King's Research Portal

DOI:

[10.1017/S1358246118000139](https://doi.org/10.1017/S1358246118000139)

Document Version

Peer reviewed version

[Link to publication record in King's Research Portal](#)

Citation for published version (APA):

Leech, J. (2018). Essence and Mere Necessity. *Royal Institute Of Philosophy Supplement*, 82, 309-332.
<https://doi.org/10.1017/S1358246118000139>

Citing this paper

Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

General rights

Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Research Portal

Take down policy

If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.

Essence and Mere Necessity

Jessica Leech, King's College London.

Abstract

Recently, a debate has developed between those who claim that essence can be explained in terms of *de re* modality (modalists), and those who claim that *de re* modality can be explained in terms of essence (essentialists). The aim of this paper is to suggest that we should reassess. It is assumed that either necessity is to be accounted for in terms of essence, or that essence is to be accounted for in terms of necessity. I will argue that we should assume neither. I discuss what role these key notions – essence and necessity – can reasonably be thought to contribute to our understanding of the world, and argue that, given these roles, there is no good reason to think that we should give an account of one in terms of the other. I conclude: if we can adequately explain *de re* modality and essence at all, we should aim to do so separately. (153 words)

1. Introduction

In recent years, a debate has developed over the nature of and relation between necessity and essence. Participants mostly fall into two broad categories: those who claim that an account of essence can be given in terms of *de re* necessity (modalists), and those who claim that an account of *de re* necessity can be given in terms of essence (essentialists). Despite their differences, both sides appear to share the same background assumption: that one of essence and necessity is to be given an account in terms of the other. They differ in their view of the direction of the relationship between them: the modalists give an account of essence in terms of necessity; the essentialists give an account of necessity in terms of essence.

The aim of this paper is to suggest that this debate is flawed, insofar as it rests on this background assumption. I aim to cast doubt on both sides: that we can give an account of essence in terms of necessity, and *vice versa*. Against the modalists, I give something of a pessimistic summary of the existing debate, with some contributions of my own. Against the essentialists, I argue that there is no good reason to think that *de re* necessity and essence are intimately linked in the right kind of way to *guarantee* that all essential properties are necessary properties (which is required for the essentialist account to work). My aim is not to argue that some essential properties are contingent, but rather to show that those embroiled in these debates thus far have *no good reason to assume* that all essential properties are necessary. If I am right, then a sizeable proportion of recent work in metaphysics is trading on a notion of essence (and necessity) that is, as yet, unfounded and therefore potentially unfit for purpose.

What is the upshot? If we can make good on the notions of *de re* modality and essence at all, we should aim to do so separately, at least in the first instance. In this paper I set aside whether or not there is a successful independent account of each notion, but on the assumption that there is or could be, we should not aim to explain one in terms of the other.

2. Modality and Essence

Before proceeding, some background. First, I should clarify the notions of essence and necessity under scrutiny.

The debate primarily concerns *de re* metaphysical necessity (and species thereof). It concerns 'essential' in the sense in which it is contrasted with 'accidental'. There are a variety of different things that might be counted, by one philosopher or

another, as essential, or essence. A demanding notion of essence is that of an *individual essence*, i.e. a property that serves to distinguish a particular individual across possible worlds. A more permissive notion is that of a property which is essential to an individual, although the property may be had by other individuals. For example, it is often claimed that Socrates is essentially human, but this doesn't prevent other things from being human (e.g. Plato). In both cases, essential properties are had by individuals: in the case of individual essence they are claimed to be necessary and sufficient, in the latter case they are only claimed to be necessary, for being a certain individual. Claims about essence are also made about natural kinds. Theoretical identities, such as 'Water is H₂O', are often described as essentialist claims.

In this paper I focus on essential properties of individuals. As far as possible, I wish to avoid debates about which properties in particular are essential, or whether there are any essential properties. My concern is with whether we can make sense of an essential property of an individual, as distinguished from a merely necessary property. I will work with cases of the form 'a is essentially *F*' in mind, such as 'Socrates is essentially human' or 'Socrates is essentially the child of Phaenarete'. I won't consider cases of theoretical identities, or essences of kinds and properties. There will not be space to give a full treatment of such cases here, but it is an interesting question for elsewhere whether what I go on to claim about individuals and their properties can be extended.

It is by no means a settled matter what, if any, properties are essential. Nevertheless, it is a useful guide to identify a class of typical cases of essence that should, as far as possible, be accommodated by any account of essence, as distinguished from cases that are intuitively not of essence. There should be the

flexibility to discover that some – perhaps many – typical cases are in fact not essential, according to an otherwise plausible and defensible account. But it would be difficult to know where to start without initially taking at least some cases for granted. Hence, I draw on typical cases from the literature on essence to guide my discussion.

A well-known and now standard introduction to the debate in question is to be found in Kit Fine's 'Essence and Modality'.¹ Fine targets the traditional view that an essential property is to be straightforwardly understood as a necessary property, a property had by an individual in any possible world in which that individual exists.²

(Modalism₁) *a* is essentially *F* if and only if necessarily, if *a* exists, then *a* is *F*.

His counterexamples are, by now, familiar. Necessarily, if Socrates exists, Socrates is a member of the singleton set of Socrates. But, intuitively, Socrates is not *essentially* a member of any set. Necessarily, Socrates and the Eiffel Tower are distinct. But it seems odd to suggest that the Eiffel Tower should feature in some way in the essence of Socrates: Socrates is not *essentially* distinct from the Eiffel Tower. Take any necessary truth, for example, that $2+2=4$. Necessarily, if Socrates exists, then $2+2=4$ – there's no world in which Socrates exists and $2+2$ does not equal 4, because it is true in all worlds that $2+2=4$. However, it does not seem to be part of the essence of Socrates that $2+2=4$. Finally, it is necessary that, if Socrates

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

² This is one of several different formulations of modalism, but nothing much hangs on my choice here.

exists, then he exists. But Socrates doesn't *essentially* exist; he was an inspirational philosopher, but not a God.

