2015-08-05

On Origin Essentialism and Arguments for It

Darnell, Eamon

UNIVERSITY OF CALGARY

On Origin Essentialism and Arguments for It

by

Eamon M. Darnell

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF ARTS

DEPARTMENT OF PHILOSOPHY

CALGARY, ALBERTA

July, 2015

Abstract

Origin essentialism gained prominence following Saul Kripke's endorsement of the view in *Naming and Necessity*. Since Kripke, several authors have developed arguments for origin essentialism; yet, no argument currently on offer adequately defends the view. In this thesis, I examine four arguments for origin essentialism and argue that each is unsuccessful. I offer a counter-model against the view that origin essentialism is a consequence of Kripke's work in *Naming and Necessity*. I show that Nathan Salmon's refinement of Kripke's argument for origin essentialism fails because it assumes an implausible principle. I discuss Graeme Forbes's argument, which proceeds from the assumptions of the *necessity of identity* and that there are *no bare truths* concerning identity, and show that origin essentialism is not a consequence of those assumptions. Lastly, I show that a branching model of possibility fails as a basis for a persuasive defence of origin essentialism due to implausible consequences.

Acknowledgements

I would particularly like to express my gratitude to Ali Kazmi who read numerous early drafts of each chapter of this thesis and provided systematic feedback at each stage in its development. His comments, criticisms and suggestions substantially improved the quality of this thesis and significantly enhanced my understanding of the topics discussed.

Table of Contents

Chapter 1

Kripke and the Intelligibility of Essentialism

This thesis is concerned with arguments for *origin essentialism* (also called, the *necessity of origin* in the literature). Origin essentialism can be broadly construed as the view that the origin of an object x, at a possible world w, is *essential* to x at w, where a feature F is *essential* to x at w just in case it is not possible (in a metaphysical sense) at w for x to exist without having F. Many find origin essentialism to be intuitively appealing and the view has been endorsed by several prominent authors, including, Graeme Forbes, J. L. Mackie, Nathan Salmon and Saul Kripke (to name a few). Yet, intuitions favouring origin essentialism are not universally shared. Indeed, M. S. Price goes so far as to say that, in fact, nobody's intuitions genuinely support origin essentialism [Pri82, p. 34]. Such variation in the nature of intuitions toward origin essentialism suggests that the view cannot be established on the basis of appeal to intuition alone: further support is required. Yet, adequate further support has not been forthcoming.

Before examining arguments for origin essentialism, it is worth discussing essentialism itself and, in particular, the manner in which essentialist claims are understood. This chapter contains such a discussion framed in terms of an exploration of the defence of the intelligibility of essentialism that Kripke gives in his *Naming and Necessity* lectures.[1] In [Kri81], Kripke intends to provide a means of understanding essentialist claims as well as to resolve the main objections against the intelligibility of such claims. Below, I present the major points that Kripke makes in [Kri81] as part of his defence of the intelligibility of essentialism.

[1] Delivered at Princeton University in 1970. I will be working from the [Kri81] published version.

1.1 Essentialism and Kripke's Task

One of Kripke's main objectives in [Kri81] is to provide a defence of the intelligibility of essentialism (and of *de re* modality in general). He focuses, in particular, on making sense of non-trivial essentialist claims. Such claims hold that one, or more, of an object's non-trivial features is essential to that object (at a given world). A feature is *trivial* just in case the feature is had by every object in virtue of the feature's form or its meaning, and a feature is *non-trivial* otherwise. As an example of a trivial feature, Salmon gives, "the property of *not being both red and not red*." [Sal79, p. 703]. In virtue of form, it is true that for any x, it is not the case that x is red and x is not red. Hence, the feature, *not being red and not red* is trivial: all objects have this feature in virtue of its form. Hereafter, I will use 'essentialism' to refer to the view that some non-trivial essentialist claim is true.

Kripke's goal is to provide a means of understanding what it is for a certain (non-trivial) feature to hold necessarily (i.e. essentially) of an object. Burgess succinctly summarizes what is needed to accomplish this task saying, "Now taking the quantifier as a genuine quantifier, $\exists x \Box P(x)$ holds just in case there is some thing such that $\Box P(x)$ holds *of it*, which in turn holds if and only if there is some thing such that $P(x)$ holds necessarily *of it.* To make sense of *de re* modality, one needs to make sense of an open $P(x)$ holding necessarily rather than contingently *of a thing...*" [Bur96, pp. 12–13].[2] Kripke proceeds to offer an explanation like the one Burgess has in mind.

Kripke's defence of the intelligibility of essentialism consists of three main points. Firstly, he gives a conception of *necessity* that allows him to meaningfully explain what it is for a certain feature to hold necessarily of an object.[3] Secondly, Kripke introduces a category of terms called *rigid designators* which are such that where t rigidly designates an object o, t

[2]Note: Burgess is following the (now standard) usage of '$\Box$' as the operator for *necessity* such that, '$\Box S$', expresses, 'necessarily-S' for any sentence (or formula) S. I will use '$\Box$' in this way for the remainder of this thesis and I will use '$\Diamond$' for *possibility* such that $\Diamond\varphi \leftrightarrow \neg\Box\neg\varphi$ for all φ.

[3]The explanation is, roughly, the same as the one I give in the first paragraph of this thesis for when a feature F is essential to x.

denotes o across possible worlds. Lastly, Kripke specifies the manner in which *possible worlds* are to be conceived.

1.2 Quine's Criticisms of Essentialism

One of the more influential opponents of the intelligibility of essentialism at the time of [Kri81] is Quine and so it is worth taking a brief look at what Quine has to say before proceeding to Kripke's defence. Quine's criticisms of the intelligibility of essentialism stem, in large part, from the manner in which he understands the notion of *necessity*. Quine notes that, as far as logical modality is concerned, *necessity* is taken as, "an absolute mode of truth" [Qui13, p. 179], to be understood such that (following Carnap) a sentence is *necessary* just in case it is *analytic*. Quine has reservations about the notion of *analyticity*[4] but accepts this understanding of *necessity* for the sake of argument [Qui13, p. 179]. Yet, taking 'necessarily' to mean 'it is analytic that' raises serious problems for essentialism.

Quine argues that if the notion of *necessity* is understood as the same as the notion of *analyticity*, then essentialism is unintelligible. When an essentialist asserts a statement like, "x is, necessarily, P", the essentialist is claiming, roughly, that *being* P is necessary of x. Yet, *analyticity* is a property of statements and so where 'necessarily' is taken to mean, 'it is analytic that', it is nonsensical to claim that *being* P is necessary of x. Therefore, if the notion of *necessity* is understood as the same as the notion of *analyticity*, essentialism is unintelligible. [Qui13, pp. 179–183]

The essentialist might attempt to respond to the above issue by showing that there is a means of understanding *necessity* as a relation between objects and their (non-trivial) features while still taking 'necessarily' to mean 'it is analytic that'. According to Burgess, the only obvious way to do this would be, " to attempt to reduce *de re* modality to *de dicto* modality by defining the open $P(x)$ to hold logically or analytically of a thing if and only

[4]See, e.g. [Qui80, pp. 20–46].

if the closed $P(t)$ holds logically or analytically, where t is a term designating the thing." [Bur96, p. 13]. Accomplishing this would seem to allow one to maintain that essentialist claims are meaningful while understanding the notion of *necessity* to be the same as the notion of *analyticity*. However, Quine contends that reducing *de re* modality to *de dicto* modality, in this way, is problematic.

Quine thinks that attempting to reduce *de re* modality to *de dicto*, in the manner suggested by Burgess,[5] will be unsuccessful given that an object may be designated by two or more terms such that a certain feature holds analytically of the object when designated by one term but fails to hold analytically when designated by another. Quine illustrates this problem by means of example. Consider the following statements:

(Q1) The number of planets = 9.

(Q2) 9 is necessarily greater than 7.

(Q3) The number of planets is possibly less than 7.

Quine grants that under the current conception of *necessity*, (Q1)–(Q3) will be regarded as true [Qui80, pp. 143–144].[6] Moreover, from (Q2) one can infer that,

(Q4) $\exists x$ (x is necessarily greater than 7).

is true. Since (Q4) was inferred from (Q2), the open 'x is necessarily greater than 7' ought to be true relative to the assignment of the number nine to x. According to (Q1), '9' and 'the number of planets' both designate the number nine. Yet, '9 is greater than 7' is analytic (from (Q2)), while 'the number of planets is greater than 7' is not analytic (from (Q3)) [Qui80, pp. 147–148]. Quine goes on to emphasize this point, claiming:

> Whatever is greater than 7 is a number, and any given number x greater than 7 can be uniquely determined by any of various

[5] Of course, Quine is not aware of Burgess but he (Quine) is criticising the view that Burgess describes.

[6] Quine was writing prior to the reclassification of Pluto as a dwarf planet. For the purposes of this discussion, I will grant that (Q1) is true.

> conditions some of which have '$x > 7$' as a *necessary* consequence and some of which do not. One and the same number x is uniquely determined by the condition:
>
> (32) $x = \sqrt{x} + \sqrt{x} + \sqrt{x} \neq \sqrt{x}$
>
> and by the condition:
>
> (33) There are exactly x planets,
>
> but (32) has '$x > 7$' as a necessary consequence while (33) does not. *Necessary* greaterness than 7 makes no sense as applied to a *number* x; necessity attaches only to the connection between '$x > 7$' and the particular method (32) as opposed to (33), of specifying x. [Qui80, p. 149]

If one was able to reduce *de re* modality to *de dicto* modality, in the manner suggested by Burgess, then one would expect that if $P(x)$ holds analytically of an object, then for any term t, that designates the object, '$P(t)$' will be analytic. Leonard Linsky explains, "'$(\exists x)F(x)$' is true or false according to whether or not at least one object satisfies the open sentence following the quantifier; but whether or not an object satisfies an open sentence is quite independent of how we refer to it, or even whether we have the means of referring to it at all." [Lin69, p. 695]. The point is that if a statement like, '$\exists x \Box P(x)$' (i.e. of the form of (Q4)) is true, then there is some object that satisfies the open, '$\Box P(x)$' (i.e. 'x is necessarily P'). Thus, one might expect that substituting any term, which designates that object, for x ought to yield a true sentence. However, this is not the case with respect to (*de re*) modal statements.

Quine takes the above point as evidence that essentialism is unintelligible. The attempt to make sense of *de re* modal claims by reducing *de re* modality to *de dicto* modality fails. Quine concludes, therefore, that *necessity*, at best, obtains between certain features and certain ways of designating an object, but it is not intelligible to view *necessity* such that it obtains between a given (non-trivial) feature and an object "of itself" [Qui80, p. 155]. Thus, the essentialist is back to square one.

One may be inclined to point out that the above problem does not arise with respect to objects and their *trivial* features, but Quine insists that this is of little use to the essentialist. He illustrates saying,

> Mathematicians may conceivably be said to be necessarily rational and not necessarily two-legged; and cyclists necessarily two-legged and not necessarily rational. But what of an individual who counts among his eccentricities both mathematics and cycling? Is this concrete individual necessarily rational and contingently two-legged or vice versa? Just insofar as we are talking referentially of the object, with no special bias toward a background grouping of mathematicians as against cyclists or vice versa, there is no semblance of sense in rating some of his attributes as necessary and others as contingent. Some of his attributes count as important and others as unimportant, yes; some as enduring and others as fleeting; but none as necessary or contingent. [Qui13, pp. 182–183]

In this passage, Quine (in effect) concedes that *de re* modality can be meaningfully reduced to *de dicto* modality (in the manner suggested by Burgess) with respect to trivial features[7] but points out that this cannot be used to show that the same is true with respect to non-trivial features. Quine grants that *being rational* is a necessary condition for *being a mathematician*. Accordingly, where '$M(x)$' means "x is a mathematician" and '$R(x)$' means

[7] Alternatively, one may take Quine to be conceding that it is meaningful to assert that *necessity* obtains between certain features that an object might have (*being a mathematician* and *being rational*) while denying that *necessity* obtains between features and objects.

"x is rational",

$$M(x) \rightarrow R(x)$$

holds analytically, relative to all assignments, and for any term t, where t designates an object,

$$M(t) \rightarrow R(t)$$

is analytic. Thus, Quine accepts that,

$$(1_{\mathrm{Q}})\ \ \forall x \Box (M(x) \rightarrow R(x))$$

From this, the essentialist may be tempted to reason that for any x if x is a mathematician, then x is essentially rational. Yet, such reasoning is unsound.

It is problematic for the essentialist to reason that $\forall x \Box (M(x) \rightarrow R(x))$ entails that $\forall x (M(x) \rightarrow \Box R(x))$. Doing so would seem to commit the essentialist to:

$$(2_{\mathrm{Q}})\ \ \forall x[\Box (M(x) \rightarrow R(x)) \rightarrow (M(x) \rightarrow \Box R(x))]$$

Quine notes that *being rational* is not a necessary condition for *being a cyclist* and so it is not necessary that if x is a cyclist, then x is rational. Thus,

$$(3_{\mathrm{Q}})\ \ \forall x \neg \Box (C(x) \rightarrow R(x))$$

holds, where '$C(x)$' means "x is a cyclist". The problem for the essentialist is that there is at least one individual who is both a mathematician and a cyclist. Accordingly, where 'a' names such an individual,

$$(4_{\mathrm{Q}})\ \ M(a) \wedge C(a)$$

is true, as are the following:

$$(5_{\mathrm{Q}})\ \ \Box (M(a) \rightarrow R(a)) \text{ (from } (1_{\mathrm{Q}}))$$

$$(6_{\mathrm{Q}})\ \ \neg \Box (C(a) \rightarrow R(a)) \text{ (from } (3_{\mathrm{Q}}))$$

From (5_{Q}) and (2_{Q}), it follows that,

$$(7_{\mathrm{Q}})\quad M(a) \rightarrow \Box R(a)$$

and this, together with (4_{Q}) entails that,

$$(8_{\mathrm{Q}})\quad \Box R(a)$$

According to (6_{Q}), it is not necessarily the case that a is a cyclist only if a is rational. It follows that it is possibly not the case that a is a cyclist only if a is rational, or equivalently,

$$(9_{\mathrm{Q}})\quad \Diamond[C(a) \wedge \neg R(a)]$$

If it is possible that a is both a cyclist and not rational, then it is possible that a is not rational. Yet, this entails that,

$$(10_{\mathrm{Q}})\quad \neg\Box R(a)$$

which contradicts (8_{Q}). Hence, even if it is conceded that *de re* modality can be reduced to *de dicto* modality (in the manner suggested by Burgess) with respect to trivial features, it remains the case that the reduction fails with respect to non-trivial features.

