaphysical with epistemic possibility and that the proposition at issue is intuitively possible in the latter sense but not the former. Furthermore, in the case of water and gold, but not in the case of food and teeth, we have robust pro-scientific-essentialist intuitions in addition to our apparently anti-scientific-essentialist intuitions. Where we find such *prima facie* conflicts among our intuitions, we have reason to suspect that there has been some error in those cases in particular; but in the absence of conflict, there is no reason to suspect that the relevant intuitions (or intuition reports) are mistaken. So in the absence of pro-law-necessitarian intuitions there would be no more reason

<sup>14</sup> See Shoemaker, 'Causal and Metaphysical Necessity', pp. 72–3; T. Handfield, 'Counterlegals and Necessary Laws', *The Philosophical Quarterly*, 54 (2004), pp. 402–19, at pp. 406–10; Elder, *Real Natures and Familiar Objects*, pp. 39–41.

to suspect that our anti-law-necessitarian intuitions are mistaken or merely epistemic than there is to suspect that our intuition that teeth could have failed to contain calcium is mistaken or merely epistemic.<sup>15</sup>

One way to assess the plausibility of employing this manoeuvre in the case at hand, and to elicit the requisite pro-law-necessitarian intuitions while eliminating any chance of confusion, is to restate relevant 'intuition pumps' in terms of expressions that are not subject to the kind of epistemic/metaphysical ambiguity that plagues 'possibly', 'might' and 'could'. We may, for instance, restate them in the idiom of *contingency*: is it contingent that electrons have exactly the charge they actually have?<sup>16</sup> Is it contingent that electrons repel one another with exactly the force they actually do? Unless law necessitarians are able to elicit the requisite anti-contingency intuitions, the allegation that we are confusing epistemic possibility with metaphysical possibility in our reasoning about laws is entirely unsupported. And these intuitions just seem to be missing.

*Evolution, Rational Intuition, and Conceptual Intuition.* Another route for the law necessitarian who opts for the second horn is to suggest that not all intuitions carry the same evidential weight. The task then would be to identify a principled means of distinguishing reliable from unreliable intuitions which deflates the evidential force of anti-law-necessitarian intuitions without thereby undermining the evidential force of our pro-scientific-essentialist intuitions. I shall consider two ways of drawing this distinction, and show that neither succeeds.

Alexander Bird suggests that our imaginative and intuitive faculties are adaptive capacities (supplied by evolutionary processes), and as such, cannot be expected to be particularly reliable when it comes to matters that are more or less irrelevant to our survival, such as the accuracy of our beliefs about the microphysical and the metaphysical.<sup>17</sup> Accordingly, there is no reason to expect our intuitions that the laws could have been different to be truth-tracking. The problem with this response is that the identity of substances on twin earths seems no more relevant to our survival than does the modal status of the laws. So if Bird is correct, our pro-scientific-essentialist intuitions cannot themselves be trusted, thereby undermining scientific essentialism and with it law necessitarianism.

Alternatively, one might attempt to distinguish between *rational* intuition, which purports to confer substantive information about the world, and merely *conceptual* intuition, which yields only information about our concepts themselves. While conceptual intuitions can be trusted, it is argued that we cannot come to know anything substantive about the world simply by consulting our intuitions, and so rational intuitions ought to be discarded. Since our anti-law-necessitarian intuitions purport to be about substantive matters of fact, we have reason to distrust these intuitions.

But this line of reasoning threatens to undermine scientific essentialism as well. For is the intuition that water necessarily contains hydrogen a rational or a conceptual intuition? If it is a rational intuition, then (by hypothesis) this and other

<sup>15</sup> Cf. Bealer, 'Mental Properties', *Journal of Philosophy*, 91 (1994), pp. 185–208, at pp. 198–9.

<sup>16</sup> Bealer proposes such a test: 'Modal Epistemology and the Rationalist Renaissance', p. 78.

<sup>17</sup> See Bird, 'Strong Necessitarianism', pp. 273–4; cf. Elder, *Real Natures*, pp. 40–1.

pro-scientific-essentialist intuitions cannot be trusted, leaving one with no reliable basis for accepting scientific essentialism. If it is a conceptual intuition, then this intuition plainly cannot serve as an evidential basis for a substantive thesis like scientific essentialism. The law necessitarian might respond that scientific essentialism is not a substantive thesis in the relevant sense, and can therefore be established on the basis of conceptual intuition alone. But then scientific essentialism would evidently be too weak to ground law necessitarianism, which, by hypothesis, is a substantive thesis about the world. The one remaining option is to deny that law necessitarianism is a substantive thesis about the world; but in that case merely conceptual (and, by hypothesis, trustworthy) contingency intuitions would suffice to undermine law necessitarianism.