In such examples, we encounter a distinction between two classes of necessary properties, those which are essential, and those which are merely necessary (had by an individual in all worlds in which the individual exists). Following Fine, such a distinction has been taken up into the literature. Indeed, it has become relatively commonplace and uncontroversial to distinguish between essence and mere necessity. This can be seen in the variety of attempts to honour the distinction between essential and merely necessary properties, whilst resisting Fine's conclusion that metaphysical necessity should be defined in terms of essence.³ It can also be seen elsewhere, for example, in work that seeks to distinguish between essential and necessary dependence and/or explanation,⁴ and in a proposal for how to understand intrinsic properties.⁵ Having accepted this distinction, a new debate

³ For example, Brogaard, B., & Salerno, J. (2013) 'Remarks on counterpossibles', *Synthese*, 190, 639–660; Correia, F. (2007) '(Finean) Essence and (Priorean) Modality', *Dialectica* 61:63-84; Cowling, S. (2013) 'The modal view of essence', *Canadian Journal of Philosophy*, 43:2, 248-266; Della Rocca, M. (1996) 'Recent Work on Essentialism: Part 1', *Philosophical Books* 37:1-13; Denby (2014) 'Essence and Intrinsicity', in Francescotti, R. (ed.) *Companion to Intrinsic Properties*, De Gruyter; Wildman, N. (2013) 'Modality, Sparsity, and Essence', *The Philosophical Quarterly* 63:760-782.

⁴ For example, Correia, F. (2008) 'Ontological Dependence', *Philosophy Compass* 3:1013-1032.

⁵ Cameron, R. (2009) 'Intrinsic and extrinsic properties', in R. Le Poidevin et al (eds.), *The Routledge Companion to Metaphysics*, Routledge, 265-275.

comes into view: that of whether we can understand essence in terms of necessity, or *vice versa*.

3. Necessity First

Fine has shown that not every necessary property is an essential property, i.e. that modalism₁ is false.⁶ A definition of essence in terms *only* of necessary properties will not do. But can this definition be supplemented? Can we define essential properties as a sub-species of necessary properties? Several proposals have been made, and criticized, in the growing literature on this debate. I cannot reproduce the entire discussion here; rather, I summarize some significant points, and make some observations.

First, we might add a clause to rule out trivial necessary properties. A simple definition of a trivial property is a property that every entity whatsoever has just in virtue of existing (being a thing).

Essentialists attempt to discover what properties are required to be a particular thing A. Typically the aim in so doing is to offer an account of what is required to be A that goes beyond the kinds of facts we can learn about A simply from the general fact that A is a thing. What we can learn from this general fact does not reveal the specific character of A and is, for that reason,

⁶ Not everyone agrees with Fine's examples, but dissatisfaction is often an overture to the presentation of a set of preferred examples which also serve as counterexamples to modalism₁. See, for example, Gorman, M. (2014) 'Essentiality as Foundationality', in D. Novotný and N. Lukáš (eds.), *Neo-Aristotelian Perspectives in Metaphysics*, 119-137, Taylor and Francis.

trivial. Properties that are necessary to A but which stem merely from the general fact that A is a thing are thus called trivial necessary properties. (Della Rocca, 1996, 3)

These properties don't tell us anything about what it is to be A *in particular*, but rather only what it is to be anything. So they aren't relevant to the peculiar nature of A in the way that the notion of essence requires.

Della Rocca extends the definition of a trivial necessary property to include properties which are not themselves properties that can be had by everything, but the having of which follows logically from a thing having a universal trivial property. Della Rocca's example is self-identity. Socrates, like all things, is self-identical. It follows from Socrates's being self-identical that Socrates is identical to Socrates, and hence that Socrates has the property of being identical to Socrates. Nothing else can have this property. Nevertheless, it is trivial: the same line of reasoning will lead us to the claim that, for example, Plato has the property of being identical to Plato, and so on for all things.⁷

⁷ One might also worry about this example. It does not follow logically from something's being self-identical that it is identical to Socrates: it is only *Socrates's being self-identical* that implies that Socrates has the property of being identical to Socrates. As such, the entailment seems to rest on specific and non-trivial information concerning Socrates. However, presumably Della Rocca's point is that we can run the same line of reasoning for anything that exists. In each case we appeal to the self-identity of one particular thing rather than another. But there is no difference in how things go for different things. It's not as if, for example, we can't

The proposal is thus:

(modalism₂) *a* is essentially *F* if and only if necessarily, if *a* exists, then *a* is *F*, and being *F* is non-trivial.

(triviality) being *F* is trivial if and only if every entity whatsoever is *F* just in virtue of existing, or, being *F* follows logically from being *G* where every entity whatsoever is *G* just in virtue of existing.

Modalism₂ allows us to address Fine's counterexamples.⁸ For example, although *being a member of singleton Socrates* is a property only Socrates can have, Socrates's having this property follows from Socrates's having a property which is universally necessary: *being a member of a singleton set*. Conversely, there is no triviality to be found in singleton Socrates's necessarily having Socrates as a member. It is not the case that everything has Socrates as a member, not even sets, so it is not universally necessary. What universal necessity might it follow from? That necessarily everything has a member? This is false, even for sets (there is an empty set).

However, one can generate counterexamples to modalism₂.⁹ Take the case of origin. The essentialist might claim that a human has their origin essentially, i.e. they essentially have the parents they actually have. So, for example, Oedipus essentially

conclude in the case of Plato that he's identical to Plato, on the basis of his being self-identical.

⁸ See Gorman (2005).

⁹ See Gorman (2005) for a different approach to generating counterexamples.

has Jocasta as a parent. But such cases are asymmetrical. Even though having Jocasta as a parent is essential to Oedipus, it is no part of what it is to be Jocasta that she had any children at all. So Jocasta is not essentially a parent of Oedipus. Now, it is necessary that, if Oedipus exists, he has Jocasta for a parent. This is non-trivial: many things lack this property, and many things lack parents.¹⁰ So according to modalism₂, Oedipus essentially has Jocasta for a parent. Also, it is not necessary that, if Jocasta exists, she has Oedipus for a child. So far so good.

However, plausibly, Jocasta does have the following property: *necessarily, if she exists, being a parent of Oedipus if he exists*. There are worlds in which Jocasta exists without Oedipus, but no worlds in which Oedipus exists without Jocasta – this is what allows for the asymmetry in the simple cases. But, in all worlds in which they both exist, Oedipus is the child of Jocasta (so the essentialist of origin claims). So, Jocasta does have the necessary property of *being a parent of Oedipus if he exists*.¹¹

¹⁰ If everything has an origin, one might claim that Oedipus's origin is trivial insofar as it follows from the universally necessary property of having an origin. However, we might not want to rule out the possibility of objects without an origin, perhaps everlasting or cyclical objects.

