The Basis of Necessity and Possibility*

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Abstract
The article argues that modal concepts should be explained in terms of the essences or nature of things: necessarily p if, and because, there is something the nature of which ensures that p; possibly p if, and because, there is nothing whose nature rules out its being true that p. The theory is defended against various objections and difficulties, including ones arising from attributing essences to contingent individuals.

1. Preliminaries

1.1. Epistemic and metaphysical modalities

We employ the modal words 'might' or 'may' and 'must', expressing possibility and necessity – as opposed, for example, to permission and obligation – in significantly different ways. One broad contrast is between *epistemic* and *alethic* uses. When, knowing that Aunt Mabel fully intended to catch the 10.22am from Sheffield to St. Pancras, and that the train has arrived without her on it, we say: 'She must have missed the train', we are claiming that, given what we know, the only reasonable conclusion to draw is that she missed the train. When you enquire after the whereabouts of Uncle Bill, and I reply: 'He may be in the garden', what I mean is that nothing we, or at least I, know rules out his being in the garden. These examples illustrate the epistemic use. But there are other cases in which we use 'must' and 'may' or 'might' to express beliefs about what is necessary or possible in a *non-epistemic*, *alethic* sense. Thus we often think that things might have gone differently from how, as we know, they went – e.g. that Mozart might have outlived Haydn, instead of predeceasing him by nearly two decades (as he actually did), or that Aristotle might never have gone in for philosophy. And when we assert, say, that the product of two odd numbers must be odd, we probably mean not merely that given what we know about

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numbers, it follows that m × n is odd, if m and n are both odd, but that it is, in some sense, outright and objectively necessary that the product of odd numbers is odd.

1.2. Relative and absolute modalities

Epistemic possibility and necessity fairly clearly involve a kind of relativity. To say that something might be so, meaning that it is epistemically possible, is to say that for all we know, it is so – that nothing we know rules it out, or that it is consistent with, and so possible relative to, what we know. Similarly, *mutatis mutandis*, with epistemic necessity – what must be so, given, or relative to, what we know.

It is plausible, or at least widely accepted, that we use modal words to express other kinds of relative necessity and possibility. Thus although the example is not uncontroversial, it is often supposed that when we speak of *physical* necessity and possibility, we are concerned with what must or may be so, relative to the laws of physics. Similarly, we may take biological, psychological, etc., necessity and possibility to be forms of relative modality.

On what may be termed the standard approach, different kinds of relative necessity are all relativizations of a single underlying kind of necessity, which is naturally taken to be *logical* necessity. Relative necessity is logical necessity relative to a certain body of propositions. Thus it is physically necessary that p just if the proposition that p logically follows from the laws of physics, and physically possible that p just if its negation (the proposition that $\neg p$) is not a logical consequence of those laws. How precisely this general idea should be implemented is a further question. In its classic formulation, the proposition that p is physically necessary *iff* the conditional $\Gamma \rightarrow p$, where Γ is a conjunction of physical laws, is logically necessary (i.e. *iff* $\Box(\Gamma \rightarrow p)$). There are reasons to think this agreeably simple and straightforward analysis won't do as it stands, but we need not pursue them here. The general idea is surely right.[1]

[1] For the classic formulation, see Timothy Smiley's 'Frege's "series of natural numbers"', (*Mind* 97 (1988): 583–4), which traces the central idea back to Alan Ross Anderson's 'The formal analysis of normative systems', (*Technical Report Technical Report* No.2, U.S.O ce of Naval Research, Group Psychology Branch, New Haven, 1956). For some discussion of the problems with the classic formulation, and alternative proposals, see I. L. Humberstone, 'Relative Necessity Revisited', *Reports on Mathematical Logic* 13 (1981): 33–42; Humberstone, 'Two-Dimensional Adventures',

It is natural to assume, as the standard approach does, that the underlying kind of necessity in terms of which the various sorts of relative necessity are explained is not itself relative, but *absolute*. Indeed, at least on the face of it, the supposition that logical necessity is itself merely relative would be viciously regressive. In any case, it is unclear what *other* kind of necessity logical necessity might be taken to be a relativization *of*. And the idea sits uncomfortably with the very plausible principle that each kind of necessity is closed under logical consequence.

If one thought, as David Lewis did, that illuminating analyses of philosophically problematic concepts could be given in terms of possible worlds, the obvious way to explain the notion of absolute necessity would be through *absolutely unrestricted quantification* over worlds: it is absolutely necessary that p just in case it is true at every world without restriction that p. For those who have less faith in the explanatory value of the hypothesis of a plurality of worlds, a better way to characterize the notion might replace unrestricted quantification over worlds by unrestricted quantification over propositions. What is absolutely necessary is what holds unconditionally – equivalently, what holds, or rather would hold, under any condition whatever. A little more formally, $\Box p$ to abbreviate 'it is absolutely necessary that p' and $\Box\!\!\rightarrow$ for the counterfactual conditional, $\Box p = \forall q(q \Box\!\!\rightarrow p)$. If this is to capture the notion of absolute necessity, q must be understood as ranging unrestrictedly over all propositions whatever, and not just those expressible in the language one happens to be using. And of course, since the *explanans* employs the subjunctive or counterfactual conditional, which is itself a modal notion, it can make no claim to provide a *reductive* explanation of the notion of necessity, such as Lewis though he could give in terms of worlds.[2]

Philosophical Studies 118 (2004): 17–65; B. C. van Fraassen, 'The Only Necessity is Verbal Necessity', *The Journal of Philosophy* 74 (1977): 71–85; and Hale and Leech, 'Relative Necessity Reformulated', *Journal of Philosophical Logic* (2016): 1–26.

[2] The notion of absolute necessity might be characterized in other ways. For example, we might think of it as a kind of limiting case of relative necessity: absolute necessities are those which hold relative to any body of propositions whatever. Or we might take them to be those propositions whose negations are in no relevant sense possibly true. In my *Necessary Beings: An essay on Ontology, Modality, and the Relations between them* (Oxford: Oxford University Press, 2013), ch. 4, I discuss these alternatives and argue that under plausible assumptions, they coincide in extension with

It is easily seen that logical necessity is absolute in this sense; when $\Box$ is interpreted as expressing logical necessity, $\Box p$ entails the strict conditional $\Box(q \rightarrow p)$ for any q, which in turn entails the generalized counterfactual $\forall q(q \Box\!\!\rightarrow p)$. But whilst it is clear that all logical necessities are absolute, it is a further, and rather less straightforward, question whether the converse is true, i.e. whether *all* absolute necessities are logical. Among those who have thought so we may count Ludwig Wittgenstein – or at least, the Wittgenstein of the *Tractatus*, who unequivocally declares that the only necessity is logical – and, provided that logical necessity is construed broadly enough, the logical empiricists, who held that all necessary truths are true in virtue of meaning, or analytic. Pre-eminent among those who have rejected the converse is, of course, Saul Kripke. Although, as far as I know, the now widely employed term 'metaphysical necessity' is nowhere used in *Naming and Necessity*,[3] Kripke firmly declares necessity to be a metaphysical concept, in contrast with analyticity and apriority, which belong, he tells us, to semantics and epistemology respectively. Logical necessity receives barely any discussion in Kripke's lectures, but he makes it unmistakeably clear that he regards as necessary many things – for example, that water is H_2O, that gold is an element, that Hesperus is Phosphorus – which he would count as neither logical truths nor analytic, nor as knowable *a priori*. Kripke does not use my term 'absolute necessity',

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the generalized counterfactual explanation suggested here. The idea of explaining necessity and possibility operators in terms of the (strong) conditional goes back at least to Robert Stalnaker ('A Theory of Conditionals', *American Philosophical Quarterly,* monograph series: 98–112 (1968)) and has since been taken up by Timothy Williamson ('Modal Logic within Counterfactual Logic', in B. Hale and A. Hoffmann (eds), *Modality: Metaphysics, Logic, and Epistemology*, 81–96 (Oxford University Press, 2010)). The formulation using the generalized counterfactual is suggested by Ian McFetridge in his posthumously published essay on logical necessity (McFetridge, 'Logical Necessity: Some Issues' in J. Haldane and R. Scruton (eds), *Logical Necessity and Other Essays*, volume 11 of *Aristotelian Society Series*, chapter VIII, 135–154, Aristotelian Society (1990)) and is explicitly adopted in my 'Absolute Necessities', *Nous Supplement: Philosophical Perspectives*, 10(30) (1996): 93–117 and my *Necessary Beings* (2013).