Quine acknowledges that some might insist that essentialism is intelligible, despite his criticisms, but thinks that doing so is problematic. He writes,

> This means adopting and invidious attitude toward certain ways of uniquely specifying x, for example (33), and favoring other ways, for example (32), as somehow better revealing the "essence" of that object. Consequences of (32) can, from such a point of view, be looked upon as necessarily true of the object which is 9 (and is the number of the planets), while some consequences of (33) are rated still as only contingently true of that object. [Qui80, p. 155]

The problem(s) illustrated in Quine's (Q1)–(Q4) example arise because, contrary to what one would expect, it is not the case that if $P(x)$ holds analytically of an object, then for any term t, that designates the object, '$P(t)$' will be analytic. Thus, if the essentialist wishes to maintain essentialism against Quine's criticisms it would seem that the essentialist will need to privilege the terms that denote x and allow the reduction of *de re* modality to *de dicto* modality to proceed (and which preserve the validity of existential generalization and universal instantiation) over the terms that do not. Yet, as Burgess explains, "the difficulty Quine sees is simply that how and why some terms should be privileged over others has not been adequately explained or justified." [Bur96, p. 13]. It is not sufficient for the essentialist to simply adopt the position that certain terms are to be privileged over others (particularly, if those terms are privileged simply because they favour essentialism when evaluated against Quine's objections). The essentialist needs to explain and justify such a position but Quine is not aware of any adequate explanation or justification.

1.3 Kripke's Defence Against Quine

Kripke begins his response to Quine by pointing out that, contrary to Quine's position, firm intuitions provide a basis for thinking that essentialist claims are meaningful. Kripke writes:

> [A]t any rate it is very far from being true that this idea is a notion which has no intuitive content, which means nothing to the ordinary man. Suppose that someone said, pointing to Nixon, 'That's the guy who might have lost'. Someone else says 'Oh no, if you describe him as "Nixon", then he might have lost; but, of course, describing him as the winner, then it is not true that he might have lost'. Now which one is being the philosopher, here, the unintuitive man? It seems to me obviously to be the second. The second man has a philosophical

> theory...When you ask whether it is necessary or contingent that *Nixon* won the election, you are asking the intuitive question whether in some counterfactual situation, *this man* would in fact have lost the election. If someone thinks that the notion of a necessary or contingent property...is a philosopher's notion with no intuitive content, he is wrong. [Kri81, pp. 41–42]

Intuitively, it is meaningful for one to claim that some of an object's non-trivial features are essential as opposed to accidental (or vice versa) independently of any "special bias toward a background grouping". This suggests, contra Quine, that there is a notion of *necessity*, distinct from *analyticity*, for which there is an intuitive basis.

Kripke proceeds to deny that *necessity* is the same notion as the notion of *analyticity*. He points out that there are several reasonable, non-equivalent, types of *necessity*, including: *epistemic* necessity, *analyticity* and necessity *de re* [Kri81, pp. 34–40]. Kripke elucidates the notion of *necessity* (simpliciter) in terms of *possible worlds* such that 'necessarily' (simpliciter) can be understood as, roughly, 'it is true at all possible worlds that'. Accordingly, that $\Box P(x)$ holds of an object at a world w can be understood as indicating that, at all worlds possible from w, $P(x)$ holds of that object. Cast in this way, what it is for x to be essentially P (at a world) can be meaningfully understood and there is no need to reduce *de re* modality to *de dicto* modality.

1.4 Rigid Designators

Following his elucidation of *necessity* in terms of possible worlds, Kripke introduces a distinction between terms that denote the same referent across possible worlds and terms that do not. Roughly, any term that denotes the same object in all possible worlds is called a, *rigid designator*, while any term that fails to function in such a way is deemed to be "*nonrigid*" (or an "*accidental designator*") [Kri81, p. 48].[8] Accordingly, rigid designators are such that where t rigidly designates an object o, $\Box P(t)$ holds iff $\Box P(x)$ holds relative to the assignment of o to x.

In order to determine whether a given term is a rigid or nonrigid designator, Kripke introduces, what he calls, an "intuitive test" [Kri81, p. 48]. He considers the terms that Quine uses in the (Q1)–(Q4) example, '9' and 'the number of planets', and writes:

> What's the difference between asking whether it's necessary that 9 is greater than 7 or whether it's necessary that the number of planets is greater than 7? Why does one show anything more about essence than the other? The answer to this might be intuitively 'Well, look, the number of planets might have been different from what it in fact is. It doesn't make any sense, though to say that nine might have been different from what it in fact is'. [Kri81, p. 48]

On this basis, Kripke concludes that 'nine' (or '9') is a rigid designator but 'the number of planets' is nonrigid. Kripke's test can be generalized to: For any term t, t rigidly designates an object o, iff the statement, "t might have been different from what it in fact is", is false (or nonsense). Put another way, where t designates o and o is assigned to the variable x, t rigidly designates o if:

(T) Necessarily, t is x.

is true and t nonrigidly designates o otherwise.

Kripke identifies three types of terms that pass his test and can, thus, be considered rigid designators: proper names, certain definite descriptions and kind terms (e.g. 'tiger'

[8] Though not especially relevant to the present discussion, it is worth mentioning that Kripke acknowledges that some objects are necessarily existent (i.e. they exist at all possible worlds). Where a rigid designator denotes such an object, Kripke calls that designator, "*strongly rigid*" [Kri81, p. 48]. For instance, the term, '9', might constitute a strongly rigid designator, where '9' rigidly designates 9 and 9 is taken to exist at all possible worlds.

and 'water'). Proper names, he argues, are always rigid designators [Kri81, p. 49]. One may take any proper name for a given object and make the appropriate substitutions into (T) and the resulting statement will be true.[9] For example, where 'Nixon' designates *the man* Nixon, it is impossible for it to fail to be the case that Nixon is x, where *the man* Nixon is assigned to x. Hence, 'Nixon' rigidly designates Nixon.

In contrast to proper names, only a few (types of) definite descriptions can be considered rigid designators. A definite description can be considered a rigid designator of an object o, when it describes o in terms of at least one property that essentially belongs to (just) o [Kri81, p. 57]. More specifically, a definite description D, rigidly designates its referent o, when D describes o by ascribing to o a property P, such that given the meaning of 'P', P can be, truly, ascribed (at all worlds) to just o. To illustrate, compare the definite descriptions, 'The square of 3' and 'The president of the United States in 2014'. The former uniquely denotes *9* at all possible worlds, whereas the latter will uniquely denote *Obama* at some worlds (like the actual one) but a different person at others. The reason is that the meaning of 'square of 3' is such that ascribing the property, *being 3 squared* to some x entails that $x = 9$. Yet, it does not follow from x is *president of the United States in 2014* that x is Obama.

1.5 Clarifying the notion of *Possible Worlds*

The last main point Kripke makes in defence of the intelligibility of essentialism is specifying the manner in which one is to conceive of *possible worlds*. He points out that the reluctance, on the part of some authors, to accept the intelligibility of essentialism, may be due to an incorrect conception of *possible worlds* on the part of those authors. Kripke writes that these authors, "[Conceive] of a possible world as if it were like a foreign country. One looks upon

[9] Kripke recognizes that one might deny this if one denies that the meaning of a name is its referent as opposed to a sort of shorthand for a description denoting that referent (see, in particular, [Kri81, p. 57]). Though, it should be noted that demonstrating that proper names directly refer to their referents is a major part of Kripke's overall project in [Kri81].

it as an observer." [Kri81, p. 43]. Such a conception of possible worlds makes non-trivial essentialist claims, concerning some object x, equivalent to giving a criterion of identity for x. Presumably, it would be by means of observing, in some possible world, that an object has a property essential to x that allows one to identify that object *as* x. This is problematic because it requires or entails a criterion of identity for x, however, at least with respect to physical objects, plausible necessary and sufficient conditions for identity have not been forthcoming [Kri81, pp. 42–43]. Hence, under such a conception of possible worlds, essentialism may appear dubious.[10]

In order to address objections against the intelligibility of essentialism that may arise from a misconception of *possible worlds*, Kripke specifies how *possible worlds* are to be understood. He says:

> A possible world isn't a distinct country that we are coming across, or viewing through a telescope...A possible world is *given by the descriptive conditions we associate with it*. What do we mean when we say 'In some other possible world I would not have given this lecture today?' We just imagine the situation where I didn't decide to give this lecture or decided to give it on some other day. Of course, we don't imagine everything that is true or false, but only those things relevant to my giving the lecture; but in theory, everything needs to be decided to make a total description of the world. We can't really imagine that except in part; that, then, is a 'possible world'...'Possible worlds' are *stipulated*, not *discovered* by powerful telescopes. [Kri81, p. 44]

Kripke makes two points here that, particularly, warrant some further explanation. Firstly,

[10] In [Lin69, pp. 698–699], Linsky argues that this is a problem for one who makes sense of *de re* modal claims by means of Kripke's semantics (though, he agrees with Kripke's conclusion).

when Kripke says that possible worlds are "stipulated" he is not claiming that one determines the truth-value of a modal claim by stipulation. Rather, one begins with some modal claim that is taken to be true, like, "Possibly, Kripke does not give this lecture today". There are many ways that the world might have been such that Kripke does not give this lecture today, and so there are many possible worlds at which it is true that Kripke does not give this lecture today. One then stipulates that, w is one of those possible worlds. This is what Kripke has in mind when he says that possible worlds are stipulated. Secondly, possible worlds are *total* even though they are given by the descriptive conditions one associates with them, which are not *total*. To illustrate, w is given by the conditions associated with Kripke not giving this lecture today (like, his deciding against doing so) but this does not mean that w only decides statements pertaining to *those* conditions. Rather, w is *total*, meaning that, with respect to any statement (that expresses a way the world might have been) S, and any possible world w, either S is true at w or $\neg S$ is true at w.

Kripke's conception of *possible worlds* precludes objections against essentialism from the need for a plausible criterion of identity. Kripke states:

> Why can't it be part of the *description* of a possible world that it contains *Nixon* and that in that world *Nixon* didn't win the election? It might be a question, of course, whether such a world *is* possible...But, once we see that such a situation is possible, then we are given that the man who might have lost the election or did lose the election in this possible world is Nixon, because that's part of the description of that world. [Kri81, p. 44]

If it is not an essential feature of Nixon that he wins the election, then there is a world w, at which it is true that Nixon does not win the election. If one conceives of possible worlds as something that one *looks into* (as it were), then determining that Nixon does not win the election at w requires determining that, of the individuals who do not win the election (at

w), one of those individuals is Nixon. Yet, that requires some plausible criterion of identity for Nixon and such a criterion does not exist. Under Kripke's conception of possible worlds, this is not an issue. It is part of the description of w that Nixon is one of the individuals who does not win the election.[11]

1.6 *Origin*: An Essential Feature

Together, Kripke takes the points outlined in §§1.3–1.5 to constitute an adequate defence of the intelligibility of essentialism, however, he does not stop there. Kripke goes on to endorse essentialism, citing the *origin* of an object (at a world) as an example of a feature that is essential to that object (at that world). Specifically, Kripke claims that the material from which an organism develops, in a biological sense, (e.g. a certain sperm and egg) at a world is essential to that organism at that world [Kri81, pp. 112–113] and that the material out of which an artefact is constructed, at a world, is essential to that artefact, at that world [Kri81, pp. 113–114].

Kripke offers some support for accepting his origin essentialist claims (mainly in [Kri81, p. 114, fn. 56]); however, it is generally agreed that the support he offers falls short of establishing origin essentialism.[12] Despite this, many share Kripke's intuition that origin essentialism is correct and several authors have attempted to defend that intuition by developing their own arguments for origin essentialism or by refining Kripke's.

Though several arguments have been offered in favour of origin essentialism, each has failed to yield a compelling reason to accept the view. In the chapters that follow I will examine four arguments which, together, make up what I take to be a representative sampling of the various ways to defend origin essentialism. Chapter 2 examines the attempt to derive origin essentialism from Kripke's defence of the intelligibility of essentialism in [Kri81].

[11] Kripke goes on to argue that the problem of transworld identification is a pseudo problem given his conception of possible worlds and rigid designators, [Kri81, pp. 49–53].

[12] For some early criticisms of Kripke's argument for origin essentialism see e.g. [Sou74].

Chapter 3 examines the refinement of Kripke's argument offered by Nathan Salmon in his [Sal79] and [Sal05]. Chapter 4 explores Graeme Forbes's attempt to establish origin essentialism from two principles concerning the nature of identity, versions of which he offers in [For80], [For81] and [For85]. Chapter 5 discusses the attempt to derive origin essentialism by means of a non-standard model of possibility that was proposed by J. L. Mackie in [Mac74] and refined by Penelope Mackie in her [Mac98] and [Mac06].[13] Each of these arguments adopts a different approach toward defending origin essentialism, however, as I will show, each fails to establish the view.

[13] Arguments for origin essentialism that have received some attention in the literature but that I will not explicitly examine include those offered by McGinn in [McG76] and Rohrbaugh and deRosset in [Rd04]. For criticisms of McGinn's argument see e.g. [Joh77] and [Mac06, pp. 99–103]. For criticisms of Rohrbaugh and deRosset, see e.g. [RF06] and [CR06].

Chapter 2

Rigid Designation to Origin Essentialism

In his [Kri81], Kripke argues that essentialism is intelligible and cites an object's *origin* as an example of something that is essential to that object. Though Kripke does not explicitly state as much, one might take this to suggest that origin essentialism is a consequence of Kripke's defence of the intelligibility of essentialism together with standard and uncontroversial assumptions concerning metaphysical possibility. I will call this view, *the semantic thesis*. Nathan Salmon offers a compelling case against the semantic thesis in his [Sal79] and [Sal05] (though he, himself, ultimately endorses origin essentialism). Below, I will argue for a somewhat more generalized version of the same conclusion by taking a different approach. I will argue that there is a counter-model against the semantic thesis. I introduce four Kripke models and argue that each accords with Kripke's defence of the intelligibility of essentialism. That is, the claims, central to Kripke's defence, hold in each model. I then argue that at least one of the models appropriately captures standard and uncontroversial assumptions concerning metaphysical possibility. Lastly, I show that the denial of origin essentialism is true at a world in each model. I conclude on this basis that there is a counter-model against the semantic thesis and so the thesis is false.

2.1 The Semantic Thesis

In order to get a clearer picture of the semantic thesis, it will be useful to spell out the thesis in a bit more detail. Recall that origin essentialism is, broadly, the view that the origin of an object x, at a possible world w, is *essential* to x at w. Variance in intuition has led to two types of origin essentialist theses (hereafter, *origin theses*):

- *Strong Origin Essentialism*: For any origin thesis T, T advocates strong origin essentialism just in case T holds that any amount of variation in the origin of an object is impossible.

- *Weak Origin Essentialism*: For any origin thesis T, T advocates weak origin essentialism just in case T holds that some variation in the origin of an object is possible, but total variation in its origin is impossible.

The semantic thesis holds that an origin thesis (of either type) is entailed by Kripke's defence of the intelligibility of essentialism together with standard and uncontroversial assumptions concerning metaphysical possibility.

As outlined in the previous chapter, Kripke's defence of the intelligibility of non-trivial essentialism consists of three central claims:

(1_{D}) The notion of *necessity* is not the same as the notion of *analyticity*.

(2_{D}) There are rigid designators.

(3_{D}) *Possible worlds* are *total* and *stipulated* not discovered.

I take it that an assumption concerning metaphysical possibility involves assuming that some claim, or principle, A, holds, where A is about metaphysical possibility. I will consider such an assumption to be standard and uncontroversial just in case:

> A is generally regarded to be correct given standard and uncontroversial intuitions concerning metaphysical possibility.