¹¹ There is a background assumption here that Jocasta and Oedipus are contingent beings, but the argument can be modified to accommodate views according to which everything exists necessarily, as, for example, in Williamson, T. (2002) 'Necessary Existents', in O'Hear, A. ed. *Logic, Thought and Language*, Cambridge: Cambridge University Press; and Zalta, E. N. (2006) 'Essence and Modality', *Mind*, 115:459, 659-693. We need only modify examples of properties had in all (and only) worlds in which a thing exists, for the surrogate notion of properties had in all (and only) worlds

This is not obviously trivial. It specifies a property that Jocasta herself bears in certain circumstances, i.e. whenever Oedipus exists. However, one might respond that, nevertheless, Jocasta's having of the particular necessary property *being a parent of Oedipus if he exists* follows logically from her having, in virtue of being a thing at all, the universally necessary property *being such that Oedipus is a child of Jocasta if they both exist*. So the case counts as trivial.

Suppose we agree. We have a 'such that [necessary truth]' property, which is trivially had by everything. However, the triviality clause was supposed to differentiate those properties which go 'beyond the kinds of facts we can learn about A simply from the general fact that A is a thing'. The necessary property of *being such that Oedipus is the child of Jocasta if they both exist* allows us to learn more about certain entities, namely Jocasta and Oedipus, than others. So, according to Della Rocca's motivations for his account, it should not count as trivial. If it doesn't count as trivial, then the account allows that Jocasta is essentially a parent of Oedipus if he exists. But this is supposed to be false. So modalism₂ should be rejected.

Even if one could find a response to this, things would go no better. Again, suppose we accept that Jocasta is trivially necessarily a parent of Oedipus if he exists (if she exists), and thus not essentially so. However, this cuts both ways. Oedipus himself bears the (slightly different) universally necessary property of *being*

in which a thing is concrete. So, for example, we might say that Jocasta and Oedipus exist in all worlds; necessarily, if Oedipus is concrete, he has Jocasta for a parent; in some worlds in which Jocasta is concrete, she does not have Oedipus as a child; but Jocasta does necessarily have the property of *being a parent of Oedipus if he is concrete, if she is concrete*.

*such that Oedipus is a child of Jocasta, if Oedipus exists.*¹² As suggested above, this implies that Oedipus is only *trivially* necessarily a child of Jocasta if he exists. So by the proposed account Oedipus is not essentially a child of Jocasta. But this is supposed to be false. So modalism₂ should be rejected. (This problem also generalises: most parties do not want to claim that Socrates is trivially necessarily human in virtue of having the universally necessary property of *being such that Socrates is human if he exists.*)

The modalist might respond by taking issue with the suggestion that there can be complex properties of this kind at all, i.e. properties involving conditionals. We can certainly construct predicates of this complex kind, e.g, 'is a parent of Oedipus if he exists'. Whether or not complex predicates such as these correspond to metaphysically robust entities called 'properties' is a reasonable question. At least: if there are complex properties of the kind described, modalism₂ fails. The modalist may therefore wish to restrict essential properties to sparse properties.

Unfortunately, attempts to defend the view that essential properties are *necessary* and *sparse* are also problematic. Skiles (2015) offers a detailed criticism. To briefly summarize one of the more obvious problems: however we define 'sparse' – in terms of perfectly natural properties, or in terms of those properties involved in the total scientific understanding of the world – there will be cases of non-sparse

¹² This change is required because the essentiality of origin claim is not that Oedipus is essentially the child of Jocasta *if they both exist*. This would allow for Oedipus having a different parent in worlds in which he existed without Jocasta. The claim is rather that Oedipus is essentially the child of Jocasta *if he exists*. But this still generates a universal necessary truth, that necessarily, if Oedipus exists then Jocasta is his parent, and accordingly a universal necessary property.

(abundant) properties that we want to count as essential. For example, we might want to make claims about what is essential to an artwork, such as that the creator of an artwork is essential to it.¹³ But artworks and many of their properties will not count as sparse on either conception. Skiles offers further examples.

Take, for instance, human artefacts such as the Eiffel Tower, which essentially exemplifies various abundant properties (e.g., *being a tower*) and essentially stand in abundant relations (e.g., the relation *was designed and constructed to perform such-and-such function by*, which it bears to some engineer or other, or perhaps to Gustave Eiffel in particular). Similarly goes for entities such as smiles (the essential nature of which include facts about faces), holes (the essential nature of which include facts about perforated surfaces), tropes (the essential nature of which include facts about the particular things they ‘inhere’ in), and events (the essential nature of which include facts about the objects, properties and times that ‘participate’ in them), among others. (Skiles 2015, 106)

None of these properties seem trivial, and so would not be ruled out by modalism₂. For example, *being created by Michelangelo* is certainly not a property that is had by all things, and (e.g. David) having this property doesn’t follow from having some other, universal, property. So appeal to sparseness cannot save modalism₂. Again, modalism₂ should be rejected. As should modalism₃:

¹³ See Levinson, J. (1980) ‘What a Musical Work Is’, *The Journal of Philosophy* 77:5-28; Wiggins, D. (2001) *Sameness and Substance Renewed*. Cambridge University Press, 136-8.

(modalism₃) *a* is essentially *F* if and only if necessarily, if *a* exists, then *a* is *F*, and *F* is a sparse property.

Another option requires that essential properties be *intrinsic*.

(modalism₄) *a* is essentially *F* if and only if necessarily, if *a* exists, then *a* is *F*, and *F* is intrinsic.

For example, Denby (2014) proposes such an account of essence, supported by his own definition of ‘intrinsic’.¹⁴ One might immediately worry that such a view cannot accommodate relational essences, such as singleton Socrates having Socrates as a member, or Socrates being the child of Phaenarete, for intrinsic properties are supposed to be those that concern only the thing itself, not anything to which it is related. Denby responds by claiming that these are non-relational, intrinsic properties of *pairs*. However, a deeper worry for modalism₄ is that intrinsicity and necessity interact in ways that undermine the proposal.