[3] Saul Kripke, 'Naming and Necessity', in Donald Davidson and Gilbert Harman (eds), *Semantics of Natural Language* (Dordrecht, The Netherlands: Reidel, 1972); Kripke, *Naming and Necessity* (Oxford: Basil Blackwell, 1980).

but he leaves us in no doubt that he takes these things to be necessary in the strongest sense.[4]

1.3. The logic of absolute necessity

Which logical principles hold for $\Box$ when it is understood as expressing absolute necessity? I contend that they are the principles of the strongest normal modal logic, S5, and thus include not only the fairly obvious K and T principles $\Box(A \rightarrow B) \rightarrow (\Box A \rightarrow \Box B)$ and $\Box A \rightarrow A$, but the more controversial S4 principle $\Box A \rightarrow \Box\Box A$ and the stronger, characteristic S5 law $\Diamond\Box A \rightarrow \Box A$. The simplest and most direct argument to support this claim I know is semantic, and is most easily sketched using the usual possible worlds semantics for modal logics. In briefest terms, a model in this semantics comprises a domain W of worlds, together with a relation R of relative possibility or accessibility defined on W and an exhaustive assignment of truth-values to the simplest propositions relative to members of W. Negations, conjunctions, etc., evaluate as you would expect. $\Box A$ evaluates as true at a member $w \in W$ *iff* A evaluates as true at each $w' \in W$ such that wRw'. Which modal principles are validated by the semantics depends upon what constraints, if any, are taken to govern the accessibility relation R. The K principle holds without further constraints. Requiring R to be reflexive – so that each world is possible relative to itself – validates the T principle: requiring symmetry – that is, if wRw', then $w'Rw$ – secures the B principle ($A \rightarrow \Box\Diamond A$); and requiring transitivity – that is, if $wR\ w'$ and $w'Rw''$, then wRw'' – secures the S4 principle. In essence, the semantic argument goes as follows. It is absolutely necessity that p just in case, no matter what proposition q may be, if it were the case that q, it would be that p. Here, q is to be understood as ranging over absolutely all propositions, without any restriction. In terms of worlds, this is tantamount to the requirement that p should be true at absolutely all possible worlds, without restriction. In the context of world-semantics, this translates into the requirement, for $\Box p$ to be true at any given world in the model, that p should be true at every world in the model accessible from that world, *when absolutely every world is accessible from every world*. This is equivalent to requiring that the accessibility relation be an equivalence relation – i.e.

[4] See, for example, *Naming and Necessity* (1980), page 99 '… characteristic theoretical identifications … are not contingent truths but necessary truths, and here of course I don't just mean physically necessary, but necessary in the highest degree – whatever that means).'

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reflexive, symmetric, and transitive. But these constraints ensure that the characteristic S5 principle holds.[5]

2. Problems

I know of no more succinct formulation of the basic philosophical questions about necessity than Michael Dummett's:

> The philosophical problem of necessity is twofold: what is its source, and how do we recognise it?[6]

The first question clearly belongs to metaphysics. It asks after the basis of necessity; that is, when something is necessary, *what makes it so*? The second is equally clearly epistemological. Assuming we know some things to be necessary, *how do we know*? The two halves of Dummett's problem interlock in a way that puts a constraint on acceptable answers to both questions. At a minimum, no satisfactory answer to either can preclude a credible answer to the other.[7]

[5] This rough and ready statement of the argument skips over some important complications. One is that since we are defining absolute necessity by $\Box p =_{\text{de f}} \forall q(q \Box\!\!\rightarrow p)$, it needs to be proved, on the basis of this definition together with a suitable semantics for $\Box\!\!\rightarrow$, that $\Box p$ is true at a given world *iff* p is true at every world accessible from that world. Another is that, since I reject the standard worlds semantics in favour of a version of possibility semantics, in which possibilities, in contrast with worlds as usually understood, are incomplete in the sense that they typically do not settle the truth-values of all propositions, the underlying semantics cannot be the standard world-based semantics (q.v. Stalnaker, 'A theory of Conditionals' (1968) and David Lewis, *Counterfactuals* (Basil Blackwell, 1973), but must itself be adjusted to work with possibilities. A fuller statement of the argument, ignoring the second complication, is given in my *Necessary Beings* (2013), 5.4. As Christopher Menzel subsequently pointed out in correspondence, the argument there stated assumes, in effect, that propositions are defined as sets of worlds. Since I prefer to avoid reliance on that assumption, I cannot wholly endorse that formulation of the argument. However, as I claimed in a footnote (*Necessary Beings* (2013), 129, fn.19), the argument can be given, avoiding that assumption, in the version of possibility semantics described later in the book (ibid, ch.10).

[6] M. Dummett, 'Wittgenstein's Philosophy of Mathematics', *Philosophical Review* 68 (1959), 169.

[7] The point was, I think, first brought into prominence by Paul Benacerraf, in connection with mathematical truth (P. Benacerraf, 'Mathematical Truth', *The Journal of Philosophy* 70 (1973): 661–80). Here, as Benacerraf argued, we face a dilemma: the most natural and attractive

In this paper, I shall be focusing on Dummett's first, metaphysical question, but we should keep in mind that no answer to it can be satisfactory which does not at least leave room for a workable epistemology of modality.

When directed at a kind of relative necessity – physical necessity, say – the metaphysical question is plausibly taken to concern the ground or basis of the truth of the body of propositions to which that kind of relative modality is relative, e.g. the laws of physics; and the epistemological question is essentially a question about how we know what follows from those propositions. These questions certainly need answering, but their answers will have no direct bearing on the metaphysics and epistemology of modality as such. It is when Dummett's questions are directed at *absolute* necessity (and by implication, absolute possibility) that they concern modality most directly, and it is then that they are apt to seem especially hard to answer. Indeed, some have thought the metaphysical question unanswerable. Simon Blackburn once argued that any attempt to say what makes for necessity must get skewered on one or the other horn of a lethal dilemma. For suppose we say that what makes it necessary that p is the fact that q. Then either it is necessary, in turn, that q, or it is a merely contingent fact that q. If the first, we may have succeeded in explaining why p is necessary, but since we have explained it by appealing to another necessity, we have merely postponed the hard question: why is there any necessity at all? If the second, then since it might just as well not have been the case that q , it seems that we have not so much explained why it must be that p, as shown that it isn't really necessary after all.[8]

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account of mathematical truth sees it as grounded in the properties and relations of numbers, sets, and other abstract entities – but, given their lack of causal or other natural connection with us, this can seem to block any believable account of how we may *know* such truths; on the other horn, epistemologically more tractable accounts of the subject matter, such as those which assimilate truth to provability, lack credibility as accounts of mathematical *truth*. As Christopher Peacocke has subsequently emphasized, a parallel dilemma confronts us in many other areas of philosophy, including the metaphysics and epistemology of modality; Peacocke calls this generalization of Benacerraf's dilemma the Integration Challenge. (See C. Peacocke, 'Metaphysical Necessity: Understanding, Truth and Epistemology', *Mind* 106 (1997): 521–574; Peacocke, *Being Known* (Oxford: Oxford Clarendon Press, 1999).)

[8] See S. Blackburn, 'Morals and Modals' in G. McDonald and C. Wright (eds) *Fact, Science and Morality: Essays on A.J. Ayer's Language, Truth and Logic* (Oxford: Blackwell, 1986) reprinted in

3. Some unsatisfactory answers

The difficulty of answering Dummett's first question head on has led some – Blackburn and others who, like him, have agreed that we cannot reject the notion of necessity altogether – to deny that there really are any *objective modal facts*, as distinct from facts about what what we find ourselves *able or unable* to *imagine or conceive*. It has led others to look for a *reductive* explanation – an explanation of modal facts in wholly non-modal and putatively less problematic terms. I shall comment briefly on two theories of this kind before turning to the approach I think best.