For any intuition I, concerning metaphysical possibility, I will say that:

> I is *standard* just in case I is generally held.

and,

> I is *uncontroversial* just in case I does not concern non-trivial essentialist claims.[1]

Accordingly, the semantic thesis can be formulated a bit more precisely as follows:

> An origin thesis is a direct consequence of (1_D), (2_D), (3_D) and principles about metaphysical possibility that are generally regarded to be correct on the basis of generally held intuitions that concern metaphysical possibility but do not concern non-trivial essentialist claims.

2.2 Developing a Counter-Model

In order for a model to constitute a counterexample against the semantic thesis, that model must meet the following three conditions:

(C1) The model must accord with (1_D), (2_D) and (3_D) (i.e. each is true in, or of, the model).

(C2) The model must appropriately *map onto* standard and uncontroversial assumptions concerning metaphysical possibility (i.e. principles about metaphysical possibility that are generally regarded to be correct given standard and uncontroversial intuitions concerning metaphysical possibility hold in the model).

(C3) Origin essentialism is false in the model.

This section is devoted to developing a model which meets conditions (C1) and (C2). I introduce four models and argue that at least one of them meets (C1) and (C2). Showing that each of the four models meets (C3) is addressed in §2.4.

[1] The semantic thesis would not be very interesting if it were the claim that non-trivial essentialism, like origin essentialism, is a consequence of Kripke's defence and modal assumptions supported by intuitions that affirm non-trivial essentialism.

2.2.1 Counter-Model Structure and Semantics

There is a counter-model against the semantic thesis that conforms in its structure and semantics to a Kripke model M, such that M consists of the following:

(M1) The set of all possible worlds, W_M. Where a world, w is *possible* (i.e. $w \in W_M$) just in case, (i) the world can be coherently conceived to be the way w describes,[2] and (ii) It cannot be known *a priori* that the world is *not* the way that w describes.[3]

(M2) A binary relation of accessibility between possible worlds $w \in W_M$, R_M.

(M3) A domain, D_M consisting of a non-empty set of objects. Let D^n_M be the n^{th} Cartesian product of D_M with itself.

(M4) An assignment function, d_M, which assigns to every world, $w \in W$ a non-empty set $d_M(w)$, such that $d_M(w) \subset D_M$.

(M5) An assignment function, i_M, which takes as arguments an n-place predicate F^n and a world $w \in W_M$ and assigns a subset of D^n_M.

The semantics for M are fairly standard. Let a sentence, φ, be true at a world, w in M, relative to an assignment α, just in case:

[2] By 'coherently conceived' I mean that w's description of the world is *meaningful* and that it is free of contradiction in terms of form and the meanings of terms.

[3] Note: the intent behind adding condition (ii) is to ensure that worlds which describe mathematical impossibilities are not included in W_M. To illustrate, one may find both Goldbach's conjecture and its denial to be (respectively) meaningful and, strictly speaking, free of contradiction in terms of form and the meanings of terms. Yet, one might also find it extremely counterintuitive to regard both Goldbach's conjecture and its denial as genuinely *possible*. Still, adding condition (ii) to avoid such concerns may give rise to a new one. There are statements which express metaphysically contingent truths that are knowable *a priori*, e.g. "It is raining at the actual world only if it is raining". Surely there are metaphysically possible worlds at which the denials of such statements are true, yet, (ii) appears to preclude such worlds from membership in W_M. To respond, I will just say that (ii) precludes such statements from being part of the way that any $w \in W_M$ describes the world, but it does not preclude such statements from being true *at* some $w \in W_M$ (for more detail on this see e.g. [Sal89, pp. 6–7] and [Sta12, ch. 1–2]). If one finds this unsatisfactory, it seems to me that one may omit condition (ii) and appropriately amend what I present below (with relative ease) to establish the same conclusion.

(1_M) Given the assignment α, of $o_1, ..., o_n$ to $x_1, ..., x_n$ and where φ is the sentence: $F^n(x_1, ..., x_n)$, φ is true at w in M, relative to α, iff $< o_1, ..., o_n >$ is a member of the subset of D^n_M assigned to the pair (F^n, w) by i_M.

(2_M) Given the assignment α, of $o_1 \in D_M$ to x and $o_2 \in D_M$ to y and where φ is the sentence: $x = y$, φ is true at w in M, relative to α iff $o_1 = o_2$.

(3_M) Given the assignment α, of $o_1, ..., o_n$ to $y_1, ..., y_n$ and where φ is the sentence: $\forall x\psi(x, y_1, ..., y_n), \varphi$ is true at w in M, with respect to α, iff for all o, where $o \in d_M(w)$, $\psi(x, y_1, ..., y_n)$ is true in M, with respect to the assignment α^*, where α^* is just like α except o is assigned to x.

(4_M) Given the assignment α, of $o_1, ..., o_n$ to $x_1, ..., x_n$ and where φ is the sentence: $\Box\Psi(x_1, ..., x_n)$, φ is true at w in M, with respect to α, iff for all $w' \in W$ such that $R_M(w, w')$, $\Psi(x_1, ..., x_n)$ is true at w' in M, with respect to α.

Let a sentence, φ be true at a world, w in M just in case:

(5_M) φ is true with respect to all assignments at w in M.

With respect to the remaining types of sentences (negations, conditionals, conjunctions, etc.), the standard semantics hold but relative to (1_M)–(5_M). For example, where φ is the sentence: $\neg\psi$, φ is true at w in M just in case ψ is false at w in M. Where φ is the sentence: $\psi \to \theta$, φ is true at w in M just in case ψ is false at w in M or θ is true at w in M. I will also follow the standard convention of defining *possibility* ($\Diamond$) in terms of necessity such that, possibly-φ is equivalent to not-necessarily-not-φ (i.e. $\Diamond\varphi \leftrightarrow \neg\Box\neg\varphi$) for all φ.[4]

2.2.2 Meeting (C1)

A model which conforms in its structure and semantics to M, meets (C1). The notion of *necessity* is not the same as the notion of *analyticity* in M. In M, '$\Box$', is equivalent to,

[4]Note: it may go without saying, but I will also follow the standard convention of defining '$\exists$' in terms of '$\forall$' such that $\exists x\varphi \leftrightarrow \neg\forall x\neg\varphi$.

'necessarily' and means, roughly, 'it is true at all *accessible* worlds that'. Hence, M accords with (1_{D}). M also accords with (2_{D}). Relative to an assignment, the variables x, y, and so on, are rigid designators. To illustrate, relative to the assignment of o to x, $\Box F(x)$ is true at a world w in M (relative to that assignment) iff, at all worlds w' such that $R_M(w, w')$, $F(x)$ is true at w' in M relative to the assignment of o to x. In other words, relative to the assignment of o to x, 'x' denotes o at all possible worlds. Thus, there are rigid designators in M.[5] The sort of possible worlds of which M consists is specified by (M1) and that specification is in accordance with Kripke's view that (3_{D}) and so it can be stipulated that (3_{D}) is true of M. Hence, M accords with each of (1_{D}), (2_{D}) and (3_{D}). Furthermore, *that* M accords with each of (1_{D}), (2_{D}) and (3_{D}) is due to its structure and semantics. Therefore, any model that conforms, in its structure and semantics to M, will, like M, meet condition (C1).

2.2.3 Meeting (C2)

M appropriately maps onto standard and uncontroversial assumptions concerning modal reasoning, in general, and so in order for it to be shown that a model which conforms in its structure and semantics to M meets (C2), in particular, it suffices to demonstrate that:

(I) W_M contains all metaphysically possible worlds.

(II) The model's accessibility relation between the worlds of W_M relates the metaphysically possible worlds, in W_M, to one another.

To see why, consider John Divers's elucidation of the distinction between "absolute and relative modalities". Divers writes,

> Simply, a modality of kind M is absolute iff (i.e. if and only if) all and only the genuine possible worlds are M-possible worlds.

[5] Kripke acknowledges that variables can function as rigid designators in [Kri81, p. 49, fn. 16].

> Consequently, a modality of kind M is not absolute (it is restricted or merely relative) if there are some genuine possible worlds that are not M-possible worlds. What is necessary in only a relative or restricted sense is what holds throughout some proper subset of the genuinely possible worlds. Thus the genuine modality that is captured by the collection of all of the possible worlds is an absolute modality. [Div02, pp. 8]

Divers uses the term, 'genuine possible worlds', to refer to those worlds that are *possible* according to whichever modality is most basic. The idea is that if something φ, is true at all genuine possible worlds, then φ is *necessary* according to all modalities[6], or necessary in an *absolute* sense. On the other hand, if φ is necessary according to some modality M, but not according to others, then φ is not necessary in an absolute sense, rather φ is necessary in a restricted sense: necessary-*relative-to*-M (at a given possible world). In this case, φ will be true at all M-possible worlds which make up a proper subset of the set of all genuine possible worlds.

In terms of possible worlds, absolute and restricted modalities are defined by the accessibility relation(s) between the worlds in the set of genuine possible worlds. Divers illustrates by supposing that the set of all genuine possible worlds G, is the set of logically possible worlds and then comparing logical possibility (absolute modality relative to G) with nomological possibility (a restricted modality, relative to G). From any given world w, in G, there will be more logically possible worlds accessible from w than nomologically possible worlds accessible from w. Since all of the worlds in G are logically possible, logical possibility is defined by an equivalence relation (of accessibility) on the worlds in G and so all worlds are logically accessible from w. Not so with respect to nomological possibility. A world w^*

[6] More specifically, *necessary* according to all modalities of a certain sort. Divers calls them the "alethic" modalities and defines a modality as *alethic* just in case the following inferences are valid: (1) At all w, A; therefore, at w^*, A. (2) At w^*, A; therefore, at some w, A. Non-alethic modalities will include, for example, deontic modalities (which guide action). [Div02, pp. 6–7]

will be nomologically accessible from w just in case the laws of nature at w^* are the same as the laws of nature at w. Yet, there might be some law of nature at w that is not a law of nature at w^*. If so, w^* is nomologically accessible from w but w is not nomologically accessible from w^*: nomological accessibility is a non-symmetric relation [Div02, pp. 8–9]. A model consisting of G will map onto logical possibility provided its accessibility relation is an equivalence relation, whereas, if all nomologically possible worlds are logically possible (as is intuitively the case), the model will map onto nomological possibility only if its accessibility relation is non-symmetric.

Assuming that Divers is correct, if the set of all metaphysically possible worlds is a subset of W_M, then a model which conforms in its structure and semantics to M appropriately maps onto metaphysical possibility if its accessibility relation relates the metaphysically possible worlds in W_M to one another. If the set of all metaphysically possible worlds is a subset of W_M, then metaphysical possibility is either an absolute or restricted modality relative to W_M. Hence, if the set of all metaphysically possible worlds is a subset of W_M, then a model consisting of W_M appropriately maps onto metaphysical possibility if it has a relation of accessibility that correctly defines metaphysical accessibility between the worlds of W_M. In other words, a model which conforms in its structure and semantics to M, meets condition (C2) if (I) and (II)

(I) holds: *Metaphysically* Possible Worlds are Epistemically Possible

The advocate of the semantic thesis (hereafter, called, *the advocate*) should grant that W_M contains all metaphysically possible worlds. As specified by (M1), W_M is the set of all *epistemically* possible worlds[7] and it seems to me that all metaphysically possible worlds are

[7]Note: I am using 'epistemic possibility' in a somewhat technical sense. The set of epistemically possible worlds according to (M1) differs from the set of epistemically possible worlds described by many (perhaps, *most*) authors. Divers, for example, describes epistemic possibility as, "fixed by what is known" [Div02, p. 4]. Priest describes something as epistemically necessary if it is known to be true and epistemically possible if it could be true *for all we know* [Pri08, p. 47] (Kripke offers a similar description in [Kri81, pp. 35–37]). According to such descriptions of epistemic possibility, the set of epistemically possible worlds would (presumably) satisfy (M1)-(i) and, rather than (M1)-(ii), may satisfy a condition like, (ii′) It *is* not known that the world is not the way that w describes. If epistemic possibility is conceived of in this way, W_M

epistemically possible. It is implausible, for instance, to think that there is a metaphysically possible world w, such that one cannot coherently conceive of the world to be the way that w describes.

(II) by cases: Four Relations, Four Models

The advocate ought to concede that (I) holds, however, it is less clear what sort of accessibility relation a model (like M) requires in order for (II) to hold (with respect to that model). The reason for this stems from the fact that it is an open question whether metaphysical possibility is *absolute* or *restricted* relative to W_M. The advocate may deny that all epistemically possible worlds are metaphysically possible worlds. Consider the statement, 'gold (exists and) does not have atomic number 79'. It is not *incoherent* to conceive of the world such that gold does not have atomic number 79. Further, it cannot be known *a priori* that the world is not such that gold does not have atomic number 79. Hence, 'gold (exists and) does not have atomic number 79', expresses an epistemic possibility. According to Kripke, if it is true that gold has atomic number 79, then *having atomic number 79* is an essential feature of gold. Therefore, 'gold (exists and) does not have atomic number 79' expresses a metaphysical impossibility [Kri81, 123–125]. If the advocate agrees with Kripke on this point, the advocate will deny that all epistemically possible worlds are metaphysically possible. Since the advocate might take such a position, it is an open question whether metaphysical possibility is a restricted or absolute modality relative to W_M.

It is not obvious whether metaphysical possibility is a restricted or absolute modality relative to W_M and so, it is not obvious what sort of relation on W_M will accurately define metaphysical accessibility. Yet, there does seem to be a narrow range upon which a plausible relation of metaphysical accessibility (between the worlds in W_M) must fall. It is generally

does not contain all epistemically possible worlds and may contain some worlds that are not epistemically possible. To illustrate, let w^* describe the world such that there is a sound and complete logic of arithmetic. Prior to Gödel, w^* was an epistemically possible world according to (M1)-(i) and (ii$'$), yet $w^* \notin W_M$ by (M1)-(ii). Let w' describe the world such that water is XYZ and not H_2O. Since it is known that water is H_2O and not XYZ, w' is not epistemically possible under (ii$'$), yet $w' \in W_M$.

agreed that metaphysically possible worlds are accessible from themselves. This is based, in part, on the common intuition that if something is true at a world, it is also metaphysically possible at that world. Thus, it seems that metaphysical accessibility between the worlds in W_M is, at least, a reflexive relation. On the other end of the range, metaphysical accessibility between the worlds in W_M is, at most, an equivalence relation. If all epistemically possible worlds are metaphysically possible, then all of the worlds in W_M are metaphysically accessible from one another. Accordingly, the relation of metaphysical accessibility between the worlds in W_M will be either: reflexive, reflexive and symmetric, reflexive and transitive or an equivalence relation.

There is, as yet, no standard and uncontroversial way to further narrow the range upon which a potential relation of metaphysical accessibility (between the worlds in W_M) must fall. Rather than argue for one sort of accessibility relation over another, I will introduce a distinct model for each of the potential types of metaphysical accessibility relations on W_M. Let M^1, M^2, M^3 and M^4 be Kripke models just like M, except:

- In M^1, let R_M be a reflexive.
- In M^2, let R_M be reflexive and symmetric.
- In M^3, let R_M be reflexive and transitive.
- In M^4, let R_M be an equivalence relation.