‘Intrinsic’ is often defined in a way that draws on modal terms. For example, in their classic treatment, Langton and Lewis draw on the idea that intrinsic properties *cannot* differ between duplicates.¹⁵ Denby’s alternative is developed in terms of *compossible* distributions of properties: roughly, the distribution of an intrinsic

¹⁴ Denby, D. (2006) ‘The Distinction between Intrinsic and Extrinsic Properties’, *Mind*, 155:457, 1-17.

¹⁵ Langton, R. and Lewis, D. (1998) ‘Defining “Intrinsic”’, *Philosophy and Phenomenological Research* 58:333-345.

property is independent of distributions of other properties, and so will be compossible with distributions of other properties.¹⁶ Trouble ensues when we try to combine modally-defined intrinsicality with necessary properties: if a property cannot differ at all (if it has a necessary distribution), then it cannot differ between duplicates, and so is intrinsic. If there is only one possible (i.e. a necessary) distribution of a property, then it will be compossible with all other possible distributions of other properties, and so the property is intrinsic. Because the notion of an intrinsic property is, according to these definitions, not independent of the necessity of a property, we should not use intrinsicality to place a further constraint on necessary properties in order to give an account of essential properties: the results will be distorted by prior interaction between intrinsicality and necessity.

Such debates continue.¹⁷ However, I will not discuss any further varieties of modalism. The current state of the literature suggests that one can continue to develop new conditions on necessary properties, and hence new varieties of modalism, but that criticism and counterexamples will not be far behind. The more complicated the proposals become, moreover, the less plausible they are. At some point, it becomes more reasonable to suppose that the modalist approach is wrong, than that the truth about essence lies in an increasingly complicated series of conditions on necessary properties.

¹⁶ This is simplifying to a great extent. I don't want to do Denby an injustice here, by not properly outlining his view, but I think this brings out the core of the proposal.

¹⁷ For example, Brogaard and Salerno (2013) propose a form of modalism that includes a counterfactual condition, Steward objects – Steward, S. (2015) 'Ya shouldn'ta couldn'ta wouldn'ta', *Synthese*, 192, 1909-1921.

4. Essence First

Perhaps the modalist gets things the wrong way around: we should give an account of essence first, and then give an account of necessity in terms of essence.¹⁸ Fine draws on an understanding of essence in terms of real definition.

[E]ssence has been conceived on the model of definition. ... The concept of essence has then taken to reside in the “real” or objectual cases of definition, as opposed to the “nominal” or verbal cases. (Fine 1994, 2)

Aristotle famously wrote,

A definition is a phrase which signifies the what-it-is-to-be. (Topics, 101b38-102a1)

A real definition, one might say, tells us what features of a thing are tied up with its being, its existence. The real definition of *a* tells us ‘what it is to be *a*’. To take an example from Aristotle: the definition of a human is that it is a rational animal. This not only distinguishes it from all other kinds of things, but it strikes at the core of what

¹⁸ See Fine (1994); Hale, B. (1996) ‘Absolute Necessities’, *Nous Supplement: Philosophical Perspectives*, 10, *Metaphysics* 30:93-117; Hale, B. (2002) ‘The Source of Necessity’, *Philosophical Perspectives* 16:299-319; Hale, B. (2013) *Necessary Beings: An Essay on Ontology, Modality, and the Relations Between Them*, Oxford: Oxford University Press.

it is to be human. By contrast, a human may be sitting or not, thus the property of sitting is an accident.¹⁹

To clarify, some recent work on the notion of real definition has moved away from equating it with essence. For example, Fine writes,

I have previously suggested that definitions, either nominal or real, might plausibly be taken to correspond to statements of essence (simply involving the reverse arrow ' $\leftarrow$ '). What I would now like to suggest is that reductive definitions be taken to correspond to real definitions in which the arrow can be reversed, so that we have what is both a constitutively necessary and a constitutively sufficient condition for something to hold. (2015, 308)²⁰

¹⁹ Aristotle arguably only has in mind definitions of kinds, such as *human*, and not definitions of individuals, such as Socrates. See Aristotle, *Metaphysics*, VII, 15: 'And so when one of the definition-mongers defines any individual, he must recognize that his definition may always be overthrown; for it is not possible to define such things'. <http://classics.mit.edu/Aristotle/metaphysics.7.vii.html>, translated by W. D. Ross.

²⁰ Reverse arrow signifies essence, forwards arrow signifies grounding, and so ' $\leftrightarrow$ ' signifies a relation of both grounding and essence. For example, $x = \text{H}_2\text{O} \leftrightarrow x = \text{water}$, means that it is essential to x being water that x is H_2O (it is constitutively necessary that x be H_2O to be water), and x is water in virtue of it being the case that x is H_2O (it is constitutively sufficient for x to be water that it is H_2O). Fine, K. (2015) 'Unified Foundations for Essence and Ground', *Journal of the American Philosophical Association*, 296-311.

Rosen (2015) gives an account of real definition in terms of essence and grounding.²¹ Insofar as these accounts draw on a prior notion of essence, and do not intend real definition to be equivalent to essence, I set them to one side. In what follows, I draw on other notions that one might take to flesh out a non-modal understanding of essence, that one might take to be related to a notion of real definition. If this is confusing in light of recent work, I am happy to give up the label ‘real definition’. The important point is working through some ways of thinking of essence, and whether they require that essential properties be necessary.

The essentialist proposal is that once we have a notion of essence (along the lines of real definition, or something similar) we can then give an account of necessity in terms of essence. A basic principle is usually the following: it is metaphysically necessary that p just when it is true in virtue of the essential nature of some things that p . Such a proposal relies on the assumption that the essences of things are necessary to them, i.e., that if a is essentially F , then a is necessarily F . My main contention will be that this assumption is unfounded – insofar as we can make sense of a notion of essence, without drawing on a prior notion of necessity, essence does not entail necessity. In simple terms: what something *is* does not tell us – absent further assumptions – what something *must be*.