3.1. Conventionalism and the linguistic theory of necessity

One answer which Blackburn explicitly takes to fall victim to the first horn of his dilemma is conventionalism – roughly, the idea that whenever it is necessary that p, what makes it so is our having adopted conventions for the use of words which somehow ensure that the sentence(s) we use to state that p are true. Since the fact, if it is one, that we have adopted the appropriate conventions is a contingent fact, this answer clearly fits the rubric of the first horn, and Blackburn swiftly concludes that the conventionalist answer must fail – if we need not have adopted those conventions, then it can't be really necessary that p after all. Since I have explained in some detail elsewhere why this argument fails[9], here I shall simply observe that it begs the question by relying on a principle which the conventionalist is bound to reject in any case. For what the contingency of the fact[10] of our having adopted such-and-such conventions directly shows is not that it isn't necessary that p, but only that it isn't *necessarily* necessary. To get to the conclusion that it is not necessary *simpliciter*, we must appeal to the characteristic S4

Blackburn, Simon, *Essays in Quasi-Realism* (Oxford University Press, 1993). For some detailed critical assessment of the proposed dilemma, see Hale 'The Source of Necessity', *Nous Supplement: Philosophical Perspectives* 16 (2002): 299–319; Hale, *Necessary Beings* (2013), 91–7; and Cameron, Ross, 'On the Source of Necessity', in Hale and Hoffmann (eds), *Modality: Metaphysics, Logic, and Epistemology*, 137–52 (Oxford: Oxford University Press, 2010).

[9] See previous footnote.

[10] Hale, *Necessary Beings* (2013).

principle: $\Box p \rightarrow \Box\Box p$. But this principle is one which any serious conventionalist must in any case reject.

The conventionalist answer is perhaps the clearest form of what is sometimes called the linguistic theory of necessity, embraced by the logical empiricists, which seeks to explain necessity away as truth in virtue of meaning. It is indeed necessary that vixens are female, for example, but all that really amounts to is that we have opted to use our word 'vixen' to mean 'female fox', so that 'Vixens are female' is guaranteed, by the meanings of its constituent words, to express a truth.[11]

The attractions of this kind of theory are obvious enough: avoidance of mystery coupled with explanatory economy – we need meanings anyway, to explain how we say true and false things about the world, and the theory then gives us necessity as a by-product. But it runs into some serious problems.

If we agree with Kripke that there are necessities like

Water is H_2O
Gold is an element

which are not analytic or knowable *a priori*, it may seem that, even if some form of the linguistic theory can explain *some* necessities, it can't give an adequate account of *all* of them. Some more recent defenders of the theory have, however, sought to meet this objection by arguing that even in these cases, whilst the *truth* of the specific proposition that water is H_2O, say, is an *a posteriori*, empirical discovery, its *necessity* derives from our having adopted a covering general convention to the effect that chemical substances are defined by their chemical composition, and similarly in other cases.[12] I shall not discuss this extension of the theory here, because I think it succumbs to older objections which apply even before any attempt to extend it to encompass *a posteriori* necessities is made.

[11] See, for example, A.J. Ayer, *Language, Truth and Logic* (Victor Gollancz Ltd, 2nd edition, 1946), 16–18, 71–86.

[12] This approach has been developed and defended in detail by Alan Sidelle, originally in his *Necessity, Essence, and Individuation* (Ithaca, New York: Cornell University Press, 1989). There are useful critical reviews by Stephen Yablo ('Review of Alan Sidelle, *Necessity, Essence, and Individuation*', *Philosophical Review* 101 (1992): 878–91) and Penelope Mackie ('Review of Alan Sidelle, *Necessity, Essence, and Individuation*', *Mind* 99 (1990): 635–37).

Briefly, the first point, made long ago by Quine[13] is that definitions don't create truths, but merely allow us to re-write them more succinctly – that 'vixen' means 'female fox' merely allows us to abbreviate the longer truth 'Female foxes are female' to 'Vixens are female', so that the latter inherits the necessity of the former; but it does nothing to account for necessity of the longer truth. To ensure that, conventions of a different kind would be needed – sentence-sized conventions, each directly stipulating the truth of a complete sentence, or perhaps that of every sentence of a certain form. But of these, there can be only finitely many, and so, since there are infinitely many different logically valid sentence forms, not enough to account of all necessary truths one-by-one. Any attempt to meet this shortfall by holding that there is a base class of truths guaranteed directly by convention, all others being logical consequences thereof, runs into some well-known problems highlighted by Quine (op.cit) and Dummett.[14] Consequence relations bring with them further necessities: Let B comprise the basic necessities, directly secured by conventions, and let q be any non-basic necessity, whose necessity is to be explained by appeal to its being a consequence of necessities $p_1,\ldots, p_n$ in B. Then the conditional $p_1,\ldots, p_n \rightarrow q$ will be a *further* necessity, so far unaccounted for. This looks, and Quine argued is, viciously regressive.[15]

3.2. Worlds and combinatorial theories of possibility

What is necessary is what holds true in all possible worlds, what is possible is what is true in at least one of them. Whatever the merits of a model-theoretic semantics based on a domain of worlds – and they are surely many and considerable – taken as explanations of the concepts of necessity and possibility, these appear hopelessly circular. Some – most notably David Lewis – have thought otherwise: that we can (i) say what *worlds* are in *non-modal terms* and (ii) have

[13] See W.V.O. Quine, 'Truth by Convention', in H. Feigl and W. Sellars (eds), *Readings in Philosophical Analysis* (1949) (reprinted from O.H. Lee (ed.) *Philosophical Essays for A.N. Whitehead* (Longmans, New York, 1936), 250–73).

[14] Dummett, 'Wittgenstein's Philosophy of Mathematics' (1959).

[15] Quine's and Dummett's objections, if well-taken, show that conventionalism cannot account for all necessities, not that it cannot account for any. For a fuller discussion of these objections, and an attempt to show that conventionalism cannot support even the weaker claim, see my *Necessary Beings* (2013), 116–27.

reason to believe that the worlds are many and varied enough to account for all the possibilities. Worlds, Lewis contends, can be characterized in non-modal terms as spatio-temporally (and hence causally) closed systems of things. One such system of things comprises Lewis himself together, as he charmingly puts it, with all his surroundings – that is, everything to which he is spatio-temporally related. His theory says that there is a vast plurality of such systems. Necessity is simply truth at each and every one of them, and possibility truth at at least one. If the theory is to have any plausibility as an explanation of necessity and possibility, the worlds must somehow cover all the possibilities – there needs to be (at least) one for each way things might have been. Obviously mere proliferation of worlds is not enough – there must be sufficient variety in the plurality. The variety is to be guaranteed by Lewis's combinatorialism. In essence, this claims that each world is made up of smallest bits – mereological individuals – arranged in a certain way. Since distinct worlds are spatio-temporally disjoint, the individuals of our world cannot be in any other world. Instead, each other world has its own individuals, but arranged differently. The admissible arrangements are given by his principle of recombination: roughly 'anything can co-exist with anything else, at least provided that they occupy distinct spatio-temporal positions. Likewise, anything can fail to co-exist with anything else'.[16,17]

[16] David Lewis, *On the Plurality of Worlds* (Blackwell, 1986), 88. Lewis elaborates and qualifies the principle in a number of ways, but the finer details of his theory will not matter here. Other worldly individuals may, according to Lewis, be exact copies, or duplicates, of our individuals, but they need not be – they may be what he calls alien individuals. Another world may contain many duplicates, perhaps infinitely many, of any one of our individuals. So not all other worlds, in Lewis's view, are simply re-arrangements of duplicates of our individuals.