*Weighing Cost and Benefit.* Some believe that it is reasonable to reject the intuitions which tell against one's theory when the theoretical payoffs of doing so are sufficiently high. Law necessitarianism, and those property theories which entail the necessity of laws, purport to offer a straightforward explanation of how laws are able to support counterfactuals, a means both for individuating properties and for distinguishing Cambridge from non-Cambridge properties, and also a source of various further explanatory advantages. The suggestion, then, is that these theoretical virtues of law necessitarianism warrant one in disregarding all one's anti-law-necessitarian intuitions.

Supposing that the indicated methodological principle is legitimate, we may well be forced to abandon not anti-law-necessitarian intuitions, but rather *pro*-scientific-essentialist intuitions. On the basis of those intuitions which led Kripke and others to scientific essentialism, descriptivist semantics was laid to ruin, Frege's puzzle and the puzzle of empty names became that much more puzzling, contingent identity theories in the philosophy of mind became untenable, and meaning was ousted from the head (leading to a wealth of further problems concerning, e.g., mental causation and privileged access). The theoretical advantages of law necessitarianism are dwarfed by the theoretical disadvantages of scientific essentialism. This methodological principle must therefore be regarded as a threat to law necessitarianism, as it threatens to undermine scientific essentialism altogether.

*Misunderstanding Concepts.* Tweedale ('Universals', p. 37) suggests that we are able to conceive of alternative laws of nature only because we inadequately grasp the concepts required for understanding them. One can therefore accept that intuition is generally reliable, but subject to improvement as one's competence with the relevant concepts increases. Tweedale's contention is that the laws of nature would not seem contingent to someone who is fully competent with the relevant concepts.

This may well be correct for some laws; and it is quite plausible that we have only a tenuous grasp of such concepts as *charge*, *force* and *electron*. But why suppose that to someone who fully grasps these concepts, *all* laws will appear necessary? Though there may be some laws which reveal themselves to be necessary, there may be others whose contingency becomes increasingly self-evident as one approaches full understanding of the relevant concepts. So Tweedale's contention that a more complete understanding will yield pro-law-necessitarian intuitions, rather than pro-contingentist intuitions, is nothing better than unfounded speculation.

## V. CONCLUSION

I have argued against various ways in which the law necessitarian might attempt to address all of the apparent contingencies *en masse*. But I have not meant to suggest that all laws that seem contingent are in fact contingent. There is no more reason to expect all laws to share the same modal status than there is to expect that all kinds have scientific essences.<sup>18</sup> For all I have shown, it may be that the apparent contingency of certain laws, and perhaps even of all laws, can be explained away case by case in an intuitively satisfactory manner.<sup>19</sup> But where this cannot be done, Kripke's intuition-driven scientific-essentialist results are of no use to law necessitarianism.<sup>20</sup>

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<sup>18</sup> '... rather than take a blanket view of the modal status of these laws, we should attempt to refine and systematize the intuitive discriminations that we are naturally inclined to make among them': K. Fine, 'The Varieties of Necessity', in Gendler and Hawthorne (eds), *Conceivability and Possibility*, pp. 253–81, at p. 261.

<sup>19</sup> Bird ('Necessarily, Salt Dissolves in Water', pp. 269–71) observes that the apparent contingency of the law that salt dissolves in water diminishes upon closer inspection. But he fails to appreciate the crucial role played by intuition: he apparently takes Kripke's arguments to settle, by themselves and without any help from intuition, exactly which counterfactual substances would count as salt and water.

<sup>20</sup> Thanks to Jason Bowers, Heather Demarest, Mylan Engel, Evan Fales, Toby Handfield, Bob Hanna, Mark Heller, Charles Hermes, Dien Ho, Mike Huemer, Rob Koons, Russ Payne, Sarah Sawyer, Chris Shields, Alan Sidelle, Michael Tooley, Kurt Torrell, Nathan Wight, Gene Witmer, Mike Zerella, and especially Matti Eklund, Dave Liebesman and Marc Moffett. Above all, my substantial debt to George Bealer will be evident to anyone familiar with his work on scientific essentialism and *a priori* knowledge.