I will not argue by counterexample, by arguing that there are cases where a is essentially yet merely contingently F . Rather, I argue that, insofar as we understand what the notion of essence is supposed to offer us, it *can do that* without having to yield necessity: necessity is not *required*. To this end, I discuss two different ways we might understand the role that essence is supposed to play: properties that are required for persistence and destruction conditions, and properties that are required

²¹ Rosen, G. (2015) “Real Definition”, *Analytic Philosophy*, 56(3): 189-209.

for individuation. My argument, in each case, takes the following form: (1) essential properties are required to play role R; (2) role R can be successfully played by contingent properties; therefore (3) we should not argue the following: that essential properties are necessary because they are required to play role R.²² I then propose a diagnosis of why we might expect essence to get us to necessity, via confusion over transworld identification. Finally, I address an argument from utility – the assumption that essence yields necessity is so fruitful that we should accept it as true.

4.1 Persistence and destruction conditions

There are some changes that some things survive, and some they don't. For example, a table can survive a change of colour (through being painted), but not a change from wood to ashes (through being burnt). A human being can survive getting a haircut, but not the cessation of all physiological functioning. What is the difference between the changes that things do and do not survive?

One proposal is that a thing only survives changes under which it retains its essential properties. We often appeal to the kind of thing something is to explain its persistence and destruction conditions. For example, it is because it is a table, and

²² Compare: one might argue that the role of properties is to account for similarities and differences. That role could be filled by transcendent universals, in which case, properties would be necessary existents. But there is nothing in the role identified for properties that requires properties to exist necessarily. It seems that contingent entities could play that role, e.g., immanent universals, or tropes, or concepts. Hence, we should not conclude, just from recognizing this role for properties, that properties are necessary beings.

not a mere collection of particles, that a table cannot survive being burnt; it is because they are a human being, and not a lump of flesh, that a human cannot survive cessation of physiological functioning. Those properties which are required for the continuing existence of an individual might be rightly thought of as what it is *to be* for that individual – for if those properties are lost, then that individual no longer *is*.

We might question whether there really are properties so central to the existence of things. Hazlett (2010), for example, presents a compelling narrative about a snowball, challenging whether there are any such specifiable properties connected to destruction.²³ One might think that a snowball couldn't survive melting. But, 'we can cook up a story in which a snowball intuitively survives being warmed: you land a vicious blow with a powerful snowball, I vow revenge, I melt your snowball and refreeze it to make it harder or more aerodynamic or something, and then I cathartically attack—using the very same snowball with which you attacked me'. (Hazlett 2010, 85) However, even granting for the sake of argument that it is correct to take some properties to play this role, does this imply that they are had *necessarily*?

Suppose that Socrates cannot lose his humanity without ceasing to exist. Is Socrates thereby *necessarily* human? Why think he had to be human in the first place? Perhaps Socrates might have been a robot. In that case, perhaps Socrates could not lose his robot-ness on pain of ceasing to exist. In other words, this notion of essence implies that if what it is to be *a* is to be *F*, then it is impossible for *a* to be *temporarily F*, i.e. necessarily, if *a* is essentially *F*, *a* is permanently *F*. But that does

²³ Hazlett, A. (2010) 'Brutal Individuation', in A. Hazlett (ed.), *New Waves in Metaphysics*, 72-90, Palgrave-MacMillan.

not imply that *a* is necessarily *F*.²⁴ Essential properties, thus understood, are amongst what we might call the *permanent properties*. But permanence does not imply necessity. Indeed, there are many properties that, once had, cannot be lost, that we would not want to class as necessary or essential, such as the property of having eaten a sandwich.

Given that not all permanent properties are necessary, what else is special about so-called essential properties? Why do we appeal, in particular, to Socrates's *being human* in an account of his persistence and destruction conditions? We might restrict ourselves to sparse properties, to rule out tensed and/or relational properties such as *having eaten a sandwich*. However, I have already noted that sparseness raises its own problems. (For example, it is likely that the properties providing the persistence conditions of an artwork, if there are such, are not sparse.)

We might take the essential properties to be those that *ground* persistence and destruction. So, although Socrates could survive losing neither his humanity, nor his having met Glaucon, it is his loss of the former property that is taken to ground his perishing. More generally, it is distinctive of a property *F* that is essential to something *a* that *it not being the case that a is F* will ground *it not being the case that a exists*.²⁵ However, just because a certain property *actually* grounds Socrates's perishing, it doesn't follow that the property *necessarily* plays that role. For example, if Socrates had been an antelope, it would have been the property of being an antelope, not that of being human, that grounded Socrates's perishing or persisting.

One might add the assumption that the grounding relation is factive and necessitating: if *P* grounds *Q*, then necessarily, if *P* obtains, *Q* obtains and *P*

²⁴ See also Kripke (1980, 144, fn 57).

²⁵ Thank you to an anonymous reader for this suggestion.

grounds Q.²⁶ This would ensure that necessarily, if it's not the case that *a* is *F*, then it's not the case that *a* exists. So the relevant properties turn out to be necessary to the existence of things after all. However, this argument rests on the assumption that the grounding relation is factive and necessitating. But this assumption is, in a way, precisely what is at issue here. Let us suppose we have a reasonable grasp of the idea that it is Socrates's having of the property of being human that grounds whether Socrates persists or perishes. It is Socrates's having the property of being human that explains why in some circumstances Socrates persists – e.g. eating a sandwich – and in others he perishes – e.g. drinking hemlock. The explanation is given in terms of Socrates's retaining or losing the property. The question at issue is: why think that this explanation of how Socrates *actually is* expands to tell us about how he *must be*? Why think that the actual facts about grounding are necessary? For example, it may be that, whilst facts about when Socrates persists or perishes are actually grounded by his being human, he could have been non-human and a robot instead, in which case facts about when Socrates persists or perishes would have been grounded by his being a robot. To simply appeal to the assumption begs the question.

If one is prepared to loosen the tie between essence and grounding, there is another response. Say what you like about grounding: if it is a necessitating relation, then we cannot explain persistence and destruction conditions in terms of grounding, because that would entail that the properties the having or lacking of which ground

²⁶ There are also weaker versions of this claim we might consider. For example, if grounding is an internal relation, then if *P* grounds *Q*, then necessarily, if *P* and *Q* obtain, then *P* grounds *Q*. However, my objections to the stronger principle carry over.

the existence or not of a thing belong to that thing necessarily, and that, I have argued, is implausible. Just because Socrates happens to be a human, and so cannot survive ceasing to be human, it does not follow that Socrates couldn't have been something else entirely in the first place.