[17] Combinatorialism is separable from Lewis's extreme form of realism about worlds. The combinational theory presented in *On the Plurality of Worlds* (Blackwell, 1986) assumes only a moderate form of realism about worlds. The basic entities in Armstrong's theory are not smallest parts (mereological individuals) as in Lewis's theory, but what Armstrong calls 'fundamental properties' and 'thin particulars', and his principle of recombination asserts that for any combination of fundamental properties and any thin particulars, there is a world in which those properties are co-instantiated in those particulars. I shall not discuss Armstrong's theory separately. As I observe below, my main objection to Lewis's theory applies, *mutatis mutandis*, to Armstrong's.

Many philosophers have rejected Lewis's theory because they find its central claim – that there exists, in addition to the space-time we inhabit, a vast number (at least $2^{\aleph_0}$) of others, each spatio-temporally disjoint both from ours and from each other – simply incredible. Lewis dubbed this objection 'the incredulous stare', and complained in earlier work[18] that an incredulous stare is not an argument. In later writings, he grants that his 'modal realism does disagree, to an extreme extent, with common sense opinion about what there is',[19] but argues that common sense opinion is not sacrosant, and that we should grit our teeth and accept his seemingly extravagant ontology because it enables us, better than any alternative, to explain or analyse a lot of things – necessity and possibility themselves, counterfactual conditionals, propositions, and properties, to mention some – which we, as philosophers, find problematic and would like to explain or analyse in less problematic terms.

The efficacy of this defence is open to question. Even if the theory succeeds – it is far from clear that it does – in explaining the modal in non-modal terms, the reduction may be reckoned unsatisfactory for two reasons. First, on the epistemological side, it may seem that giving the truth-conditions of modal propositions in terms of how things are throughout a vast plurality of worlds each of which bar one is inaccessible to us precludes any credible account of how we may know or reasonably believe anything about necessity and unrealized possibility. Second, on the metaphysical/ontological side, it may be thought that the putative reduction comes at an exorbitant cost: how is having to swallow a vast array of inaccessible space-times any sort of philosophical advance on accepting unreduced modal facts?

In fairness to Lewis, I should confess that I am less sure of the epistemological objection – at least in this form – than I used to be. For whilst it is very hard to see how we could know what goes on and how things stand in any world other than ours, it can be argued that we need no such knowledge of *particular* other worlds. To know that it might have been the case that p, even though it is actually not so, we do not need to know, concerning some other *particular* world, w_{17} say, that it is true at *that* world that p; we need only to know the purely general existential proposition that there is a world at which p. And to know that necessarily p, we don't need somehow to verify, concerning each of the other worlds besides our own, that p is true there: we need rather to know the general negative

[18] Lewis, *Counterfactuals* (Blackwell, 1973), 86.
[19] Lewis, *On the Plurality of worlds* (Blackwell, 1986), 133.

existential proposition that there is no world at which $\neg p$. And, or so Lewis may claim, these are the kinds of thing we can know by considering whether things can be combined or arranged so that p, or so that $\neg p$. Lewis can best reply to the epistemological challenge, in other words, by appealing to his principle of recombination.

This may be a good reply, as far as it goes. But it serves only to refocus critical attention where it should have been all along, on the recombination principle itself. First, whilst Lewis is surely right when he says that 'our everyday modal opinions are, in large measure, consequences of a principle of recombination',[20] this serves to relocate epistemological doubts about his theory, rather than to dispel them: if it really is the case that anything can co-exist with anything else, that tells us a lot about what counterfactual states of affairs are possible – but why should we believe it?

Further, it seems clear that the kind of recombination principle Lewis would have us accept amounts to a very substantial *modal* thesis. Given its pivotal role in his theory, it is is good question whether that theory can after all claim to provide a *reductive* explanation of the modal in genuinely non-modal terms. Perhaps Lewis could argue that while his recombination principle does indeed have very substantial implications for what possibilities there are, it can be *stated* in entirely non-modal terms – roughly, for anything x and anything else y, there is a world in which x exists but y does not, and a world in which y exists but x does not; the principle's having modal consequences does not preclude its playing a part in providing an explanation of modal concepts in non-modal terms. I shall not try to assess the effectiveness of this defence here. Even if it succeeds, the fact that Lewis's explanation effectively conflates the task of explaining the *concept* of possibility with the separable question of *what possibilities there are* gives those of us who do not share his view on that question ample reason to reject it. Lewis's explanation may appeal to those who share his commitment to a form of Humean atomism (no necessary connections between distinct existences[21]). But the assumption that any recombination – or separation – of basic entities (i.e. Lewis's mereological individuals) is possible threatens to foreclose from the outset against any view on which there are absolute necessities which are not, even in a quite

[20] Lewis, *On the Plurality of worlds* (Blackwell, 1986), 113.

[21] Although his combinatorialism differs in details from Lewis's, Armstrong likewise endorses this principle – Hume distinctness, as he calls it – with the result that his theory likewise forecloses against many essentialist claims.

broad sense, logical necessities. In particular, it rules against a host of familar kinds of essentialist claims, such as the necessity of a thing's membership in its fundamental kind, or its composition or origin. Such claims are, of course, controversial. But that is precisely the point: just for that reason, they ought not to be settled by what purports to be a good explanation of the *concepts* of possibility and necessity – they are *controversial*, but they are *not self-contradictory*.

4. Essence and modality

4.1. Basics

Everyone, save those who think we should dispense with the notion of necessity altogether, agrees that if a conjunctive proposition (*A and B*) is to be true, each of its conjuncts must be true. That is, it is not just true, but necessarily true, that if *A and B* is true, each of *A* and *B* is true. Why is this? What makes it so? A simple, and I believe correct, answer is that it is necessary because that is *what it is to be* a conjunction. Or more accurately, it is part of what it is to be a conjunction. For it is equally part of what it is to be a conjunction that if *A* is true and *B* is true, then their conjunction (*A and B*) must be true. Conjunction is a function from pairs of propositions to propositions. It is that function which takes a pair of propositions (*A*, *B*) to a true proposition (*A and B*) if and only if each of *A* and *B* is true. That is the *nature*, or *essence*, of conjunction. It is necessarily true that a conjunction is true only if each of its conjuncts is because it is true by, or in virtue of, the nature of conjunction that a conjunction is true only if each of its conjuncts is.

The general pattern of explanation illustrated by our example could be represented:

Necessarily … because it is true by the nature of _____ that —

where the first and final gaps are filled by declarative sentences, and the second by a singular or plural noun-phrase.

Further plausible examples conforming to this pattern readily suggest themselves:

Necessarily *Aristotle is a man* because it is true by *Aristotle*'s nature that *he is a man*
Necessarily *whales are mammals* because it is true by the nature of *whales* that *they are mammals*
Necessarily *gold is an element* because it is true by the nature of *gold* that *it is an element*

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Necessarily *everything is self-identical* because it is true by the nature of *identity* that *it is a reflexive relation*
Necessarily $a + b = b + a$ for all whole numbers a,b because it is true in virtue of the nature of *addition* that *it is commutative*

What I shall call the *essentialist theory of necessity* claims that *all* necessities – or at least all metaphysical necessities[22] – can be explained in this way, and that metaphysical possibilites are simply those propositions whose truth is not ruled out by the natures of things. In what follows, I shall try first to give a more precise and explicit statement of the theory, and then – in part by discussing some of the more obvious questions to which it gives rise and some of the difficulties it faces – to explain the theory more fully.

4.2. Historical remark

The idea that we should distinguish the essential properties of things from those 'accidental' properties which they merely happen to possess, but might perfectly well have lacked, and that its essential properties collectively constitute a thing's nature or essence, goes back to Aristotle. The suggestion that (all) necessities have their source in the nature of things is less clearly attributable to Aristotle, although there are certainly passages in which he comes close to making it[23] . In modern times, it was, as far as I know, first put forward by Kit Fine in his ground-breaking paper 'Essence and Modality'.[24,25] Prior to the publication of Fine's paper, the prevailing view among those philosophers and logicians who accepted Aristotle's distinction was that the notion of an essential property should be explained in terms of the notion of necessity, as expressed

[22] …which I take to include logical necessities.