The correct accessibility relation between metaphysically possible worlds in W_M is either reflexive, reflexive and symmetric, reflexive and transitive or an equivalence relation. Hence, (II) holds for either M^1, M^2, M^3 or M^4. Accordingly, if origin essentialism is false at some world in each model, then the semantic thesis is false: M^1, M^2, M^3 or M^4 constitutes a counter-model against the semantic thesis.

2.3 Expressing Anti-Origin Essentialism in the Counter-Model

Before it can be determined whether origin essentialism is false at a world in each of M^1, M^2, M^3 and M^4, there needs to be an appropriate way of formally expressing the denial of origin essentialism in each model. Recall that there are two types of origin theses: those which advocate *strong* origin essentialism and those which advocate *weak* origin essentialism. Strong origin essentialism holds that any amount of variation from an object's origin (at a given world) is impossible (at that world). Weak origin essentialism holds that *total* variation from an object's origin (at a given world) is impossible (at that world). Trivially, both types of origin thesis are false if total variation from an object's origin (at a given world) is possible (at that world).

Appropriately expressing the denial of origin essentialism in each of M^1, M^2, M^3 and M^4 requires a means of appropriately expressing an object's *origin* (at a world) and what it is for one origin (of an object) to *totally vary* from another origin (of that object). Below, I will propose a means of expressing each of these notions.

2.3.1 What is *Object-Origin*?

In order to determine how to appropriately formally express what it is for an object to originate in a certain way at a certain world (call this the notion of, *object-origin*, for short), it will be useful to explore the manner in which the term 'origin' is used by origin essentialists. Broadly construed, the *origin* of an object o, at a world w, consists in something like the following:

> (O_1) The features or features and elements of w responsible for bringing it about that o comes to exists at w.

The *elements* of a world are the objects that exist at that world (i.e. the objects $\in d_M(w)$). The *features* of a world are the rules, circumstances, or conditions that govern (or determine) object interactions and cause and effect relations at that world (hereafter, I will use the italicized, '*features*', in this way.). Thus, (O_1) indicates that object-origin consists in the history of events and interactions that led up to, and were causally influential in, a given object's coming to exist at a given world.

Intuitively, (O_1) seems to be an accurate way of rendering the concept of object-origin; however, in general, origin essentialists offer much more restricted accounts of object-origin when putting forward origin theses. That is, they do not claim that *all* of the aspects that contribute to an object's coming to exist at a given world (as given in (O_1)) are essential to that object at that world. Rather, they advance theses which hold that particular aspects of an object's origin (at a world) are essential to that object (at that world).

Kripke describes an object's essential origin in terms of material or biological composition. In his origin theses, he takes an artefact to *originate from* the material out of which it is constructed and he takes persons to *originate from* a certain sperm and a certain egg [Kri81, pp. 112–115]. Thus, following Kripke, the *origin* of an object o, at a world w, may be construed to consist in, the narrower,

> (O_2) The *features* of w and the elements of w out of which o is constructed (if o is an artefact) or the *features* of w and the elements of w that develop (in a biological sense) into o (if o is an organism).[8]

The trouble with (O_2) is that it gives an a account of object-origin that rules out many origin theses. Some origin essentialists argue that additional and alternative aspects of origin become relevant depending on the object under consideration. For example, if the object under consideration is Michelangelo's *David*, then *being constructed by Michelangelo* might be considered essential to *David*, in addition to the material out of which *David* was constructed. However, if the object being considered is an Ikea end-table, it might not be considered relevant that the table was assembled by one individual as opposed to another.

[8]Note: although not explicitly mentioned by Kripke, I think that it is important to keep in mind the importance of the *features* of a world when considering an object's origin. If the rules governing biological interactions were altered enough, it is reasonable to suppose that a certain sperm and egg might unite but not develop into a person as they would given the way that biological interactions unfold at the actual world.

An origin essentialist may advance an origin thesis that holds that the origin of an object (at a world) is essential to that object (at that world) where the *origin* essential to that object is understood as anything ranging from (O_1) to (O_2). That is, the origin essentialist could claim that any number of aspects of an object's origin (at a world), ranging from just the material out of which it is constructed to *every* factor contributing to its coming to exist, is essential to that object (at that world).

Determining a way to express object-origin so as to encompass all of the various potential origin theses that might be put forward is a daunting task but it is not the task at hand. The task at hand is to determine a way of expressing *object-origin* for the purpose of expressing the denial of origin essentialism in each of M^1, M^2, M^3 and M^4. This means that the definition of *object-origin*, required for the present purposes, does not need to be broad enough to include the details of the various potential origin theses that might be put forward, rather, it need only be broad enough to render the various potential origin theses *false*. This can be accomplished by identifying the feature(s) deemed essential to an object's origin (at a world) common to the various origin theses that may be put forward and then expressing object-origin in terms of those features.[9]

If any origin thesis that might be put forward will understand the *origin* essential to an object (at a world) as something on the range between (O_1) and (O_2), then with respect to

[9]Note: this is not quite right, but it will suffice for my purposes. Object-origin needs to, at least, be expressed in terms of such common features; however, expressing the denial of all origin theses requires more (potentially). The reason has to do with the ways in which the notion of *total variation* can be defined. To see why, consider two origin theses, T_1 and T_2. Suppose that T_1 holds that the matter M, out of which x is originally constructed is essential to x. Further suppose that T_2 holds that the plan P according to which x is constructed as well being originally constructed of M are essential to x. Both theses hold that being originally constructed of M is essential to x. Accordingly, say object-origin for x is defined in terms of this feature. It might be shown that it is possible that x originates in some manner that *varies totally* from being originally constructed of M. This would entail that T_1 is false, but it may not entail that T_2 is false. If, according to T_2, *total variation* from x's origin requires *both* total variation from being originally constructed of M *and* total variation from being constructed according to P, then T_2 has not been shown to be false by the possibility that x originates in some manner that varies totally from being originally constructed of M. What I present below ignores this possibility, however, I do not think that this is a significant shortcoming. Indeed, it seems to me that my argument could be amended, with relative ease (say, by introducing additional predicates and amending the definition of *total variation* accordingly), to handle such theses (like T_2) and will yield the same results.

an object o at a world w, all origin theses assert that either, the elements of w out of which o is constructed (if o is an artefact) or the elements of w that develop (in a biological sense) into o (if o is an organism) is a feature of o's origin at w that is essential to o at w. So, if it fails to be the case that the elements of w out of which o is constructed (if o is an artefact) or that the elements of w that develop (in a biological sense) into o (if o is an organism) is a feature of o's origin at w that is essential to o at w, then all origin theses are false. Hence, for the present purposes, I will understand object-origin to consist in the material object(s) out of which an object is constructed, if that object is an artefact, or the biological material from which an object develops, if that object is an organism.[10]

In order to formally express object-origin, I will introduce, into each model, a multi-place predicate O^n, such that: for any world $w \in W_M$, with respect to the pair (O^n, w), i_M assigns to that pair ordered n-tuples such that each n-tuple is composed of members of $d_M(w)$ and for each n-tuple: if the first object in that n-tuple is an artefact at w, then the first object is constructed out of remaining object(s) in that n-tuple at w; if the first object in that n-tuple is an organism at w, then the first object develops from the remaining object(s) in that n-tuple at w. To illustrate, $< o_1, o_2, ..., o_n >$ is a member of the subset of D^n_M assigned to (O^n, w) by i_M iff $\{o_1, o_2, ..., o_n\}$ is a subset of the domain of w and if o_1 is an artefact, o_1 is constructed out of $o_2, ...o_n$ at w. I will use '$O(x, y_1, ..., y_n)$' to formally express, in M, M^1, M^2, M^3 and M^4, the manner in which an object x originates (x originates from $y_1, ..., y_n$),

[10]Note: though, to my knowledge, no origin essentialist *has* made such a claim, an origin essentialist *could* claim that there are exceptions to the proposal that, for any object, the material out of which it is constructed or develops (biologically) is an essential feature of its origin (at a given world). For instance, one may hold that da Vinci's *Mona Lisa* would still be *that very painting* if da Vinci had used different paints of the same colour. Perhaps all that is essential to the *Mona Lisa* is that it is painted by da Vinci. I mention this because this sort of example has been used as a counterexample against certain origin theses (see e.g. [Joh77]). Yet, it seems to me that with a bit of effort a given origin thesis could potentially be amended to incorporate such exceptions. The potential for an origin thesis to be amended to allow for such exceptions, does not significantly undermine my proposal for formally expressing object-origin. If an origin thesis were amended to incorporate exceptions, like the Mona Lisa, the thesis would still hold that a certain kind of relation between the object that is originating (at a given world) and another object (at that world)—in the case of the Mona Lisa, the artisan who created it—is a feature of that object's origin that is essential to it (at that world). Hence, it would not be difficult to amend my proposal for formally expressing object-origin such that it takes such amended origin theses into consideration.

at a given world.

2.3.2 Total Variation between Origins

Determining an appropriate way to express the denial of origin essentialism in each model now requires a way to express *total variation* between two object-origins. To begin, a bit more should be said about what sort of thing(s) the relation of *total variation* should be taken to relate. Given my understanding of object-origin, for x to originate in a certain manner at a world w, *just is* for x to originate from certain objects at w. Accordingly, for x to originate in a manner that *varies totally* from the manner in which x originates at w is for x to originate from objects that *vary totally* from the objects that x originates from at w. In other words, *total variation* between two origins of x is expressible in terms of relationship that obtains between the objects from which x originates (at some pair of worlds).

One way to define the notion of *total variation* is to say:

> With respect to $O(x, y_1, ..., y_n)$ and $O(x, z_1, ..., z_n)$, $y_1, ..., y_n$ *vary totally* from $z_1, ..., z_n$ iff for all $y_i \in \{y_1, ..., y_n\}$ and for all $z_j \in \{z_1, ..., z_n\}$, $y_i \neq z_j$.

In other words, the manner in which x originates at a world w varies totally from the manner in which x originates at a world w' just when each of the relevant objects from which x originates at w are *distinct from* each of the relevant objects from which x originates at w'.

The above definition of *total variation* is not quite adequate. It does not take into consideration objects that are, strictly speaking, distinct from one another, but that have overlapping parts. Origin essentialists often emphasize the importance of taking into account distinct objects with common parts. To see why, consider the origin of Michelangelo's *David* from the block of marble out of which David was actually sculpted. Call this block, b_1. Suppose that at a world w', *David* is sculpted out of a block of marble b_2, where b_2 consists of most of the marble making up b_1 but some marble not contained in b_1. Under the above definition of total variance, the manner in which *David* originates at the actual world varies totally from the manner in which *David* originates at w' because $b_1 \neq b_2$. Yet, intuitively, this seems incorrect: *David* is sculpted of most of the same marble at both worlds.

A better definition of *total variation* will be one that takes into consideration that there might be distinct objects with common parts. Let x be *discrete from* y just in case $x \neq y$ and x has no parts in common with y. Now define *total variation* as follows:

> With respect to $O(x, y_1, ..., y_n)$ and $O(x, z_1, ..., z_n)$, $y_1, ..., y_n$ *vary totally* from $z_1, ..., z_n$ iff for all $y_i \in \{y_1, ..., y_n\}$ and all $z_j \in \{z_1, ..., z_n\}$, y_i is discrete from z_j.

This definition entails that the origin of an object x at a world w varies totally from the origin of x at a world w' just when each of the relevant objects from which x originates at w is *distinct from* and has *no common parts with* any of the relevant objects from which x originates at w'. This definition resolves the above worry. The manner in which *David* originates at the actual world does not vary totally from the manner in which *David* originates at w' because b_1 is not discrete from b_2.

The issue with the above definition of *total variation* is that there is presently no means of expressing that one object is discrete from another within M^1, M^2, M^3 and M^4. In order to resolve this issue, I will introduce a new binary relation Δ, into each model that I will use to express *discreteness*. Before doing so, however, I require a means of expressing that something *is a part of* something. Let the two-place predicate P^2, be such that: for any world $w \in W_M$, with respect to the pair (P^2, w), i_M assigns to that pair ordered pairs such that each ordered pair is a member of D_M^2 and for each ordered pair: the first object in that pair is a part of the second object in that pair at w. To illustrate, $< o_1, o_2 >$ is a member of the subset of D_M^2 assigned to (P^2, w) by i_M iff o_1 a part of o_2 at w. In other words, '$P(x, y)$' expresses 'x is a part of y'.

Let 'Δ' express 'is discrete from' and be defined by the following:

1_Δ $\forall x \forall y (x \Delta y \rightarrow x \neq y)$

2_Δ $\forall x \forall y(x\Delta y \rightarrow y\Delta x)$

3_Δ $\forall x \forall y[x\Delta y \leftrightarrow \neg\exists z(P(z,x) \wedge P(z,y))]$

The above state, in less formal terms, firstly that if x is discrete from y, then x is distinct from y. Secondly that if x is discrete from y then y is discrete from x. Lastly, x and y are discrete from one another iff there is no object z, such that z is a part of x and a part of y. For the sake of simplicity when assigning truth-values to sentences containing 'Δ', I will introduce another clause into the semantics for M (and thereby for M^1, M^2, M^3 and M^4). Let a sentence φ be true at a world w in M, relative to an assignment α, just in case:

($4'_M$) Given the assignment α, of $o_1 \in D_M$ to x and $o_2 \in D_M$ to y and where φ is the sentence: $x\Delta y$, φ is true at w in M, relative to α iff $o_1 \Delta o_2$ is true at w in M .

2.3.3 Expressing Anti-Origin Essentialism

Both weak and strong origin essentialism are false if there is an object such that total variation from its origin, at a given world, is possible at that world. With respect to models M^1, M^2, M^3 and M^4, origin essentialism is false in each model just in case at some world w, in each model, the sentence:

(AO) $\exists x \exists y_1 ... \exists y_n[O(x, y_1, ..., y_n) \wedge \Diamond \exists z_1 ... \exists z_m(O(x, z_1, ..., z_m) \wedge \forall y_i \in \{y_1, ..., y_n\} \forall z_j \in \{z_1, ..., z_m\}(y_i \Delta z_j))]$[11]

is true at w. (AO) entails that there is an object x and objects y_1,...,y_n such that x originates from y_1 and...and y_n and it is possible that there exist objects $z_1, ..., z_m$ such that x originates from *those* objects where each of z_1,...,z_m is discrete from y_1 and...and y_n. In other words, there is an object such that total variation from that object's origin (at a world) is possible

[11]Note: I am using '$\forall y_i \in \{y_1, ..., y_n\} \forall z_j \in \{z_1, ..., z_m\}(y_i \Delta z_j)$' as shorthand for the long conjunction needed to express that each y is discrete from each z: $y_1 \Delta z_1 \wedge ... \wedge y_1 \Delta z_m \wedge ... \wedge y_n \Delta z_1 \wedge ... \wedge y_n \Delta z_m$.

(at that world). Thus, if (AO) is true at a world in each of M^1, M^2, M^3 and M^4, origin essentialism is false in each model and each model meets (C3).

2.4 Meeting (C3): At Least One Counter-Model

In order to show that each model meets (C3), it suffices to show that there is no *reductio*, available to the advocate, against any of the following suppositions:

(1) (AO) is true at a world w, in M^1.

(2) (AO) is true at a world w, in M^2.

(3) (AO) is true at a world w, in M^3.