Perhaps these examples simply show that it is not being a human or a robot that provides Socrates with his persistence conditions; it must be some more general property. For example, Socrates is a thinker and his persistence conditions are grounded by his being a thinker. Supposing that thinkers can be animal or machine, this explains why he could have been a human or a robot. Fair enough. But we can introduce more extreme cases, where it becomes harder to think of a plausible, more general, property to ground persistence. For example, Socrates might have been a marble statue, and had he been, his persistence conditions would have been grounded in his being a statue. Is there a plausible more general property, which a human, a robot, and a statue could share? They are all *objects*, but that is too general to provide a meaningful persistence condition for Socrates. One cannot simply reply that Socrates couldn't have been something as different as a statue – that is the point at issue. My claim is that the role of providing or grounding persistence and destruction conditions can be fulfilled by something we might call the 'what it is to be' something, without this being necessitating. In these examples, Socrates always has some such conditions, even if he could have been a very different kind of thing.

4.2 Individuation of things

How can we identify particular individual things, and discriminate between them? It has been argued that this is only possible through reference to sortal concepts. Sortal concepts, roughly speaking, allow us to count. As Brandom puts it,

Unsorted 'things' or 'objects' cannot be counted. There is no answer to the question how many things there are in this room; there is one number of books, another of molecules, another of atoms, another of subatomic particles. ... Counting is intelligible only with respect to a sortal concept.²⁷

Sortals, so the thought goes, allow us to think of individuals. We can only think of an individual as a *this such*, not as an individual *simpliciter*.²⁸ There is some plausibility in the idea. How do we draw a line between one thing and another? Just pointing and shouting 'That!' is perhaps not specific enough. But, for example, if when pointing at something running across the field, I shout 'That rabbit!' rather than simply 'That!', I make it clear that I want to pick out the rabbit (the organism), not the un-detached rabbit parts, or an instance of swiftness. Similarly in thought: I can't just magic up *de re* thought of a particular, rather I require a sortal concept to draw boundaries around the individual object of thought. The sortal concept – and the sortal property thereby represented – provide conditions for the persistence of the object, and for its identity and distinctness from other things. As such, it is natural to think of sortal properties (or falling under sortal concepts) as being essential to their bearers, in the sense that they are intimately connected with the identity of those things.

²⁷ Brandom, R. B. (1994) *Making it Explicit*, Harvard University Press, 438,

²⁸ See Wiggins (2001, 159), Brandom (1994, 439).

The proposed line of thought takes us from the importance of *a*'s being *F* for individuation of *a*, to *a*'s being necessarily *F*. The idea is that, as *a*'s being *F* is so central to our very ability to conceive of *a*, *a* couldn't be otherwise than *F*. Note, the view that sortals are required in something like this way for singular reference is controversial.²⁹ If it turns out to be wrong, then of course there can be no helpful route from here to essence to necessity. But I also want to argue that, even granting that sortals do play this kind of role in individuation, they can do so without being instantiated necessarily.

First, even granting that we need sortal concepts to enable an *initial* grasp of an individual, once we have *de re* thought of it we can hold that fixed through a wide range of variations. For one, it seems highly plausible that we can track an individual through changes in its sortal properties over time. Fictional stories are endemic with such changes. For example, in *The Chronicles of Narnia* by C.S. Lewis many characters are turned from flesh to stone by the White Witch, but on her defeat, they turn back to flesh. Arguably, this involves cases of an individual changing from one sortal property (e.g. faun), to another (stone) and back (faun) over time. Or, in J.K. Rowling's *Harry Potter* books a number of characters are able to take an animal form at will and can change, for example, from human, to cat, and back to human. Or we might return to Hazlett's snowball example, where we track an individual through change from snowball, to quantity of water, to iceball. We might plausibly imagine a human having more and more body parts replaced with mechanical prostheses (first

²⁹ For example, Campbell (2006) argues that singular reference requires general constraints that are much weaker than sortal concepts. Campbell, J. (2006) 'Sortals and the Binding Problem', in F. MacBride (ed.), *Identity and Modality*, 203-218, Clarendon Press: Oxford.

a metal hip, then a bionic leg, then a bionic eye, a synthetic heart, and so on). After a while, we are left with a robot, not a human being, but it is at least open to argument that the same individual has persisted throughout those changes.

What is important about these examples is that they make sense. So the claim that our ability to conceive of an individual always requires us to use the same sortal concept for that individual doesn't fit at all with our actual abilities to track identities, even if we do need to use *some* sortal concept at each stage of tracking.

One could again respond by claiming that such cases merely show that we have isolated the wrong properties as sortals. For example, in the change from human to robot, the individual is perhaps a *person* throughout, and hence it is this latter property that provides individuation conditions. However, again, this is less plausible with more extreme examples, such as Mr Tumnus changing from faun, to stone, to faun again. Any property that is shared by the faun and the stone, and had by Mr Tumnus throughout his existence, such as being an object or being self-identical, is too general to be helpful.

However, let us suppose that the temporal case can be made, and that sortal properties thereby underwrite principles of individuation: a principle that 'allows us to answer questions about identity and distinctness at a time and over time'.³⁰ So, for example, if *being human* is such a property, then it provides Socrates with a principle of individuation. It tells us what changes he will and won't survive, and it gives criteria for determining when humans are the same or different.

Again, there is no immediate reason to suppose that, just because being *F* actually provides *a* with a principle of individuation, *a* is thereby *necessarily F*. For

³⁰ Mackie, P. (2006) *How Things Might Have Been: Individuals, Kinds, and Essential Properties*, Oxford: Clarendon Press, 134.

example, just because the conditions under which Socrates actually survives, and according to which he is actually distinct from Plato, are tied to his actually being human, this does not mean that he *could not have been* non-human (with a different principle of individuation).³¹ What is required is further argument that a given principle of individuation corresponds to a necessary feature of an individual.³²

Mackie (2006) argues convincingly that no such argument is successful. Summarizing: one might claim that counterfactual possibilities for individuals have to be grounded in their actual characteristics. So there must be some actual characteristic of an individual which it has in all counterfactual possibilities for that individual. However, this is just bad reasoning. From, 'x has one of its actual properties in all of its counterfactual possibilities', it does not follow that 'there is an actual property of x such that x has it in all of its counterfactual possibilities'. One might strengthen the claim to: counterfactual possibilities for individuals have to be grounded in an actual characteristic that is *sufficient to individuate* the individual.³³

³¹ Hazlett argues that if we are not committed to *some* necessary properties of individuals, then 'nothing would or could be destroyed' (2010, 87). However, suppose that Socrates has no (non-trivial) necessary properties. He is actually a human philosopher, but he might have been a talking donkey. That said, *given that he is a human*, if he loses that property, he will cease to exist. And *had he been a donkey*, if he lost that property, he would cease to exist. So we can allow for destruction without necessary properties.