[23] See, for example, *Posterior Analytics* Book A, ch. 4 (J. Barnes (ed.) *Aristotle Posterior Analytics* (Oxford: Clarendon Press, 2nd edition, 1993), 6–8), where Aristotle argues that what is said of something in itself (*kath' hauto*), or in what it is, is necessary.

[24] K. Fine, 'Essence and Modality', *Philosophical Perspectives* 8: Logic and Language (1994): 1–16.

[25] The idea that both individuals and general kinds have essential properties, of course, received strong support two decades or so earlier from Kripke in *Naming and Necessity*, especially lecture III. But while Kripke embraces essential properties, he does not discuss, much less endorse, the idea that necessities might be explained as grounded in the essences or natures of things.

by the usual modal operator, □; . On this approach, essential predications such as:

> Cows are essentially quadrupeds
> Aristotle is essentially human

are to be analysed as:

> $\forall x\Box(x$ is a cow $\rightarrow x$ is a quadruped)
> □Aristotle is human [or, to allow for Aristotle's possible non-existence: □(Aristotle exists → Aristotle is human)]

After arguing, in my view pretty convincingly, that this approach can't adequately capture the notions of essential property and essence, Fine proposes that we should reverse the order of explanation. Thus instead of explaining 'Cows are essentially quadrupeds' as meaning '$\forall x\Box(x$ is a cow $\rightarrow x$ is a quadruped)', we should hold that the latter necessitated predication is true precisely because it is true in virtue of the nature of cows that they are quadrupeds.

4.3. An essentialist theory of necessity and possibility

Although the essentialist theory is basically quite simple, giving a general explicit statement of it is not entirely straightforward. As a first stab, we might try formulating the theory's two central theses schematically as:

> Necessarily p if, and because, there is something the nature of which ensures that p
> Possibly p if, and because, there is nothing whose nature rules out its being true that p

Taken at face value, the first of these involves an existential quantification, and the second the negation of one. So we might rewrite them, in what looks like familiar notation, as:

> $\Box p$ if an only if, and because, $\exists x$ *it is true by the nature of x that* p
> $\Diamond p$ if and only if, and because $\neg\exists x$ *it is true by the nature of x that* $\neg p$

But a moment's reflection should be enough to see that these can be no ordinary quantifications – ordinary quantification being either first-order, in which the bound variables range over objects or individuals (and nothing else), or second- or higher-order, in which the variables range over properties or relations of first- or higher-level. For, as our examples illustrate, the 'things' whose natures are to be

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invoked to explain why such-and-such is necessary may be entities of very different types. They *may* be individual objects, such as *Aristotle*. But they may be general kinds or sorts of objects, e.g. *whales,* or general kinds of stuff or substance, e.g. *gold*, or relations, e.g. *identity,* or functions, e.g. *conjunction,* or perhaps entities of some other kind. Syntactically, the quantification is first-order – at least in the sense that its bound variable *x* occupies a position which needs filling with a noun or noun-phrase (singular or plural) or some other kind of substantival expression. But semantically, it must be understood as ranging over entities belonging to different ontological types or categories. Indeed, if the essentialist theory is to explain all (metaphysical) necessities, we must suppose that it ranges over entities of *all* types. We need, in other words, to employ a *universal variable*, whose admissible values include not only objects, but properties, relations, and functions, of each type and level, and entities of any other sorts there may be.[26]

To get an adequate formulation, we need to introduce some further flexibility along a different dimension. So far, what we have allows only for explanations of necessity which appeal to the nature of a *single* entity. But it is easy to see that we need to go beyond this. Consider this slightly more complicated example. It is necessary that if *A and B* is true or *A and C* is true, then *A and* (*B or C*) is true. This is not true in virtue of the nature of conjunction *alone*, nor in virtue of the nature of disjunction *alone*; it is true in virtue of the natures of conjunction and disjunction *together*. It is easy to find examples in which an essentialist explanation would need to appeal to the natures of three or more entities. Since there is no plausible finite bound of the number of entities to which we may need to appeal, it would seem that we need something like:

$\Box p$ *iff*, and because, $\exists x_1 \ldots x_n$ *it is true by the nature of* $x_1 \ldots x_n$ *that* p
$\Diamond p$ *iff*, and because, $\neg \exists x_1 \ldots x_n$ *it is true by the nature of* $x_1 \ldots x_n$ *that* $\neg p$

so that the natures of any finite number of things may be involved in accounting for a given necessity. Employing the very useful and

[26] The use of x, y, … as universal variables over entities of all types involves a departure from Frege's doctrine that the reference of a singular term must always be an object, and more generally that ontological categories match up perfectly with logical types of expression. For further discussion, see my *Necessary Beings* (2013), ch. 1.

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suggestive notation $\Box_x p$ introduced by Fine,[27] our two principles may be more concisely stated:

(*Necessity*) $\Box p \leftrightarrow \exists x_1 \ldots x_n \Box_{x1 \ldots xn} p$
(*Possibility*) $\Diamond p \leftrightarrow \neg \exists x_1 \ldots x_n \Box_{x1 \ldots xn} \neg p$

Our formulation is schematic in two respects, as indicated by the free propositional variable p and the free numerical variable n. Since the theory claims to account for *every* (metaphysical) necessity and possibility, the propositional variable is to be understood as implicitly universally quantified. And since its explanations may appeal to *any* finite number of things, the numerical variable is to be understood as implicitly bound by an appropriately placed existential quantifier ranging unrestrictedly over the positive integers.[28]

4.4. The essentialist theory further explained – questions and difficulties

4.4.1. What are essences/natures?

This is the first, and most obvious question about the content, as distinct from the form, of the theory. The *essence* (or *nature*) of something is *what it is to be* that thing. A thing's essence is given by its *definition*, in the primary non-obsolete sense listed in the SOED, i.e. 'A precise statement of the nature, properties, scope, or essential qualities of a thing'. There is, I think inevitably, a strong whiff of circularity in this explanation. You will make nothing of it unless you have already some sort of grasp of a contrast between saying what something is and saying any of many other things true of it – between saying, for example, that Aristotle is a man, which is to state part of what it is to be Aristotle, and saying that he is a philosopher, which is to state something which is, but mightn't have been, true of him. A definition in the relevant sense is *of the thing*, rather than of a *word* standing for the thing, although in an important class of cases, what serves as a definition of the thing might just as well be presented as a definition of a word for it, as with the definition of a square as a closed rectilinear plane figure composed of four sides equal in length and meeting at right-angles. This is what it is to be a square, but it would serve equally well to define the word 'square' (in the geometrical sense).

[27] Fine (1994), 'Essence and Modality'.

[28] This assumes that there are no necessities the explanation of which requires invoking the natures of infinitely many entities. The assumption is certainly not obviously correct. For further discussion and defence of it, see *Necessary Beings* (2013), 6.4.3.

The properties figuring in a thing's definition are those properties which make it what it is, and so those properties without which it quite literally could not be (i.e. exist). They are its *essential* properties. Thus if x is essentially φ , it is so necessarily – that is, it is necessary that x is φ . Furthermore, nothing could fail to have the essence it has; that is, if x is essentially φ , it is necessary that it is essentially φ. $(\Box_x\varphi(x)\rightarrow\Box\Box_x\varphi(x))$. Thus when the essentialist theory claims that it is necessary that p because it is true in virtue of the nature of something x that p, the explanans is itself necessary, and the theory is explaining one necessity by appeal to another.