(4) (AO) is true at a world w, in M^4.

If there is no *reductio*, available to the advocate, against (1), (2), (3) or (4), then each model can be described such that (AO) is true at some world in each model and the advocate cannot show this to be false without appealing to a non-standard or controversial assumption concerning metaphysical possibility.

2.4.1 Is there a *Reductio*?

There is a *reductio* against supposition (1), (2), (3) or (4), available to the advocate, only if either: the supposition that (AO) is true at w is *internally inconsistent* with M^1, M^2, M^3 or M^4 (respectively) or, that supposition is *externally inconsistent* with M^1, M^2, M^3 or M^4 (respectively). I will understand these two types of inconsistency as follows. With respect to a supposition S, that a statement φ, is true at a world w, in a model M':

- S is *internally inconsistent* with M' just in case S, together with the semantics for M', entail that a contradiction obtains (i.e. a statement and its denial are both true) at some world in M'.

- S is *externally inconsistent* with M' just in case either: S is false given the structure of M', or there is a standard and uncontroversial assumption about metaphysical possibility, left out of M', such that that assumption (if included in M') entails that φ is not true at w in M'.

Below I will argue that, with respect to each model, it is both internally and externally consistent to suppose that (AO) is true at w.

2.4.2 Internal Consistency

For the moment I will assume that suppositions (1), (2), (3) and (4) are externally consistent with M^1, M^2, M^3 and M^4 (respectively) and focus on showing that (1), (2), (3) and (4) are internally consistent with M^1, M^2, M^3 and M^4 (respectively). Each of the models, M^1, M^2, M^3 and M^4, is the same as M except with respect to the manner in which the relation of accessibility between the worlds of W_M, R_M, is defined. Thus, if (1), (2), (3) or (4) is internally inconsistent with M^1, M^2, M^3 or M^4 (respectively), the supposition that (AO) is true at w entails that a contradiction obtains at some world in M^1, M^2, M^3 or M^4 (respectively) given either: the semantics for M^1, M^2, M^3 or M^4 *independent* of their, respective, definitions of R_M, or the semantics for M^1, M^2, M^3 or M^4 *dependent* on their, respective, definitions of R_M. If the former is the case, then the assumption that (AO) is true at w will entail a contradiction at some world in M (given the semantics for M). If the latter is the case then the assumption that (AO) is true at w will yield a contradiction in at least one of M^1, M^2, M^3 and M^4 given its semantics in virtue the way that R_M is defined (in at least one of those models). I will consider each case in turn.

Case 1

Supposition (1), (2), (3) or (4) is internally inconsistent with M^1, M^2, M^3 or M^4 (respectively) *independent* of their respective definitions of R_M, only if the supposition that (AO) is true at a world w in M, together with the semantics for M, entails that a contradiction obtains at some world in M. Suppose that (AO) is true at a world w in M. By (5_M), (AO) is true at w in M just in case (AO) is true with respect to all assignments at w in M. Since (AO) has no free variables, (AO) is true at w in M (with respect to all assignments, α) iff there is an o_0 and an o_1 and an...and an o_n such that $\{o_0, o_1, ..., o_n\} \subseteq d_M(w)$ and the statement:

$$(\mathrm{AO}_1) \;\; [O(x, y_1, ..., y_n) \wedge \Diamond \exists z_1 ... \exists z_m (O(x, z_1, ..., z_m) \wedge \forall y_i \in \{y_1, ..., y_n\} \forall z_j \in \{z_1, ..., z_m\}(y_i \Delta z_j))]$$

is true with respect to the assignment, α_1 of o_0 to x and $o_1, ..., o_n$ to $y_1, ..., y_n$. (AO_1) is true at w in M with respect to α_1 iff $< o_0, o_1, ..., o_n >$ is a member of the subset of D^n_M assigned to the pair (O^n, w) by i_M and there is a world $w' \in W_M$ such that $R_M(w, w')$ and:

$$(\mathrm{AO}_2) \;\; \exists z_1 ... \exists z_m [O(x, z_1, ..., z_m) \wedge \forall y_i \in \{y_1, ..., y_n\} \forall z_j \in \{z_1, ..., z_m\}(y_i \Delta z_j)]$$

is true at w' in M with respect to α_1. It does not entail a contradiction to suppose that $< o_0, o_1, ..., o_n >$ is a member of the subset of D^n_M assigned to the pair (O^n, w) by i_M. Indeed, to deny this would commit one to the implausible position that there are no organisms or artefacts which (respectively) develop from or are constructed out of other objects (at w in M). Furthermore, it does not entail a contradiction to suppose that (AO_2) is true at w' in M with respect to α_1. (AO_2) is true at w' in M with respect to α_1 iff there is an o_{n+1} and an...and an o_{n+m} such that $\{o_{n+1}, ..., o_{n+m}\} \subseteq d_M(w')$ and the statement:

$$(\mathrm{AO}_3) \;\; [O(x, z_1, ..., z_m) \wedge \forall y_i \in \{y_1, ..., y_n\} \forall z_j \in \{z_1, ..., z_m\}(y_i \Delta z_j)]$$

is true at w' in M with respect to the assignment α_2, where α_2 is just like α_1 except that $o_{n+1}, ..., o_{n+m}$ is assigned to $z_1, ..., z_m$. (AO_3) is true at w' in M with respect to α_2 iff $< o_0, o_{n+1}, ..., o_{n+m} >$ is a member of the subset of D^n_M assigned to the pair (O^n, w') by i_M and $\forall o_i \in \{o_1, ..., o_n\} \forall o_{n+j} \in \{o_{n+1}, ..., o_{n+m}\}(o_i \Delta o_{n+j})$ (i.e. each of the objects assigned to the ys is discrete from all of the objects assigned to the zs in (AO_3) at w'). Supposing that $< o_0, o_{n+1}, ..., o_{n+m} >$ is a member of the subset of D^n_M assigned to the pair (O^n, w') by i_M and that each object in $\{o_1, ..., o_n\}$ is discrete from every object in $\{o_{n+1}, ..., o_{n+m}\}$ (at w')

does not entail a contradiction in M. Therefore, the assumption that (AO) is true at a world w in M, together with the semantics for M, does not entail that a contradiction obtains at some world in M.

Case 2

The supposition that (AO) is true at a world w in M is internally consistent with M and so if supposition (1), (2), (3) or (4) is internally inconsistent with M^1, M^2, M^3 or M^4 (respectively), then (1), (2), (3) or (4), together with the semantics for M^1, M^2, M^3 or M^4, *in virtue* of their respective definitions of R_M, entails that a contradiction obtains at some world in M^1, M^2, M^3 or M^4 (respectively). Yet, with respect to each model, the definition of R_M is not sufficient to derive a contradiction from the assumption that (AO) is true at w. The main reason for this has to do with the type of modal claim being made in (AO) in conjunction with the fact that the semantics for each model is sound.

The modal claim in (AO) is a claim that something is *possible* which means that only two worlds are required for (AO) to be true at w in M^1, M^2, M^3 and M^4: w and w' (where $R_M(w, w')$). Furthermore, with respect to each model, the assumption that (AO) is true at w does not entail another statement that requires considering an additional world.[12] Hence, to show that (1), (2), (3) and (4) are (respectively) internally consistent with M^1, M^2, M^3 and M^4, it suffices to show that, with respect to each model, the assumption that (AO) is true at w does not entail a contradiction at w nor at w'.

Let each model to be such that what makes (AO) true at w is the same as what makes (AO) true at w in M. (AO) is true at w in M iff (AO_1) is true at w in M with respect to (the assignment) α_1. (AO_1) is true at w in M with respect to α_1 iff $O(x, y_1, ..., y_n)$ is true at w in M with respect to α_1 and there is a world $w' \in W_M$ such that $R_M(w, w')$ and (AO_2) is true at w' in M with respect to α_1. (AO_2) is true at w' in M with respect to α_1 iff (AO_3) is true at w' in M with respect to α_2. To make things simpler, I will represent this information

[12] To illustrate, if $\neg\varphi$ is true at w and $\neg\varphi$ is true at w' and it can be inferred that $\Diamond\varphi$ is true at w, then a world w^* would need to be considered such that $w \neq w' \neq w^*$, $R_M(w, w^*)$ and φ is true at w^*.

by means of the following chart:

M	w	w'
1.	(AO)	
2.	(AO_1), wrt α_1	
3.		(AO_2), wrt α_1
4.		(AO_3), wrt α_2

where the middle and rightmost columns indicate the statements that are true at w and w' (respectively) and the assignment with respect to (wrt) which those statements are true (if applicable). Accordingly, with respect to each model, let (AO) be true at w just in case the statements in rows 1–4 obtain in the appropriate columns (i.e. as they are recorded in the above chart).

With respect to each model, the assumption that (AO) is true at w and the manner in which R_M is defined does not entail that a contradiction obtains at w nor at w'. This can be made clear by considering a few examples of the statements that will obtain at w and w' in each model given the manner in which R_M is defined and the assumption that (AO) is true at w. To do this, I will give charts, like the above one for M, with additional rows under the double solid line that contain (some of) the statements that will obtain at w and w' given the manner in which R_M is defined:

M^1:

> R_M is reflexive and so, for any statement φ, if φ is true at a world w^* in M^1, then $\Diamond\varphi$ is also true at w^* in M^1.

The statements entailed by the fact that R_M is reflexive and the supposition (AO) is true at w in M^1 are as follows:

M^1	w	w'
1.	(AO)	
2.	(AO_1), wrt α_1	
3.		(AO_2), wrt α_1
4.		(AO_3), wrt α_2
5.	$\Diamond$(AO)	
6.	$\Diamond(\text{AO}_1)$, wrt α_1	
7.		$\Diamond(\text{AO}_2)$, wrt α_1
8.		$\Diamond(\text{AO}_3)$, wrt α_2
9.	$\Diamond\Diamond(\text{AO}_2)$, wrt α_1	
10.	$\Diamond\Diamond(\text{AO}_3)$, wrt α_2	
$\vdots$	$\vdots$	$\vdots$

One can continue, in this way, to add '$\Diamond$'s in front of the statements in rows 5–10, and in front of those new statements and so on; however, it seems clear that doing so will not lead to contradiction.

M^2:

> R_M is reflexive and symmetric and so, for any statement φ, if φ is true at a world w^* in M^2, then $\Diamond\varphi$ and $\Box\Diamond\varphi$ are also true at w^* in M^2.

The statements entailed by the fact that R_M is reflexive and symmetric together with the supposition that (AO) is true at w in M^2 are the statements contained in rows 5–10 (and so on) from the chart for M^1 in addition to the following:

M^2	w	w'
1.	(AO)	
2.	(AO_1), wrt α_1	
3.		(AO_2), wrt α_1
4.		(AO_3), wrt α_2
$\vdots$	$\vdots$	$\vdots$
11.	$\Box\Diamond$(AO)	
12.	$\Box\Diamond(\mathrm{AO}_1)$, wrt α_1	
13.		$\Box\Diamond(\mathrm{AO}_2)$, wrt α_1
14.		$\Box\Diamond(\mathrm{AO}_3)$, wrt α_2
15.		$\Diamond$(AO)
16.		$\Diamond(\mathrm{AO}_1)$, wrt α_1
$\vdots$	$\vdots$	$\vdots$

As was the case with the M^1 chart, one can continue, in this way, to add '$\Box\Diamond$'s or '$\Diamond$'s in front of the statements in rows 5–16, and in front of those new statements and so on without arriving at a contradiction at w nor at w'. Of course, one might worry that, given the equivalence of '$\Box$' and '$\neg\Diamond\neg$', it is not entirely clear that no contradiction will result from executing this procedure. This worry can be eased by considering a few examples:

M^2	w	
1.	(AO)	
2.	$\Diamond$(AO)	$\neg\Box\neg$(AO)
3.	$\Box\Diamond\Diamond$(AO)	$\neg\Diamond\Box\Box\neg$(AO)
4.	$\Box\Diamond\Box\Diamond\Diamond$(AO)	$\neg\Diamond\Box\Diamond\Box\Box\neg$(AO)
$\vdots$	$\vdots$	$\vdots$

This chart shows some of the statements that follow from (AO) at w in M^2 where, in each row, the statements on either side of the solid vertical line are equivalent to one another, given the equivalence of '$\Box$' and '$\neg\Diamond\neg$'. The chart should make it clear that the equivalence of '$\Box$' and '$\neg\Diamond\neg$' will not allow one to infer that a statement of the form φ, and a statement of the form $\neg\varphi$, obtain at w or at w' in M^2. Hence, it does not seem that the assumption that (AO) is true at w is internally inconsistent with M^2.

M^3:

> R_M is reflexive and transitive and so, for any statement φ, if φ is true at a world w^* in M^3, then $\Diamond\varphi$ is also true at w^* in M^3; *and* if $\Diamond\Diamond\varphi$ is true at a world w^* in M^3, then $\Diamond\varphi$ is true at w^* in M^3.

The statements entailed by the fact that R_M is reflexive and transitive together with the supposition that (AO) is true at w in M^3 are the statements contained in rows 5–10 (and so on) from the chart for M^1. Since the only worlds being considered are w and w' and $R_M(w, w')$ is the case in both M^1 and M^3, the added stipulation that R_M is transitive in M^3 makes no significant impact on the statements that are deducible at w and w' in M^3 over the statements deducible at w and w' in M^1. The fact that R_M is reflexive allows one to add '$\Diamond$'s in front of statements and the fact that R_M is also transitive allows one to remove '$\Diamond$'s from the front of statements (that contain two or more '$\Diamond$'s). Accordingly, as no contradiction will arise from one's adding '$\Diamond$'s to the front of statements, no contradiction will arise from one's removing the '$\Diamond$'s that one has added. Hence, the assumption that (AO) is true at w in M^3 does not lead to contradiction.

M^4:

> R_M is an equivalence relation and so, for any statement φ, if φ is true at a world w^* in M^4, then $\Diamond\varphi$ is also true at w^* in M^4; *and* if $\Diamond\varphi$ is true at a world w^* in M^4, then $\Box\Diamond\varphi$ is true at w^* in M^4.

The statements entailed by the fact that R_M is an equivalence relation together with the supposition that (AO) is true at w in M^4 are the same as the statements that can be obtained in M^1, M^2, and M^3. The reason is that the only worlds being considered are w and w' and in each model, $R_M(w, w')$. Again, this means that the stipulation that R_M is transitive and reflexive in M^4 makes no significant impact on the statements that one can infer over what one could infer had R_M been reflexive and not transitive in M^4. As R_M is also symmetric in M^4, one can (as was the case with respect to M^2) add a '$\Diamond$' or a '$\Box\Diamond$' to the front of any statement in rows 1–4 and the resulting statement will be true at both w and at w' in M^4. This process can be repeated for any new statement produced, but doing so will not lead to contradiction.

The respective manner in which R_M is defined in M^1, M^2, M^3 and M^4 is consistent with the assumptions that (AO) is true at w in M^1, M^2, M^3 and M^4. With respect to each of the models, no statement follows from the assumption that (AO) is true at w that requires considering a world in addition to w and w'. Furthermore, with respect to each model, the assumption that (AO) is true at w does not lead to a contradiction obtaining at w nor at w'.