³² Further problems for this view may arise from potentially competing principles of individuation, as in the case of Lump1 (lump of clay) and Goliath (statue). But I have no space to adequately consider such issues here.

³³ See, for example, Wiggins's Anchor Constraint (Wiggins, 2001, ch. 4).

But why can't another, actually non-individuating, property anchor the individual? This won't prevent the individual from having a principle of individuation in other possibilities; it will just be a different one. In terms of accounting for identity, persistence, change and destruction, a principle of individuation can perform these functions whilst being connected to a contingent property.

Again, we are surprisingly adept at tracking individuals across modal variations. For example, I may need to identify my neighbour's pet Bouncer through use of the sortal *dog*, but having thus identified her, I can consider meaningful questions about what Bouncer would have been like had she been a guinea pig, e.g., she might have had (and been recognisable in virtue of) the same savage personality, but required quantities of cucumber rather than meat. Here, the putatively nonessential property of a savage personality serves as our 'counterfactual anchor', not the putatively essential properties of doghood or Guinea-pig-hood. Whether or not you agree that Bouncer really could have been a guinea pig, I contend that the proposal above at least makes sense. It's not *unintelligible* that Bouncer could have been a guinea pig, recognizable by virtue of her distinctive savagery. So it's not right to claim that our very ability to conceive of Bouncer is constrained by her actual sortal property of being a dog.

Let us start again with the claim that we need sortals to identify things, e.g. I can only identify *a* by conceiving of *a* as *F*, where *F* is a sortal concept. If that is really what *a* is, then how can one count as genuinely conceiving of *a*, if *a* is not conceived of as *F*? One can reply that even if one needs the sortal to identify *a* as the object of *de re* thought, once grasped, we can track *a* over a remarkable range of

changes – cross-temporal and cross-modal.³⁴ I take it that our ability to identify and track objects across sortal changes – both over time and counterfactually – is data about our individuating abilities that needs to be accounted for in any theory of individual reference or individuation. The onus is on the proponent of the sortalist view to either provide such an account or to explain away the data. Either way, a case remains to be made that any of this shows us that essential properties, thus understood, are necessary.

There may be cases where a link between essence and necessity seems clearer. For example, Wiggins presents an example drawing on the familiar and uncontroversial principle that sets are identical if and only if they have the same members.

Suppose that we try to apply these criteria, and we are invited to think of a thing α simply identified as the entity ... to which there belong the items x and y and only these. Then it seems that, if we are to envisage for α what it is, the question we have to ask is whether α , the very thing α , could have dispensed with the particular entities x and y . If it could ... then α is not a set or a class.
(Wiggins 2001, 119)

³⁴ See Textor, M. (2009) “‘Demonstrative’ colour concepts: recognition versus preservation”, *Ratio*, 22, 234-49, section 4, for a discussion of anaphora and preservative memory, which might serve as the basis for a positive account of how we can achieve this kind of tracking.

What it is for a thing to be a set implies that the thing couldn't have had different members. But now this looks like a case of essence yielding necessity: α essentially contains x and y , so α necessarily contains x and y .

It is significant that this is an example of a mathematical object: a set. I have discussed two putative roles for a notion of essence. First, to give things persistence and destruction conditions, and second, to provide things with individuation conditions, to enable identification of them over cross-temporal and cross-modal changes. But, on a typical understanding of the nature of mathematical objects, such as sets, they aren't the kinds of things that could be destroyed, or that undergo any change.³⁵ We typically think of mathematical objects as abstract, transcending space and time, existing necessarily, and thereby also undergoing no 'modal change', i.e. having their (genuine) properties necessarily. So, we don't need to take some of these properties as fixed to explain persistence and destruction or to enable tracking through change. This is thus not the reason why we take, for example, the membership of a set to be necessary. There seems to be an antecedent commitment to the (genuine) properties of the set being necessary.

My guiding question at present is: why should what it *is* to be a thing imply what a thing *must* be? It seems to be part of how we think about mathematical objects that they have their (genuine) properties necessarily. So, part of what it is to be a set, say, is to have its properties – including its membership – necessarily. If what it is to be α is to have its properties necessarily, then if α is ϕ , it follows pretty obviously that α is necessarily ϕ . But this gives us no *general* way to move from what something is, to what it must be. For example, it is not part of what it is to be

³⁵ By which I mean genuine change, not mere Cambridge change: the number 2 can change from being my favourite number to no longer being my favourite number.

Socrates that he have all his (genuine) properties necessarily. So there is no comparable route from it being part of what it is to be him to be human, to his being necessarily human.

4.3 Transworld identification

I have argued that we are able to track individuals over changes in ways that suggest that sortal concepts or properties do not in general give rise to necessities. To say more would require a detailed account of the nature of individual thought and reference, which I cannot do here. I have tried to show that various ways to understand essence do not imply that essential properties are necessary. I want to offer a brief suggestion for a diagnosis of what has gone wrong. In future work, or in an improved recasting of the debate, this is a problem to be avoided.

Thinking about identity can be confusing. When we talk about *de re* modality we need to be careful to distinguish good questions from bad questions. We have to be careful asking questions such as

- (1) Which thing in world *w* bears the identity relation to object *a* in the actual world? What is that thing like?

That sounds like we're talking about two things being one, which is absurd.³⁶ Rather, we should ask questions more like

³⁶ A different question that *isn't* absurd is: 'which thing in world *w* bears *the counterpart relation* to *a* in *@?*' Counterpart theory offers a different approach to understanding questions of transworld identity that potentially avoids the pitfalls under discussion. I won't discuss this option in any depth here, as my main target is

(2) Here is *a* (here in the actual world). How could that thing (*a*) have been different? How could it feature in counterfactual scenarios?

We don't need to find *a* by looking through a metaphysical telescope: the relevant thing is already *right here* (see Kripke 1980, 44). In particular, if *a* is *F*, we don't need to look through the telescope to find the *F* over there that is *a*. We might need some help, e.g. the resources of sortals, to actually identify *a*, but once identified, we can proceed with our questions.