4.4.2. Blackburn's dilemma revisited, and a related difficulty

According to Blackburn's dilemma, if we seek to explain one necessity by appealing to another, we merely go in a circle or set off on a vicious regress, while if we appeal instead to some merely contingent fact, we succeed only in undermining the putative necessity. In view of the point just made, it may seem that the essentialist theory must get impaled on the first, necessity, horn. And so it would, if the dilemma were sound. But it isn't. Blackburn is, of course, quite right that if we explain a proposition p's necessity by claiming that necessarily p because q, the proposition that q will itself be either contingent or necessary. But, supposing it to be necessary, this does not mean – as the necessity horn appears to simply assume – that we will be explaining p's necessity by appeal to q's *necessity*. There is a clear distinction between an explanation in which the explanans is the fact that q and one in which the explanans is the fact that it is *necessary* that q. Certainly, explanations of the latter kind are common enough: we explain why necessarily p by deducing p from q , and observe that since q is necessary, p must be so too (i.e. we rely on the obviously valid principle that what follows from a necessary truth must be itself necessary: $\Box A$, $\Box(A\rightarrow B) \vdash \Box B$). Necessity is *transmitted* from the premise to the conclusion. But an explanation of the former sort is *not* transmissive. The explanans is plain q, not its being necessary that q . It may be – and with an essentialist explanation, it is – the case that the explanans is itself necessarily true if true at all, but that does not mean that what 'really' does the explanatory work is the necessity of the explanans rather than its plain truth. Blackburn simply misses this distinction.

It may be felt that even so, the essentialist theory runs into a related problem. Schematically, suppose that $\Box_x\varphi x$. Then as we've just seen, $\Box\Box_x\varphi x$. So applying (*Necessity*), it must be that for some y, $\Box_y\Box_x\varphi x$. But now, haven't we just taken the first step in a troublesome-looking

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regress? – for it will, presumably, be *necessary* that $\Box_y\Box_x\varphi x$, i.e. $\Box\Box_y\Box_x\varphi x$, so that for some z, $\Box_z\Box_y\Box_x\varphi x$, and so on. One might, to be sure, block the threatened regress by exempting necessities of the form $\Box\Box_x p$ from the scope of the essentialist theory (i.e. by restricting the range of p in (*Necessity*) so as to exclude propositions explicitly stating the natures of things). But even if such a restriction could be argued to be other than simply *ad hoc*, it is not clear that it is needed, since it is not clear that the regress is vicious. Arguably, it is not. Whatever x may be, if it is true in virtue of x's nature that p, it is so necessarily precisely because nothing could have a different nature from the nature it actually has – whatever x may be, it is part of what it is for something to be x's nature that x could not have had any other nature. In that sense, if it is (part of) x's nature to be φ, then that itself holds true in virtue of x's nature. That is, whilst, assuming $\Box_x\varphi x$, there has to be a y such that $\Box_y\Box_x\varphi x$, there need not be anything *other than x itself* whose nature ensures that $\Box_x\varphi x$.

4.4.3. What kind of explanation does this essentialist theory provide? Blackburn's objection to any attempt to explain necessities by appeal to further necessities – that we are always left with a 'bad residual "must"'[29] – assumes, in effect, that any worthwhile explanation of a necessity must explain it reductively, in wholly non-modal terms. The related difficulty just discussed is likewise liable to appear more serious if it is assumed that reduction is required, and could not be answered as I've suggested if that assumption is granted. But we should, I am suggesting, reject the assumption. Essence, as I've described it, is an essentially modal notion. I don't myself think it can be adequately explained in non-modal terms. However, although it can't be fully grasped by someone who does not already have some understanding of necessity, it cannot be adequately explained in terms of necessity, at least as it is expressed by a unary sentential operator such as the usual $\Box$.

If the essentialist theory does not provide a *reductive* explanation of necessity, what kind of explanation, if any, does it provide? Philosophers sometimes say – and in my view are at least sometimes right to say – that when we are dealing with fundamental concepts (concepts which cannot be analysed in terms of other, *more* fundamental ones), we must settle for an explanation which charts the connections between them – there is no digging deeper, so we must dig

[29] Blackburn, 'Morals and Modals' (1986), 121.

sideways. I am suggesting that this is so here, with the concepts of essence and other modal concepts (centrally, necessity and possibility and the strong or counterfactual conditional). But in one way, at least, the essentialist explanation does a little more. For what explaining necessity in terms of essence ($\Box$ in terms of $\Box_x$) does is to bring out a kind of *structure* in the class of necessities as a whole, by identifying a fundamental subclass – those encapsulating the natures of things – in which all others have their source or ground.

4.4.4. Contigency

The essentialist theory explains $\Box p$ and $\Diamond p$ by means of the *unmodalized* quantifications $\exists x_1 \ldots x_n \Box_{x1 \ldots xn} p$ and $\neg \exists x_1 \ldots x_n \Box_{x1 \ldots xn} \neg p$ respectively. As I have said, the bound variables x_i are to be understood to range over all things whatever. But if this includes things which exist only as a matter of contingency, it might be thought that the theory must run into some serious, and perhaps insuperable, objections. Of course, no such problems arise, if the essentialist embraces *necessitism* – the view, forcefully defended by Timothy Williamson, that everything that exists does so necessarily, and that nothing which doesn't exist could do so. And at least some of them might be avoided by adopting a view, such as Alvin Plantinga's, according to which the essences of things exist of necessity, even when those things themselves exist only contingently. I do not think these views can be dismissed out of hand, as obviously incorrect. But I think it is of interest to see whether the essentialist can withstand the objections turning on contingent existence without resorting to them.

5. Iterated necessities

According to the essentialist, a proposition is necessary *iff* there are some things in virtue of whose natures it is true. This is the claim we formalized as:

(*Necessity*) $\Box p \leftrightarrow \exists x_1 \ldots x_n \Box_{x1 \ldots xn} p$

It is, we may suppose necessary that if Aristotle exists, he is a man, i.e.

(a) $\Box \forall z(z = a \rightarrow Ha)$

Applying (*Necessity*) to (a) gives

(b) $\exists x \Box_x \forall z(z = a \rightarrow Ha)$

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We are assuming that □ in (a) expresses *absolute* necessity, which we have argued to be governed by S5 principles, so that (a) entails:

(c) $\Box\Box\forall z(z = a \rightarrow Ha)$

On the face of it, pending some restriction on the application of (*Necessity*), (c) in turn entails:

(d) $\Box\exists x\Box_x\forall z(z = a \rightarrow Ha)$

But this, it seems, cannot be right. For it says that as a matter of necessity, there exists something the nature of which makes it true that if anything is Aristotle, it is a man. And it is quite unclear what this thing could be, other than Aristotle. But Aristotle's existence – at least according to widely held views – is a contingent matter, and if we are right in supposing that nothing else is such that its nature could make this true, it seems that it cannot be *necessary* that there is something which makes it true that if anything is Aristotle, it is a man.

One might block this argument by denying that (a) entails (c). This would involve either denying that absolute necessity conforms to the S4 principle that $\Box A$ entails $\Box\Box A$, or denying that metaphysical necessity is, after all, absolute. Neither course seems to me attractive.[30] Assuming that it is not an option to deny that (a) entails (c), can we deny that (c) entails (d)? How exactly is (d) to be inferred from (c)? The only obvious route[31] is to assume that we may necessitate (instances of) (*Necessity*) to obtain

(**) $\Box(\Box p \leftrightarrow \exists x_1 \ldots x_n \Box_{x1 \ldots xn} p)$

and apply a principle of substitution of necessary equivalents:

($\Box_{\leftrightarrow}$ *sub*) $\Box(A \leftrightarrow B), \Box A \vdash \Box B$

[30] The grounds for taking the logic of absolute necessity, briefly sketched above, seems to me compelling. The latter course has indeed been advocated, for quite different reasons, by Nathan Salmon ('The logic of what might have been', *Philosophical Review* 98 (1989): 3–34). But I am not alone (see Sonia Roca-Royes, 'Peacocke's principle-based account of modality: "Flexibility of Origins" Plus S4', *Erkenntnis* 65 (2006): 405–26, as well as *Necessary Beings* (2013), 128, fn.18) in thinking that Salmon's argument begs the question. Further, powerful arguments for taking the logic of metaphysical necessity to be S5 have been given, most notably by Timothy Williamson (*Modal Logic as Metaphysics* (Oxford University Press, 2013), ch.3).