The reason for the above result is due to the fact that the semantics for each model is sound. With respect to each model, what it takes for (AO) to be true at w is precisely that:

	w	w'
1.	(AO)	
2.	(AO_1), wrt α_1	
3.		(AO_2), wrt α_1
4.		(AO_3), wrt α_2

In each model, these conditions for the truth of (AO) at w are satisfied and the various constraints on R_M (that it is reflexive, symmetric, etc.) do not entail that the conditions in rows 1–4 are *not* satisfied. Furthermore, with respect to each model, the modal inferences drawn from the manner in which R_M is defined are valid. Hence, with respect to each model, given that the conditions in rows 1–4 are satisfied, no contradiction can be drawn from the manner in which R_M is defined and the assumption that (AO) is true at w.

2.4.3 External Consistency

Suppositions (1), (2), (3), and (4) are not internally inconsistent with M^1, M^2, M^3 and M^4 (respectively) and so, if (1), (2), (3), and (4) are also not externally inconsistent with M^1, M^2, M^3 and M^4 (respectively) then there is no *reductio*, available to the advocate , against (1), (2), (3), or (4). Recall that there are two ways for (1), (2), (3), or (4) to be externally inconsistent with M^1, M^2, M^3 or M^4 (respectively). Firstly, if (1), (2), (3), or (4) is false given the structure of M^1, M^2, M^3 or M^4 (respectively). Secondly, if there is a standard and uncontroversial assumption about metaphysical possibility, missing from M^1, M^2, M^3 and M^4, such that adding it to M^1, M^2, M^3 or M^4 entails that (AO) is false at w (in the model to which the assumption is added).

Case: 1

Prima facie it does not seem that (1), (2), (3), or (4) is false given the structure of M^1, M^2, M^3 or M^4 (respectively). There is one plausible way in which (1), (2), (3), or (4) will be false, given the structure of M^1, M^2, M^3 or M^4 (respectively). Namely, if supposing that

(AO) is true at w entails that w violates (M1)-(i) or (M1)-(ii) (i.e. if (AO) is true at w, then w is not epistemically possible). Presumably supposing that (AO) is true at w entails that w violates (M1)-(i) only if, (AO) is incoherent. Yet, (AO) is not incoherent. (AO) is meaningful and it is not contradictory in terms of its form or its meaning. Hence, supposing that (AO) is true at w does not entail that w violates (M1)-(i). Alternatively, if supposing that (AO) is true at w entails that w violates (M1)-(ii), then it should be knowable *a priori* that (AO) is false (at the actual world). This would require knowing, *a priori* that:

(AP) $\forall x \forall y_1 ... \forall y_n [O(x, y_1, ..., y_n) \rightarrow \Box \forall z_1 ... \forall z_m (O(x, z_1, ..., z_m) \rightarrow \exists y_i \in \{y_1, ..., y_n\} \exists z_j \in \{z_1, ..., z_m\} \neg (y_i \Delta z_j))]$

(AP) could be known *a priori* just in case it could be known *a priori* either that $O(x, y_1, ..., y_n)$ is false of all $x, y_1, ...y_n$, or that $\Box \forall z_1 ... \forall z_m [O(x, z_1, ..., z_m) \rightarrow \exists y_i \in \{y_1, ..., y_n\} \exists z_j \in \{z_1, ..., z_m\} \neg (y_i \Delta z_j)]$ is true of all $x, y_1, ...y_n$. The former entails that there are no organisms or artefacts that (respectively) develop from or are constructed out of other objects and so, it is false. Thus, the former cannot be known (*a priori* or otherwise). The latter cannot be determined to be true in virtue of its form or meaning. Hence, if the latter can be known *a priori* it is either the direct consequence of intuition or of some statement(s) that can be known *a priori*. Yet, no such statement (including (AP)) holds in M^1, M^2, M^3 or M^4. Hence, if the advocate is to show that supposing that (AO) holds at w entails that w violates (M1)-(ii), the advocate needs to show that there is a principle about metaphysical possibility that is generally regarded to be correct, given standard and uncontroversial intuitions concerning metaphysical possibility, that is missing from M^1, M^2, M^3 and M^4.

Case: 2

If there is a *reductio*, available to the advocate, against (1), (2), (3), or (4), then there is a standard and uncontroversial assumption concerning metaphysical possibility left out of M^1, M^2, M^3 or M^4 (respectively) such that, with respect to each model, adding that assumption entails that (AO) is not true at w. Undoubtedly, there are certain assumptions missing from

M^1, M^2, M^3 and M^4 that, if added (to each model), would entail that (AO) is false at w (in each model). Assuming that (AP) holds in each model would have this effect. Yet, what *is* doubtful is that there is a principle like this that can be established on the basis of standard and uncontroversial intuitions concerning metaphysical possibility.

It seems to me that for any principle P, if assuming that P holds in M^1, M^2, M^3 and M^4 entails that (AO) is not true at w (in each model), then the assumption that P holds is controversial. (AO) expresses an anti-(origin) essentialist claim and (AO) is internally consistent with M^1, M^2, M^3 and M^4. Accordingly, with respect to each model, the added assumption that P holds entails that (AO) is false at w only if P expresses a (non-trivial) essentialist claim. Therefore, assuming that P holds is controversial: establishing that P involves appeal to intuitions concerning non-trivial essentialist claims. It follows that the advocate cannot show that (1), (2), (3), and (4) are externally inconsistent with M^1, M^2, M^3 and M^4 (respectively).

2.4.4 Internal and External Consistency

Suppositions (1), (2), (3), and (4) are both internally and externally consistent with M^1, M^2, M^3 and M^4 (respectively) and so there is no *reductio*, available to the advocate, against (1), (2), (3), and (4). Hence, each of M^1, M^2, M^3 and M^4 meets (C3). It follows that at least one of M^1, M^2, M^3 or M^4 meets all three conditions for being a counter-model against the semantic thesis.

2.5 The Semantic Thesis Fails

The semantic thesis is false. Origin essentialism is not a direct consequence of Kripke's defence of the intelligibility of essentialism together with standard and uncontroversial assumptions concerning metaphysical possibility. Origin essentialism is false in the models, M^1, M^2, M^3 and M^4, and each model accords with (1_{D}), (2_{D}) and (3_{D}) and at least one of the models appropriately *maps onto* standard and uncontroversial assumptions concerning metaphysical possibility. Hence, the semantic thesis has a counter-model.

Although, strictly speaking, the semantic thesis is false, the advocate may be inclined to respond by proposing a slightly weakened version of the thesis. The advocate may argue that there are commonly held and firm intuitions that support some (non-trivial) essentialist claims. If such claims are true and knowable on the basis of those intuitions, then it is reasonable to appeal to such claims in discussions concerning origin essentialism. As such, the advocate may insist that there is a plausible argument for origin essentialism that proceeds from such claims together with Kripke's (1_{D}), (2_{D}) and (3_{D}) and standard and uncontroversial assumptions concerning metaphysical possibility.

Nathan Salmon offers a refinement of Kripke's argument for origin essentialism that, if sound, would support a weakened version of the semantic thesis. Salmon argues that origin essentialism is a consequence of Kripke's work in [Kri81] and three additional principles, one of which is a (non-trivial) essentialist claim. Salmon's argument is discussed in the following chapter.

Chapter 3

Salmon for Origin Essentialism

One of the better known arguments for origin essentialism is offered by Nathan Salmon in his [Sal79] and [Sal05]. Salmon presents his argument as a refinement of the argument given by Kripke in [Kri81, p. 114, fn. 56]. Following Kripke, Salmon focusses his discussion on tables and their origins (from certain hunks of matter). He (Salmon) contends that, at least with respect to tables, origin essentialism is a consequence of Kripke's work in [Kri81], and three additional principles. First, that a single table cannot be originally constructed entirely from all of one hunk of matter and also originally constructed entirely from all of a different hunk of matter. Second, that if it is possible for a table x to be constructed from some hunk of matter y, and possible for some table or other to be constructed from a discrete hunk of matter y', then it is possible for x to be constructed from y and a table x' to be constructed from y'. Third, that a table-specific version of the *necessary sufficiency of origin* holds. Below, I will argue that Salmon's argument does not constitute a convincing case for origin essentialism. I present Salmon's argument in terms of the model M, given in the previous chapter, and raise two worries. Firstly, strictly speaking, Salmon's conclusion is consistent with the denial of origin essentialism as I am understanding the view. Secondly, the *necessary sufficiency of origin* is implausible due to compelling counterexamples against the principle. It is on the basis of this latter worry that I conclude that Salmon's argument is not persuasive.

3.1 Preliminaries and Assumptions

Salmon's argument for origin essentialism can be reconstructed in terms of M. As was shown in the previous chapter, M accords with Kripke's work in [Kri81] and appropriately maps onto standard and uncontroversial assumptions concerning metaphysical possibility, but leaves the nature of metaphysical accessibility unspecified. Salmon's argument makes no assumptions about the sort of relation (on W_M) that accurately defines metaphysical accessibility. Accordingly, if his argument is successful, assuming that his three principles hold in M will be inconsistent with the supposition that it is possible for a table to originate in some manner at w and possible for that table to originate in a manner that *varies totally* from the manner in which it originates at w.

3.1.1 Expressing Key Notions

Presenting Salmon's argument in terms of M requires a means of expressing, in M, both *table-origin* and what it is for two table-origins to *vary totally* from one another (at some pair of worls). With respect to the former, Salmon introduces a two-place predicate T^2, intended to represent table-origins and defines it as follows:

> Let '$T(x, y)$' mean "x is a table that was originally constructed entirely from all of hunk y." [Sal05, p. 204]

In terms of M, T^2 is such that: for any world $w \in W_M$, with respect to the pair (T^2, w), i_M assigns to that pair a set of ordered pairs such that each ordered pair (in that set) is composed of members of $d_M(w)$ and for each ordered pair: the first object in that pair is a table at w, the second object in the pair is a hunk of matter at w, and the first object is originally constructed entirely from all of the second object at w. To illustrate, $< o_1, o_2 >$ is a member of the subset of D^2_M assigned to (T^2, w) by i_M iff $\{o_1, o_2\}$ is a subset of the domain of w and o_1 is a table at w, o_2 is a hunk of matter at w and o_1 is originally constructed entirely from all of o_2 at w.

Salmon's (implicit) understanding of *total variation* between table-origins is very similar to the understanding of *total variation* between object-origins presented in the previous chapter. Salmon's definition of table-origin means that, for a table x to originate in a certain manner at a world w, *just is* for x to be originally constructed entirely from all of a certain hunk of matter at w. Thus, for a table x to originate in a manner that *varies totally* from the manner in which x originates at w is for x to be originally constructed from some hunk of matter that *varies totally* from the hunk of matter from which x is originally constructed at w. Hence, *total variation* between two table-origins of x is expressible in terms of a relationship that obtains between the hunks of matter from which x is originally constructed (at some pair of worlds). Salmon specifies the nature of this relationship in stating what he intends his argument to establish. He writes:

> The conclusion of the argument will not be that a table could not originate from any hunk of matter distinct from its actual (or possible) original matter, but only that a table could not originate from any nonoverlapping hunk of matter. [Sal05, pp. 203–204]

Salmon is using the term, 'nonoverlapping', as a synonym for, 'discrete', as it ('discrete') was defined in the previous chapter [Sal05, p. 201]. Accordingly, *total variation* between table-origins can be defined as follows:

With respect to $T(x, y)$ and $T(x, z)$, y *varies totally* from z iff $y \Delta z$.

where 'Δ' expresses 'is discrete from' and is defined as it was in the previous chapter.

Given the above means of expressing *table-origin* and *total variation* between two table-origins (at some pair of worlds) in M, *table-origin essentialism* can be said to hold in M just in case:

$$(\Diamond T(x, y) \wedge y \Delta y') \rightarrow \neg \Diamond T(x, y')$$

is true at all worlds in M. That is, at all worlds in M, if it is possible that x is a table originally constructed from a hunk of matter y and y' is a hunk of matter discrete from y, then it is not possible for x to be a table originally constructed from y'.

3.1.2 Salmon's Assumptions

Salmon argues that table-origin essentialism follows under the assumption that the three principles hold.[1] The first of these principles is the following:

> (I) It is impossible for the same table x to be originally constructed from a hunk of matter y and in addition to be originally constructed from a *distinct* hunk of matter y'. [Sal05, p. 200]

It follows from (I) that:

$$\text{(P1)}\quad \Box\forall x\forall x'\forall y\forall y'[(y \neq y' \wedge T(x,y) \wedge T(x',y')) \rightarrow x \neq x']$$

holds in M.

Salmon formulates the second principle as follows:

> (IV) For any possible table x and any possible hunks of matter y and y', if it is possible for table x to be originally constructed from hunk y while hunk y' does not overlap with hunk y, and it is also possible for a table to be constructed from hunk y', then it is also possible that table x be originally constructed from hunk y and in addition some table or other x' be originally constructed from hunk y'. [Sal05, p. 203]

This principle is based on the intuition that discrete objects, if able to be constructed into artefacts, could be constructed into artefacts at the same world. For example, where b_1 is the block of marble out of which Michelangelo's *David* is actually sculpted and b_2 is a block

[1] Note: Salmon uses the term 'premise' not 'principle'.

of marble that is discrete from b_1 and such that something or other *could be* sculpted out of b_2, it seems that it should be possible for one sculpture to be made from b_1 (say, *David*) and also for a sculpture to be made from b_2.

If Salmon's second principle holds, then,

$$\text{(P2)}\ \ [\Diamond T(x,y) \wedge y\Delta y' \wedge \Diamond\exists z T(z,y')] \rightarrow \Diamond(T(x,y) \wedge \exists x' T(x',y'))$$

holds at all worlds in M, with respect to the assignment of any possible table to x and any possible hunks of matter to y and y'. I take it that x is a *possible table* at a world w with respect to the assignment α^* of an object o to x iff there is a world w', accessible from w, such that $o \in d_M(w')$ and 'x is a table' is true at w' with respect to α^*. I also take it that *possible hunks of matter* are to be similarly understood.[2]

The third principle assumed in Salmon's argument is a table-specific version of the *necessary sufficiency of origin.* He renders this principle as follows:

> (V) If it is possible for a table x to be originally constructed from a hunk of matter y, then necessarily, any table originally constructed from y is the very table x and no other. [Sal05, p. 206][3]

(V) entails that,

$$\text{(P3)}\ \ \Diamond T(x,y) \rightarrow \Box\forall z(T(z,y) \rightarrow z = x)$$

[2]To illustrate, suppose that $\Diamond\exists x\exists y T(x,y)$ is true at a world w in M. Accordingly, there is a world w', accessible from w and $\exists x\exists y T(x,y)$ is true at w' in M. $\exists x\exists y T(x,y)$ is true at w' in M iff there is an object o_1 and an object o_2 such that $\{o_1, o_2\} \subseteq d_M(w')$ and $T(x,y)$ is true at w' in M with respect to the assignment α, of o_1 to x and o_2 to y. $T(x,y)$ is true at w' in M with respect to α iff $< o_1, o_2 >$ is a member of the subset of D^2_M assigned to (T^2, w') by i_M, which occurs only if, o_1 is a table at w' and o_2 is a hunk of matter at w'. Since w' is accessible from w, it follows that, at w, o_1 is a possible table and o_2 is a possible hunk of matter. To put it another way, $\Diamond T(x,y)$ is true at w (in M) with respect to the assignment α. Hence, (P2) is true at w in M with respect to the assignment of o_1 to x, o_2 to y and any possible hunk of matter to y'.