Question (1) above might also quickly turn into

(3) How can we identify *a* in *w*?

such that we need to know what *a* is like in *w* before we can know which thing it is, rather than the other way around – wanting to know what *a* is like in *w*, taking *a*'s identity for granted. Furthermore, there is a temptation to extend this to

(4) In virtue of what property or relation is *x* in *w* identical to *a* in the actual world?

This then asks for a property that must be had by *a* in every world in which it exists.

Hence, we see how one could move (illegitimately) from the perhaps plausible requirement that we need sortals to initiate *de re* thought of an individual, to the

the essentialist who does not avail themselves of counterpart theory (largely because they want to give an account of modality in terms of essences, not in terms of worlds, independently understood).

claim that we therefore need to employ that same sortal in any thought of the same individual, across times and counterfactual possibilities. But we got here from thinking in terms of distinct things in other worlds that we need to find, rather than in terms of the actual thing here the possibilities for which we want to consider.

4.4 Generalised identity

In the previous section I argued that it is easy to get confused about identity in a way that leads to a bad conception of essence. However, there are other ways that thinking about identity may in fact shed light on essence. In particular, Correia (2006, 2017) draws links between essence, identity, and real definition that might be thought to provide the link to necessity that I have been seeking.³⁷ Correia takes statements of the form “To be F is_{def} to be G” to be real definitions, and statements of the form “To be F is_{id} to be G” to be generalised identities (such as, “to be a water molecule is to be an H₂O molecule”). Correia takes real definitions to be essentialist statements (2017, 53), and gives an account of them in terms of generalised identity and metaphysical priority.

(RD) To be F is_{def} to be G iff (i) to be F is_{id} to be G, and (ii) being G is metaphysically prior to being F. (2017, 60)

According to this proposal, identity is built into essence. It is hard to argue (and I am not willing to do so) against the necessity of identity. Hence, this gives us a more

³⁷ Correia, F. (2006) “Generic Essence, Objectual Essence, and Modality”, *Nous* 40(4): 753-767; (2017) “Real Definitions”, *Philosophical Issues*, 27, *Metaphysics*, 52-73.

plausible route to taking the essence of a thing to be necessary to it: if to be F is_{def} to be G, then necessarily, all Fs are G.

The question I have been exploring is: why should we need a notion of essence, and do essential properties need to be necessary to fulfil that need? The question remaining for Correia's proposal is thus: why should we need *this* notion of essence? In particular, for the kinds of cases I have been considering, why should we need to ask, for example, what it is to be Socrates, where that amounts to asking something like: what is identical to and metaphysically prior to being Socrates? In brief, it seems to me that this brings us back to the same considerations already canvassed. We might want to know what is *the same as* being Socrates so that, in these terms, we can explain Socrates's persistence conditions, or reidentify Socrates over time, and over possibilities. But, I have argued, these roles for essence do not require essence to be necessary, hence, they do not require an essence that is *identical* with being Socrates.³⁸ This is not to say that an alternative answer to the question could not be found, but what I take to be the more obvious options are not, or so I have argued, sufficient.

4.5 An argument from utility

I have argued that, given some plausible ways to understand the role of essential properties, it does not follow, from their playing this role, that they are necessary properties. But there is an alternative line of argument open to the essentialist: the assumption that essential properties are necessary, combined with the essentialist account of necessity, is so theoretically fruitful that this gives us reason to believe it.

This approach is reminiscent of David Lewis on his plurality of worlds.

³⁸ This is, in effect, a *modus ponens/modus tollens* move.

Why believe in a plurality of worlds? – Because the hypothesis is serviceable, and that is a reason to think that it is true. The familiar analysis of necessity as truth at all possible worlds was only the beginning. In the last two decades, philosophers have offered a great many more analyses that make reference to possible worlds, or to possible individuals that inhabit possible worlds. ... What price paradise? If we want the theoretical benefits that talk of *possibilia* brings, the most straightforward way to gain honest title to them is to accept such talk as the literal truth. (Lewis 1986, 4)

This brings me to my first response to the utility argument. There are other philosophical packages that offer theoretical fruits, such as a Lewisian metaphysics. It would be beyond the scope of this paper to adjudicate between all possible packages. My point is just that utility alone is not enough to support the essentialist view; its benefits must be detailed and shown to be preferable to those of rival packages.

This leads to a further response. The essentialist claims a bounty of theoretical benefits. The only way to combat that claim thoroughly is to examine (and challenge) those benefits in turn. This is not something that can be achieved in the scope of this paper, but is a long term project. At least, I hope to have shown here that one could reap some of the benefits of a notion of essence connected to persistence conditions or individuation, without being committed to essential properties also being necessary properties.

5. Divide and conquer

On the one hand, we take things to have modal profiles: we think of them as being necessarily one way, contingently another, and merely possibly yet another. We therefore seek an account of *de re* necessity and possibility. On the other, we want to understand the identity, persistence, and destruction conditions for things. We therefore seek an account of what each thing is, in terms of something we might call its real definition. If we appeal to *one* notion – call it ‘essence’ – to provide both accounts, we end in confusion: either we struggle to give an adequate restriction of necessary properties to essential properties, or we struggle to give an account of real definition that can adequately explain necessary properties. Better to keep these two roles apart. Fine (1994) compares two different approaches to understanding essence: one in terms of *de re* modality, another in terms of real definition. He suggests we replace one with the other, as if they are competing notions. My proposal is to recognise each as a substantive notion in its own right, answering to its own family of issues. We may discover relations between the two, but I have argued that we should not begin by assuming that one is to be analysed in terms of the other. An investigation into the relationship between essential properties and *de re* necessities should begin with independent accounts of each notion. From there, we can inquire into the relationship between essence and necessity, given those accounts. But it is a mistake to assume too close a relationship from the outset.³⁹

(10048 words)

³⁹ Thank you to audiences in Birmingham, Edinburgh, Glasgow, St. Andrews, Stirling, and the Royal Institute of Philosophy in London, for helpful discussion of some of the ideas in this paper. Thank you also to Ghislain Guigon, Nicholas Jones, Bob Stern and Mark Textor for comments on various incarnations of the paper.