[31] Applying (*Necessity*) directly to (c) would give us only $\exists x\Box_x\Box\forall z(z{=}a \rightarrow Ha)$ which, in contrast with (d), is unobjectionable. Since $\Box_a\forall z(z{=}a \rightarrow Ha)$ entails $\Box\Box_a\forall z(z{=}a \rightarrow Ha)$, one can also obtain $\exists x\Box\Box_x\forall z(z{=}a \rightarrow Ha)$, which again seems harmless.

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to infer (d) from (c) together with

(e) $\Box(\Box\forall z(z = a \rightarrow Ha) \leftrightarrow \exists x \Box_x \forall z(z = a \rightarrow Ha))$ instance of (**)

We can, and I think should, block this, by restricting ($\Box_{\leftrightarrow} sub$) to formulae not containing occurrences of $\Box_v$, i.e. A, B must be $\Box_v$-free. This restriction is not merely *ad hoc* – propositions about essence have additional content beyond what can be captured just using ordinary modal operators. Of course, there is nothing to prevent us from applying ($\Box_{\leftrightarrow} sub$) to formulae whose subformulae are $\Box_v$-free equivalents of formulae containing $\Box_v$. Thus given that $\Box(A \leftrightarrow \exists x \Box_x B)$, we may replace $\exists x \Box_x B$ by its equivalent $\Box B$ to get $\Box(A \leftrightarrow \Box B)$ and then apply ($\Box_{\leftrightarrow} sub$), together with $\Box A$ as a minor premise to get $\Box\Box B$.

6. Contingent existents and non-existents

If some of the things which in fact exist might not have existed, or if there might have existed things other than those which actually exist, it may seem that the essentialist theory is bound to give incorrect results – to count as necessary some propositions which, absolutely speaking, might have been false, and to count as possible some propositions which could not have been true. For suppose that $\Box_x p$ (so that according to the theory, $\Box p$), but that (i) there is no other entity y such that $\Box_y p$ and (ii) x exists only contingently. Then if x hadn't existed, there would have been nothing to guarantee p's truth, and, since x mightn't have existed, it can't be (absolutely) necessary – although necessary, it is not necessarily necessary. Or suppose that there is nothing whose nature rules out its being the case that p, so that according to the theory, $\Diamond p$; nonetheless, it may seem, there might have existed something whose nature would rule out its being the case that p, so that it is possible that p only in a relative sense, not absolutely – it is possible that p, but not necessarily possible that p (contrary to the S5-character of absolute modalities).

As with our previous objection, one might respond by retreating from the claim that the logic of absolute modality is S5, or by abandoning the view that metaphysical necessities are (always) absolute. But can the objection be countered without giving ground on these matters? I do not have space for a full discussion of the issue. Instead, I want to sketch my reasons for thinking that a positive answer may be defensible. In broadest outline, I shall argue, first, that whilst there may indeed be a good deal of contingency about

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what does and doesn't exist, the crucial question, for the essentialist theory, is how variations in what exists might affect what natures there are; and second, that, to the extent that variations in what things exist does affect what natures there are or would be, the differences make no difference to what is necessary or possible.

Suppose, schematically, that it is true in virtue of x's nature that p, and so, according to the essentialist theory, necessary that p. And suppose that x is something which exists only as a matter of contingency, and so might not have existed. If, but *only if*, x's non-existence would entail that there is no such thing as x's nature, there will – assuming there is nothing apart from x whose nature ensures that p – be a problem for the essentialist theory, because although it is, as things are, necessary that p, had x not existed, there would have been nothing whose nature ensured that p, so that it might not have been necessary that p, whence it is not absolutely necessary that p, but only necessary relative to how things are. So the crucial question, as far as (*Necessity*) is concerned, is whether x 's non-existence would mean that there is no such thing as x's nature – no such thing as what it is to be x. In a similar way, when we turn to the possibility of there existing things besides those which actually exist, the crucial question, as far as (*Possibility*) is concerned, is whether the existence of such 'new' things would bring with it the existence of 'new' natures which might place additional constraints of what is possible – so that something which is possible as things are would not be possible, were there to exist those 'new' things.

A thing's essence or nature consists of those of its properties which are essential to it. We may accordingly take essences in general to be more or less complex conjunctive properties. For example, the essence or nature of elephants – what it is to be an elephant – consists in being a large mammal equipped with a trunk and tusks. Being a natural, or finite cardinal, number consists in being either 0 or one of its successors (i.e. standing in the ancestral of the relation of immediate succession to 0). And similarly in other cases. The existence of elephants appears to be a contingent matter. Sadly, it may be that one day there will no elephants, and it seems at least possible that there should never have been any elephants. Does that mean that there will be, or might have been, no such thing as being an elephant? It seems to me that it the answer is plainly that it would not. There being elephants is one thing, and there being such a thing as the property of being an elephant is another. Properties may be uninstantiated. It may be a contingent matter whether a certain property has instances. That does not mean that the existence of the property itself is a contingent matter. And in many cases, including many of

the complex properties which constitute the essences of things, it will not be a contingent matter, on the theory of properties I favour.[32]

According to that theory – the *abundant theory* – the conditions for the existence of properties and relations are in an important respect very weak and undemanding. To a first approximation, the existence of a meaningful predicate – that is, roughly, a predicate with well-understood application or satisfaction conditions – is *sufficient* for the existence of a corresponding property or relation. A property (or relation) is simply a way for a thing or things to be – the way something is (or the way some things are), if it (or they) satisfies (or satisfy) the predicate. Of course, it would be implausible to take the actual existence of a suitable predicate to be a *necessary* condition for that of a corresponding property. Which properties actually have predicates standing for them is an accident of history. To state a condition which is not only sufficient but also necessary, we must have recourse to modality – what is required (and also sufficient) is not that there *actually be* a suitable predicate, only that there *could be* one. At least, this is both necessary and sufficient for the existence of what we may call *purely general* properties. Purely general properties are those which correspond to purely general predicates – that is, predicates which essentially involve no names or other devices of definite singular reference. They are thus to be contrasted with *object-dependent* properties, properties specified by predicates essentially involving singular reference to an object or object which must exist, if there is to be a corresponding property.

[32] My claim that properties may exist but be uninstantiated involves a clear break with the Aristotelian doctrine of *universalia in res*, which allows only instantiated properties. More controversially, perhaps – as my example of elephants and the property of being an elephant makes clear – it also puts me at odds from the quite widely held view that natural kind terms are extension-involving. At least, it does so, on the assumption that the predicates corresponding to some such terms are purely general. In this respect, I may also be in disagreement with Aristotle again, who requires that we must first establish that a general term φ is instantiated before we can enquire after the nature or essence of φs. The issue demands more careful discussion than a footnote permits. Very roughly, I think Aristotle is right in practice, at least in regard to essences discovered *a posteriori*, in the sense that it is invariably by investigating instances that we can get to know the essence. But that is an epistemological point which is consistent, in principle, with our being able to form a general predicate which defines the kind in question without extrapolating from instances, or even knowing whether there are any.

The condition for the existence of purely general properties is essentially modal: for any purely general property φ, it is necessary and sufficient for φ's existence that there *could* be a predicate standing for it. If, as I believe we should, we take this modality to be absolute, and governed by S5 principles, then we can give a simple argument for the conclusion that all purely general properties exist necessarily – so that all purely general properties actually exist, and none of them could have failed to exist. Let φ be any purely general property, let p be the proposition that φ exists (i.e. that there is such a property as φ), and let q be the proposition that there exists a predicate standing for φ. Then according to the abundant theory, it is necessarily the case that p *iff* $\Diamond q$ – that is: $\Box(p \leftrightarrow \Diamond q)$. It follows from this both that $\Box p \leftrightarrow \Box\Diamond q$ (by the K-principle) and that $p \leftrightarrow \Diamond q$ (by the Law of Necessity). But by S5, $\Diamond q \leftrightarrow \Box\Diamond q$. Whence by the transitivity of the biconditional, $p \leftrightarrow \Box p$.

If that is right, then, in so far as the essences of things are purely general properties, contingencies of existence and non-existence can pose no threat to the essentialist theory's central claims (i.e. to (*Necessity*) and (*Possibility*)). In other words, there will be a threat only if some essences are not purely general, but object-dependent properties, and the existence of the objects in question is itself a contingent matter.