[3]It is perhaps worth mentioning that unlike (I) and (IV), each of which Salmon takes to be "essentialism-free" [Sal05, p. 204], Salmon recognizes that (V) is, "a strong essentialist principle concerning tables and their origins" [Sal05, p. 208].

holds at all worlds in M with respect to the assignment of any possible table to x and any possible hunk of matter to y. If (P3) holds in M, it follows that, with respect to any (possible) table x, if it is possible at a world w that x is originally constructed entirely from all of a (possible) hunk of matter y, then at all worlds w', accessible from w, any object z that is a table originally constructed entirely from all of y is identical with x.

3.2 Salmon's Argument

Salmon's argument can be rendered as a *reductio* against the supposition that the denial of table-origin essentialism holds at some world in M. That is, assuming that (P1), (P2) and (P3) hold in M, the supposition that,

(AO$^{\mathrm{T}}$) $\Diamond T(x,y) \wedge y\Delta y' \wedge \Diamond T(x,y')$[4]

is true at a world w in M, with respect to an assignment, entails a contradiction. Salmon reasons as follows:

(1_{S}) Suppose, for *reductio*, that (AO$^{\mathrm{T}}$) is true at w in M with respect to the assignment α_1 of o_1 to x, o_2 to y and o_2' to y'.

(2_{S}) So, there is a world w', accessible from w, such that $T(x,y')$ is true at w' with respect to the assignment of o_1 to x and o_2' to y'.

(3_{S}) So, $\Diamond\exists z T(z,y')$ is true at w in M with respect to the assignment of o_2' to y'.

(4_{S}) So, $[\Diamond T(x,y) \wedge y\Delta y' \wedge \Diamond\exists z T(z,y')]$ is true at w in M with respect to α_1.

(5_{S}) Since (P2) holds at w in M, $\Diamond(T(x,y) \wedge \exists x' T(x',y'))$ is true at w in M with respect to α_1. (from (4_{S}))

[4]Notice there are differences between (AO) and (AO$^{\mathbf{T}}$) beyond the use of a different predicate. However, it does not seem to me that the differences are particularly significant and so I will not make anything of them.

(6_S) Thus, there is a world w'', accessible from w, such that there is an object $o'_1 \in d_M(w'')$ and $(T(x,y) \wedge T(x',y'))$ is true at w'' in M with respect to the assignment α_2, which is just like α_1, except o'_1 is assigned to x'.

(7_S) Since $y\Delta y'$ is true at w in M with respect to the assignment of o_2 to y and o'_2 to y', $y \neq y'$ is true at w in M with respect to the assignment of o_2 to y and o'_2 to y'. (Since for all y and y', $y\Delta y' \rightarrow y \neq y'$)

8($_S$) So, $(y \neq y' \wedge T(x,y) \wedge T(x',y'))$ is true at w'' in M with respect to α_2. (from (6_S), (7_S) and the semantics for '=')

(9_S) So, $x \neq x'$ is true at w'' in M with respect to the assignment of o_1 to x and o'_2 to x' (from (8_S) given (P1) holds at w and $R(w,w'')$)

(10_S) $\Diamond T(x',y')$ is true at w in M with respect to the assignment α_3, of o'_1 to x' and o'_2 to y' (from (6_S) given $R(w,w'')$)

(11_S) So, $\Box\forall z(T(z,y') \rightarrow z = x')$ is true at w in M with respect to α_3. (from (10_S) and (P3))

(12_S) So, $\forall z(T(z,y') \rightarrow z = x')$ is true at w' with respect to α_3. (since $R(w,w')$)

(13_S) So, $(T(z,y') \rightarrow z = x')$ is true at w' in M with respect to the assignment α_4, which is just like α_3 except o_1 is assigned to z. (since $o_1 \in d_M(w')$ given (2_S))

(14_S) Therefore, $o_1 = o'_1$. (from (2_S), (13_S) and the semantics for '=')

(15_S) Contradiction. ($o_1 \neq o'_1$, given (9_S) and the semantics for '=')[5]

Salmon concludes that the original supposition that is false. Hence, table-origin essentialism holds in M under the assumption that (P1), (P2) and (P3) hold in M.

[5]This reconstruction of Salmon's argument is adapted from [Sal05, pp. 206–207].

3.3 Is Salmon's Conclusion Strong Enough?

Assuming, for the moment, that each of the principles assumed in Salmon's argument is correct, it is not obvious that Salmon's conclusion is strong enough to warrant one's accepting origin essentialism, as I am understanding that view. Recall that origin essentialism (either strong or weak) is false just in case it is possible, at a world w, for an object x to originate in a manner that *varies totally* from the manner in which x originates (or possibly originates) at w. These conditions do not entail that table-origin essentialism is false.

One can consistently affirm table-origin essentialism while denying origin essentialism. Given the manner in which 'T^2' is defined, table-origin essentialism holds that: if it is possible at a world w for x to be a table originally constructed entirely from a hunk of matter y, then at all possible worlds, accessible from w, at which (i) x exists and (ii) x is a table, x is originally constructed entirely from a hunk of matter y^*, where y^* is not discrete from y (at w). This view is compatible with the denial of origin essentialism provided there is some w', accessible from w, at which x exists, x is not a table and at which x originates in a manner that *varies totally* from the manner in which x originates at w (say, by being a chair originally constructed entirely from all of a hunk of matter y', at w', where $y' \Delta y$). Neither Salmon's argument, nor the structure or semantics for M precludes there being such a w'. Hence, strictly speaking, it would seem that Salmon's argument fails to establish origin essentialism (with respect to tables).

3.3.1 Assuming Another Principle

One way for Salmon to amend his argument such that table-origin essentialism entails origin essentialism (with respect to tables) is by assuming some additional principle that would ensure that if x is possibly a table, then at all (accessible) worlds at which x exists, x is a table. Salmon might assume something like the following,

(P4) $\Diamond T(x, y) \rightarrow \Box \forall z (z = x \rightarrow z \text{ is a table})$

holds for all possible tables x and all possible hunks of matter y. (P4) entails that if it is possible, at a world w, that x is a table (originally constructed entirely from all of a hunk of matter y), then at all worlds accessible from w, w', if x exists at w' (i.e. x is identical with an object in the domain of w'), then x is a table at w'. Hence, by assuming that (P4) holds in M Salmon would guarantee that, if table-origin essentialism holds for some x, so does origin essentialism.

Many may be sympathetic toward the *kind* (or *sortal*) essentialism endorsed in (P4); however, a thoroughgoing anti-essentialist would surely insist that (P4) is equally as counterintuitive and in need of justification as is origin essentialism. Thus, assuming that (P4) would be rather controversial in the context of the present discussion.[6] Indeed, that may be why Salmon refrains from assuming such a principle.

3.3.2 Using a Different Predicate

As an alternative to the above, perhaps Salmon can amend his argument by replacing T^2 with a more broadly applicable predicate that allows him to establish origin essentialism without appeal to a principle like (P4). In attempting to define such a predicate, it will be useful to first pin down the kinds of objects to which Salmon takes his argument (or variants thereof) to be applicable. Salmon is quite clear that Kripke's argument generalizes. He writes:

> Kripke's argument is perfectly general. Similar considerations can be raised with regard to objects other than tables: other artefacts such as walls and bridges, natural inanimate objects such as mountains and rocks, and even natural organisms such as people. In fact, the argument seems to apply to virtually any sort of object that may be said to have a physical origin and composition...In this way, if Kripke's argument is successful,

[6] For some criticisms of the sortal essentialism endorsed in (P4) see e.g. [Rei78, pp. 222–228].

variants of it may be used to establish several strong essentialist theses concerning the origin and composition of a variety of both animate and inanimate objects. [Sal05, p. 199]

Since Salmon presents his argument as a refinement of Kripke's argument, it is reasonable to suppose that Salmon takes his argument to generalize just as Kripke's does. Accordingly, the above passage would seem to indicate that Salmon thinks that analogues of T^2 can be defined for (nearly) any kind of object that has a physical origin and composition and that analogues of (P1), (P2) and (P3) can be defined corresponding to each analogue of T^2. If so, Salmon's conclusion generalizes because a variant of his argument exists (or can be constructed) for (nearly) each kind of object with a physical origin and composition. This suggests that a variant of Salmon's argument can also be produced for a kind of object where the kind in question is defined as equivalent to the disjunction of (nearly) each kind of object with a physical origin and composition. An object would belong to this kind just in case it is either an artefact or an organism or a mountain or a planet or etc. I will call this kind, G and, for the sake of simplicity, define the kind such that: for any x, x is a G at a world w just in case x is either an animate object or an inanimate object (with an origin and composition) at w.

G-origin may be expressed in M by introducing a multi-place predicate G^n, and defining it in a manner analogous to Salmon's definition of T^2, such that:

> '$G(x, y_1, ..., y_n)$' means "x is an object that is originally composed entirely of all of each of $y_1, ..., y_n$ (if x is inanimate) or originally develops from only and all of each of $y_1, ..., y_n$ (if x is animate)".

In terms of M, G^n is quite similar to the predicate, O^n, that I introduced in the previous chapter. For any world $w \in W_M$, with respect to the pair (G^n, w), i_M assigns to that pair a set of ordered n-tuples such that each n-tuple (in that set) is composed of members of $d_M(w)$ and for each n-tuple: if the first object in that n-tuple is inanimate at w, then the first object is *originally* composed *entirely* out of *all of each of* the remaining object(s) in that n-tuple at w; if the first object in that n-tuple is animate at w, then the first object *originally* develops from *only* and *all of each of* the remaining object(s) in that n-tuple at w. To illustrate, $< o_1, o_2, ..., o_n >$ is a member of the subset of D^n_M assigned to (G^n, w) by i_M iff $\{o_1, o_2, ..., o_n\}$ is a subset of the domain of w and if o_1 is inanimate, o_1 is originally composed entirely out of all of o_2 and all of...and all of o_n at w.[7]

As was the case with T^2 (and O^n), total variation between two G-origins for an object x can be expressed in terms of discreteness between each of the objects out of which x is composed or from which x develops (at some pair of worlds). More specifically:

> With respect to $G(x, y_1, ..., y_n)$ and $G(x, z_1, ..., z_n)$, $y_1, ..., y_n$ *vary totally* from $z_1, ..., z_n$ iff for all $y_i \in \{y_1, ..., y_n\}$ and all $z_j \in \{z_1, ..., z_n\}$, $y_i \Delta z_j$.

Given the above conceptions of *G-origin* and *total variation* between two G-origins, *G-origin essentialism* will hold in M just in case:

$$[\Diamond G(x, y_1, ..., y_n) \wedge \forall y_i \in \{y_1, ..., y_n\} \forall z_j \in \{z_1, ..., z_m\}(y_i \Delta z_j)] \rightarrow \neg\Diamond G(x, z_1, ..., z_n)$$

is true at all worlds in M. Assuming appropriate analogues of (P1), (P2) and (P3) can be defined for G^n, a variant of Salmon's argument will show that G-origin essentialism holds in M.

If a variant of Salmon's argument can be used to establish G-origin essentialism, it seems to me that that argument would also constitute a convincing case for origin essentialism. G-origin essentialism holds that: if it is possible at a world w for x to be an animate or inanimate object that is originally constructed entirely from all of each of the objects $y_1, ..., y_n$, or which develops from only and all of each of $y_1, ..., y_n$ (respectively), then at all possible worlds, accessible from w at which (i) x exists and (ii) x is an animate or inanimate object, x is originally composed entirely from all of each of, or develops from only all and

[7] Note: this definition presupposes that animate objects *develop* and inanimate objects are *composed*. This may not be correct. For instance, one might consider a tree to be inanimate and to originate by developing out of some set of (organic) objects. This worry can be avoided by adding additional clauses that allow for such exceptions; however, to keep things simple, I will refrain from doing so.

each of, $z_1, ..., z_n$, where $\neg[\forall y_i \in \{y_1, ..., y_n\} \forall z_j \in \{z_1, ..., z_m\}(y_i \Delta z_j)]$ (i.e. at least one of the zs from which x originates, at worlds accessible from w, is not discrete from at least one of the ys from which x originates at w).

It does not seem that one can reasonably affirm G-origin essentialism and deny origin essentialism. If one was to affirm G-origin essentialism and deny origin essentialism, then one would be committed to the position that there is some w' accessible from w at which x exists and is neither an animate nor an inanimate object. If 'animate' and 'inanimate' are taken to designate categories into which any object falls, then such a view is absurd. Alternatively, if 'animate' and 'inanimate' are taken to designate categories into which (all and) only physical objects fall, then one might adopt the position that w' is such that at w', x exists, x is not a physical object and x originates in a manner that *varies totally* from the manner in which x originates at w. Though not strictly precluded by Salmon's argument nor the structure and semantics for M, such a position seems rather implausible (assuming it is even sensible).

Accordingly, I am willing to concede that under the assumption that each principle assumed in Salmon's argument is correct, Salmon's argument (or a variant thereof) represents a compelling case for origin essentialism. However, it does not appear that each principle assumed in Salmon's argument *is* correct.

3.4 Salmon's Argument is Unsound

The main problem with Salmon's argument is not that his conclusion is too weak but that at least one of the principles used to establish that conclusion is implausible. There are compelling reasons to doubt the (table-specific version of) the *necessary sufficiency of origin.* Indeed, though Salmon finds the version of the *necessary sufficiency of origin* expressed in (V) to be compelling [Sal79, pp. 712, 714], he ultimately rejects (V) as too strong. He points out that where some table x is originally constructed from some matter y at a world w, it is counter-intuitive to think that a table constructed from y but with a structure and design that is radically different from that of x at w would be identical with x [Sal05, pp. 210–211].

Since (V) is too strong, Salmon proposes that it be replaced with the weaker:

> (V′) If it is possible for an artefact x to originate from a certain hunk of matter y *according to a certain plan P*, then necessarily any artefact originating from y according to precisely the same plan P, is x and no other artefact. [Sal79, p. 716][8]

Salmon calls (V′), "exceedingly plausible, almost to the point of being indubitable." [Sal79, p. 716]. However, he does note that one may be inclined to reject (V′) in favour of still weaker principles depending on one's view of (essential) object-origin [Sal05, p. 211].[9]

3.4.1 Robertson's Table of Theseus Problem

Salmon seems correct in assessing (V′) as based on firm and commonly held intuitions; however, the reliability of those intuitions is undermined by counterexamples. The version of the *necessary sufficiency of origin* endorsed in (V′) is subject to a plausible counterexample along the lines of the ship of Theseus. Teresa Robertson formulates such a counterexample in her [Rob98]. She considers a table, Ed, that is composed of matter m and constructed according to plan P. Over the course of time, Ed is subject to repairs and part replacements until some point at which Ed is entirely composed of matter discrete from m. Next she supposes that the matter m is gathered together and constructed, according to plan P, into a table, Fred. According to (V′), Fred=Ed but that is false because Fred and Ed exist simultaneously and are, thus, numerically distinct. Hence, (V′) is false [Rob98, pp. 734–735].