That at least some essences are, or involve, object-dependent properties seems to me virtually certain. A plausible example is afforded by the natural numbers. If these are to be defined as Frege proposed, to be a natural number is to be either identical with 0 or one of its successors.[33] However, whilst this makes the essence of the natural numbers an object-dependent property, the existence of 0 is arguably no contingent matter. Are there object-dependent essences involving objects which exist only contingently? And if there are, do they pose an insuperable problem for the essentialist theory? These questions

[33] Cf. Gottlob Frege, *Die Grundlagen der Arithmetik – Eine logisch mathematische Untersuchung über den Begri der Zahl Breslau* (Wilhelm Koebner, 1884), §83. Frege's term for a natural number is 'finite number' (endliche Anzahl). The finite numbers are those among the cardinal numbers which stand in the ancestral of the relation of immediate succession to 0. Frege proposes to define 'n is a finite number' to mean 'n belongs to the natural series of numbers beginning with 0'. J.L. Austin renders Frege's German 'n gehört der mit 0 anfangenden natürlichen Zahlenreihe an' as 'n is a member of the series of natural numbers beginning with 0', but this is badly misleading, as was first observed by Timothy Smiley ('Frege's "Series of Natural Numbers"' (1988)).

call for fuller answers than I can give give here, where I have space for only a few brief and sketchy remarks.

The most plausible case I know for an affirmative answer to the first question turns on the essences of individual objects – individual people, plants, numbers, and so on. The essentialist should agree that individual objects have essences, for we can surely properly ask: what is it to be Aristotle, or to be this plant, or the number 17, say. Part of the answer, at least, will be that it is to belong to a certain kind. Thus to be Aristotle is, at least in part, to be a human being. But is there *more* to being Aristotle than this purely general property? Being a human being is something Aristotle has in common with many other individuals. It may be held that there must be something which makes Aristotle the particular human being he is. And now, since any purely general property will be one that he could share with other individuals, it may seem that what makes him the particular human being he is must be some object-dependent property, in virtue of which he and he alone is related to some other object(s) – an object or objects whose existence is as contingent as his own. The obvious candidates for such an object-dependent essential property are, of course, provided by the much discussed thesis that material objects, or at least individual living things, have their origins essentially. Thus what distinguishes Aristotle, say, from every other human being is his having originated in a particular egg and sperm produced by Phaestis and Nicomachus respectively.

This line of argument is clearly not irresistible. Apart from any doubts which may be felt about the specific thesis of essentiality of origin, it is anything but obvious that an individual must have an essence in the strong sense invoked in the argument – that is, an essential property which distinguishes it from every other individual. Here it is important cleanly to separate an epistemological sense of individuation from a metaphysical sense. Perhaps it is true – although it is scarcely uncontroversial – that if an individual is to be individuated in thought or speech, there must be some means of distinguishing that individual from all others. But that is clearly an epistemological matter, and the property or properties by which something is individuated in this sense – singled out, in thought or speech – need not, and typically will not, be essential ones. In any case, what is needed is an argument for the *metaphysical* principle that for each particular object a, there must be some essential property of a which by virtue of which it is distinct from every other object. The prospects for such an argument do not seem bright. We may well be reluctant to accept the distinctness of distinct individuals as a brute, inexplicable fact. But even if something akin to the

Identity of Indiscernibles – say that $\forall x \forall y(x \neq y \rightarrow \exists \varphi(\varphi x \leftrightarrow \neg \varphi y))$ – were accepted as *necessarily* true, it would fall well short of what is required. First, nothing in this ensures that the property which separates any given pair of individuals is an *essential* property of either; second, there is plainly no valid move from Leibniz's principle to the much stronger one that is required, which asserts that there is, for any given individual, some *single* property which separates it from *every* other individual, i.e. $\forall x \exists \varphi \forall y(x \neq y \rightarrow (\varphi x \leftrightarrow \neg \varphi y))$.

In the absence of any clear and compelling grounds for thinking that at least some individual essences must be object-dependent properties involving contingently existing objects, the essentialist may agree that there are contingencies of existence and non-existence, but argue that they make no difference to what essences there are, and so after all pose no threat to his central principles. But even if he does accept that at least some individuals have object-dependent essences requiring objects whose existence is a contingent matter, it is still far from clear that trouble must ensue. There are two cases to consider, according as what is envisaged is the existence of 'new' objects, distinct from all those which actually exist, or the non-existence of some of those objects which actually exist. In the first case, what is envisaged involves there being some 'new' individual essences; in the second, we envisage the absence of some 'old' (i.e. actually existing) individual essences.

The essentialist may argue, in the first case, that the possibility of there being new objects is purely general – it is the possibility that there should exist objects of some general kind, distinct from any (actually) existing objects of that kind. Since that general kind – as distinct from its 'new' instances – already exists, any limitations it may impose on what is possible are already in place. Further, while its envisaged new instances – or so we are conceding – will possess object-dependent essences, either those essences will depend on objects which actually exist, or they will be envisaged as depending upon further 'new' objects of some relevant general kind(s). To the extent that they are envisaged as dependent on actually existing objects, any constraints they impose on what is possible must be already in place; but to the extent that they may depend upon 'new' objects, any resulting constraints are purely general, resulting from having an essence of a certain kind, and so once again are already in place. Thus there are no essentially *new* constraints on what is possible.[34,35]

[34] For a less compressed development of this answer, see *Necessary Beings* (2013), 9.4.

[35] It is also worth noting that even if, in view of the way or ways in which species and other biological taxa are used in modern biology, essences cannot

Turning to the second case, the crucial question is whether the absence of some 'old' essence – i.e. the essence of some actually existing individual – could open up possibilities which are, as things stand, closed off by its presence. The essentialist can argue that it cannot do so, as follows. Suppose, for example, there were no such thing as Aristotle's essence. If there is any proposition which could not be true as things stand, but which could be true, were there no such thing as Aristotle's essence, it must be one expressing a putative possibility concerning Aristotle himself, since Aristotle's essence is irrelevant to, and imposes no constraints upon, putative possibilities in which he is not involved. It would have to be a proposition such as the proposition that Aristotle might have been a frog – a proposition which is, and must be, false as things are, because its truth is ruled out by Aristotle's essence (supposing it to be true in virtue of Aristotle's nature that if he exists at all, he is a man). The question is whether such a proposition would or could be true, were there to be no such thing as Aristotle's essence. And the answer is that it would not, and could not, be true, and it is sheer confusion to think otherwise. It is, of course, possible that there should have been no such thing as Aristotle's essence. Had there been no such thing as his essence, there would have been no such thing as Aristotle either. Hence there would have been no singular propositions concerning Aristotle. Thus, had there been no such thing as Aristotle's essence, there would have been no such proposition as the proposition that Aristotle might have been a frog – so that proposition could not be true *in* those circumstances, because it would not have existed in those circumstances. The only question that remains is whether that proposition – which does, of course, actually exist (since Aristotle and his essence exist) – is or could be true *of* those possible circumstances. And the answer is that it could not be true, because its truth is ruled out by Aristotle's essence.[36]

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be purely general properties but must be conceived as relational properties involving, say, descent from earlier species members, this need not trouble the essentialist. To be sure, the existence of the relevant relational properties will no longer be necessary, but contingent. But that is no problem, given that any 'new' objects must be of kinds which already exist.

[36] This issue is also discussed in *Necessary Beings* (2013) (see especially 9.4.5), but I have since come to think that the answer there proposed is less than satisfactory. The answer proposed here drastically abbreviates a longer discussion in an as yet unpublished paper on existence and essence ('Essence and Existence', *Revista de Filosofia de Costa Rica* (*forthcoming*)).

7. Concluding remark

Many of the issues discussed here require much fuller treatment than I have been able to manage here, and there are doubtless further questions and problems which will need to be addressed, before we may have any confidence that the essentialist theory is viable. But I hope I have done enough to persuade you that the theory has at least some merit and is worthy of further investigation.

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