[8] I have generalized this slightly, changing "a table x" to "an artefact x".

[9] Recall the discussion of *object-origin* in §2.3.1. Salmon's point is, roughly, that there is some conception of an object's *origin*, on the range between (O_1) and (O_2), such that according to that conception, it is exceedingly plausible to think that: if an individual x originates (according to that conception) at a world w, then necessarily, if any individual y originates (according to that conception) in the same way that x originates at w, then y is x.

Salmon is aware that ship of Theseus style thought experiments can be used as counterexamples against the version of the *necessary sufficiency of origin* endorsed by (V′) and considers Hugh Chandler's [Cha75] version of this sort of objection.[10] Ultimately, Salmon concedes that (V′), is inconsistent with the plausible view that an object's identity persists through time even if its matter is frequently replenished [Sal79, p. 721]. Yet, rather than give up on the *necessary sufficiency of origin*, Salmon offers an amendment to (V′).

Salmon claims that one might try to save the *necessary sufficiency of origin* principle by adding a clause to (V′) that rules out cases of matter replenishment or reassembly and amends (V′) to:

(V″) If it is possible for an artefact x to be the only artefact originally constructed from a certain hunk of matter y *according to a certain plan* P, then necessarily any artefact that is the only artefact originally constructed from y according to precisely the same plan P, is x and no other artefact.[11]

3.4.2 Robertson's *Almost* Table of Theseus Problem

Robertson observes that, even (V″) is likely to be false. Indeed, she thinks that (V″) is still subject to her table of Theseus counterexample. It is possible that Ed is the only table constructed from m according to P, yet it also seems possible to Robertson that Fred is the only table constructed from m according to P. As such, (V″), indicates that Ed=Fred, but that is false. Robertson acknowledges that one might respond by insisting that Ed can exist without Fred, however, Fred cannot exist without Ed. Hence, though it is possible for Ed to be the only table constructed from m according to P, it is, in fact, not possible that Fred is the only table constructed from m according to P [Rob98, p. 737]. Robertson thinks this reply is, ultimately, insufficient as a defence for (V″) because her table-of-Theseus example

[10] Salmon also formulates a version of the objection that applies to versions of (V′) applicable to organisms [Sal79, p. 721].

[11] Note: this is Robertson's version of the amendment that Salmon suggests in [Sal79, p. 721] and [Sal05, p. 219], see [Rob98, p. 736].

can be amended so as to avoid it.

Robertson proceeds to offer a variation on her initial counterexample that she takes as strong evidence that (V″) is false. In this example, she considers an "almost-table-of-Theseus" world [Rob98, p. 737]. At this world there is a table, Gary, originally constructed from matter m', such that $m' \neq m$ but m' has nearly all of its molecules in common with m (i.e. m' shares nearly all of its parts with m). She further supposes that Gary is originally constructed according to plan P. During its existence Gary undergoes matter replacement and at some point comes to be composed of matter that is discrete from m. After this, the matter m is gathered together and built into a table, Harry, originally constructed according to P. In this example, it is possible (indeed, it is true) that Harry is the only table originally constructed from m according to P. Robertson also claims that it is equally possible for Gary to be the only table originally constructed from m according to P, given that Gary was originally constructed from m' and m' has nearly all of its molecules in common with m. Furthermore, it seems that Gary can exist without Harry and Harry can exist without Gary. Hence, it follows from (V″) that Gary=Harry, but Gary≠Harry [Rob98, pp. 737–738]. Therefore, (V″) is false.

3.5 Salmon's Argument Fails

Salmon fails to make a convincing case for origin essentialism. Strictly speaking, the conclusion at which Salmon arrives is consistent with the denial of origin essentialism. Though Salmon's argument can be amended to entail origin essentialism, his argument still requires appeal to some version of the *necessary sufficiency of origin* and that principle appears to be false. (V) is too strong and attempts to refine the principle proved ineffectual due to Robertson's counterexamples. Hence, Salmon's argument does not constitute a persuasive case for origin essentialism.

At this juncture, the origin essentialist might be inclined to stray from some of the views advanced by Kripke in [Kri81] when formulating an argument for origin essentialism. Salmon observes that Kripke's work in [Kri81] presupposes a view called, *haecceitism*: "the view that it makes sense to identify, in an *absolute* sense, individuals in different possible worlds." [Sal79, p. 719]. Perhaps it is because this view is presupposed in M that allows origin essentialist consequences to be avoided in M.

Graeme Forbes does not think that it makes sense to identify individuals in different possible worlds in an *absolute* sense. Forbes argues that there are no *bare truths* concerning transworld identities and that this, together with the *necessity of identity*, entails origin essentialism. In the next chapter, I will examine Forbes's argument for origin essentialism and show that it too fails to be compelling.

Chapter 4

Forbes for Origin Essentialism

One of the better known arguments for origin essentialism is offered by Graeme Forbes. Forbes views origin essentialism as a consequence of two principles concerning identity. First, that identity statements, if true (or false), are necessarily true (or false). Second, that there are no *bare truths* concerning (transworld) identity. Below I will operate under the assumption that both of Forbes's principles are true and argue that, despite this, he fails to provide a compelling case for origin essentialism. I show that origin essentialism is not a consequence of Forbes's two principles, rather, he requires an additional assumption to derive his conclusion. Yet, that additional assumption, if admitted, has highly implausible consequences and so it should be rejected. On these grounds, I conclude that Forbes's argument is not persuasive.

4.1 Preliminaries and Assumptions

Forbes presents versions of his argument for origin essentialism in his [For80], [For81] and [For85]. His argument is intended to establish that an organism's origin (at a world) is essential to that organism (at that world). Following Forbes, I will take the origin of an organism (at a world w) to consist in the collection of propagules from which the organism develops (at w). The term 'propagule' is meant to denote specific collections of genetic material from which an organism may originate (e.g. a sperm or an egg). Forbes explains, "x is a propagule of y iff x is one of the entities which grew or developed into y." [For80, p. 353].

Forbes's argument assumes that two principles hold. The first is the *Necessity of Identity* (NI), which holds just when if $x = y$ is true at some possible world, then $x = y$ is true at all possible worlds.[1] The second is that a transworld identity statement, $x = y$ or $x \neq y$, cannot be "ungrounded" or a "bare truth" [For85, p. 129]. Following Mackie [Mac87], I will call this the principle of *No Bare Identities* (NBI).[2] NBI holds that where x is an object at a world w_1 and y is an object at a world w_2 and $x = y$, there is some feature F such that $x = y$ is true in virtue of the fact that $F(x)$ is true at w_1 and $F(y)$ is true at w_2 [For85, p. 139]. Forbes qualifies this by noting that the relevant feature, F, cannot be an extrinsic feature of x at w_1 nor an extrinsic feature of y at w_2, where F is an *extrinsic feature* of x (or y) at a world w if F is causally isolated from x (or y) existing at w [For85, p.141].[3] Accordingly, that $x = y$ (or that $x \neq y$) must be grounded by an *intrinsic* (i.e. not-extrinsic) feature of x at w_1 and of y at w_2.

4.1.1 No Bare Identities

NBI is a particularly crucial element of Forbes's argument and so it is worth looking at in greater detail. To begin, I will address the ambiguity with respect to the scope of the existential claim about F. As formulated above, NBI may entail either:

NB1$_1$ $\forall x \forall y \exists f \forall w \forall w'[((x \text{ exists at } w) \wedge (y \text{ exists at } w')) \rightarrow (x = y \rightarrow ((f \text{ is an intrinsic feature of } x \text{ at } w) \wedge (f \text{ is an intrinsic feature of } y \text{ at } w')))]$

or

NBI$_2$ $\forall x \forall y \forall w \forall w'[((x \text{ exists at } w) \wedge (y \text{ exists at } w')) \rightarrow (x = y \rightarrow \exists f((f \text{ is an intrinsic feature of } x \text{ at } w) \wedge (f \text{ is an intrinsic feature of } y \text{ at } w')))]$[4]

[1]Notice, NI entails the necessity of non-identity. If $x \neq y$ is true at some possible world, then it is not the case that $x = y$ is true at all possible worlds. So, by modus tollens on NI it is not the case that $x = y$ is true at some possible world. Thus, $x \neq y$ is true at all possible worlds (assuming that either $x = y$ or $x \neq y$ must be true at a given world).

[2]Forbes calls this principle, "the no-bare-facts doctrine" in [For83, p. 236]. However, as the principle is intended to apply just to *identity* statements, I have elected to use Mackie's terminology.

[3]For example, if x is an oak tree (at w_1) and y is an oak tree (at w_2) and $x \neq y$, *that* $x \neq y$ cannot be true in virtue of there being a pine tree beside y and no pine tree beside x.

[4]Note: throughout this chapter I have elected to use natural language in formal statements, mainly, for the purpose of making them easier to follow (e.g. I use 'x exists at w' instead of an expression like: '$x \in D_w$', where D_w is the domain of w). For the same reason I have decided to treat intrinsic features as objects (that can be assigned to the variable: f).

NBI_1 is a rather strong essentialist claim. Roughly, it states that for any x and y, $x = y$ only if there is an intrinsic feature F such that at all worlds w and w', where x exists at w and y exists at w', x has F at w and y has F at w'. In other words, *having* F is a necessary condition, at all possible worlds, for *being identical with* x.

NBI_2 is a weaker claim. It implies that for any x and any pair of worlds where x exists, w and w', there is some intrinsic feature that x has at both w and w'. That is, NBI_2 requires there to be an overlap of at least one of x's intrinsic features across any pair of worlds at which x exists. Yet, unlike what is entailed by NBI_1, NBI_2 permits the relevant intrinsic feature to differ from pairs of worlds to pairs of worlds.

I will proceed under the assumption that NBI entails NBI_2 (and not NBI_1). That is, that the scope of the existential claim about F in NBI is best captured in NBI_2. Two reasons motivate this assumption. First, Forbes's argument can be constructed given either scope (i.e. from either NBI_1 or NBI_2). Second, if NBI_1 is true, then NBI_2 is true and so operating under this assumption does not impact my discussion even if the assumption is, in fact, incorrect.[5]

No Bare *Non*-Identities

Though NBI entails NBI_2, NBI_2, alone, does not fully capture Forbes's description of NBI. NBI is meant to ensure that the truth value of *any* identity claim is grounded by facts about intrinsic features that an object has or lacks at a given world. This means that where $x \neq y$, there is some intrinsic feature that x has and y lacks (or vice versa), at their respective worlds, that *grounds* the fact that x and y are distinct [For85, p. 139]. In other words, NBI also holds that there are no bare *non*-identities (NBNI).

NBNI is a crucial part of NBI. As before, the scope of the existential claim in NBNI is unclear. For the sake of continuity, I will interpret the existential claim as one corresponding to that of NBI_2 and proceed under the assumption that NBNI entails:

[5]It is worth mentioning that many of Forbes's critics interpret NBI such that it entails NBI_1. See e.g. [Mac87] [Mac06] and [PB99].

NBNI$_2$ $\forall x \forall y \forall w \forall w'[(x$ exists at $w \wedge y$ exists at $w') \rightarrow (x \neq y \rightarrow \exists f \neg((f$ is an intrinsic feature of x at $w) \leftrightarrow (f$ is an intrinsic feature of y at $w'))]$

Roughly, NBNI$_2$ states that for any x and y, if x and y are distinct (at any pair of worlds), then there is an intrinsic feature that x has and y lacks (at their respective worlds in that pair) or there is an intrinsic feature that y has and x lacks (at their respective worlds in that pair).

NBI entails both NBI$_2$ and NBNI$_2$ and the conjunction of NBI$_2$ and NBNI$_2$ is logically equivalent to the following:

NBI$'$ $\forall x \forall y \forall w \forall w'[(x$ exists at $w \wedge y$ exists at $w') \rightarrow \exists f((f$ is an intrinsic feature of x at $w \vee f$ is an intrinsic feature of y at $w') \wedge ((f$ is an intrinsic feature of x at $w \wedge f$ is an intrinsic feature of y at $w') \leftrightarrow x = y))]$

Hence, NBI entails NBI$'$. This entailment is useful, at least, insofar as it captures both elements of NBI at once and will serve to aid my discussion in § 4.3. However, reconstructing Forbes's argument does not require a specific appeal to NBI$'$, as that task can be accomplished by appealing to NBNI$_2$ (or the following corollary).

4.1.2 A Further Corollary of NBI

Before proceeding to Forbes's argument, I will mention one last relevant corollary of NBI. NBI entails that:

(C) For any object x with the set of intrinsic features I at a world w and any object y with the set of intrinsic features I' at a world w', if $I = I'$, then $x = y$.[6]

It is relatively straight forward to show that (C) follows from NBI. The contrapositive of the consequent in NBNI$_2$ is:

[6]Notice, (C) is a version of Leibniz' principle of the *Identity of Indiscernibles*. As such, one might be inclined to object to (C) by appealing to Max Black's [Bla52] *Two Spheres* thought experiment. Forbes offers a reply to Adams's [Ada79] version of Black's thought experiment in [For85, pp. 149–152].

$\forall f((f$ is an intrinsic feature of x at $w \leftrightarrow f$ is an intrinsic feature of y at $w')\rightarrow x = y)$

So, from NBNI_2 it follows that:

NBNI'_2 $\forall x \forall y \forall w \forall w'[(x$ exists at $w \wedge y$ exists at $w')\rightarrow \forall f((f$ is an intrinsic feature of x at $w \leftrightarrow f$ is an intrinsic feature of x at $w')\rightarrow x = y)$

(C) is a direct consequence of NBNI'_2. Hence, (C) follows from NBI. Many of the inferences in Forbes's argument are clearer when appeal is made directly to (C) as opposed to NBI. For this reason I will appeal directly to (C) in my reconstruction of Forbes's argument.

4.2 Forbes's Argument

Forbes argues that NI and NBI entail origin essentialism. He begins by stipulating the following:

- Let L_1 and L_2 be discrete locations such that it is possible for an acorn planted at either location to grow into an oak tree and it is possible to simultaneously plant an acorn at L_1 and another acorn at L_2 and for each acorn to (simultaneously) grow into an oak tree.
- Let t_1 be an oak tree at a world w_1.
- Let t_1 originate from an acorn (i.e. a collection of propagules) a_1 at w_1.

Forbes then gives the following *reductio* against the sceptic who wishes to maintain NI and NBI but deny origin essentialism:

(1_{F}) Suppose that the origin of t_1 from a_1 at w_1 is neither strongly nor weakly essential to t_1 at w_1. (for *reductio*)

(2_{F}) So, it is possible at w_1 for t_1 to originate from a collection of propagules which is discrete from a_1.[7]

(3_{F}) So, there is a world w_2, accessible from w_1, and t_1 originates from a_2 (planted at location L_1) at w_2, where a_2 is an acorn which is discrete from a_1.

Forbes contends that it is possible that a_1 could be planted at a location L_2 and develop into an oak tree. Making no assumptions about how much or little such a tree resembles t_1 in w_1 nor about the identity of such a tree, Forbes considers the class worlds at which such a tree develops. By stipulation, it is possible that the planting of an acorn at L_2 and its subsequent growth into a tree occurs simultaneously with the planting of a_2 at L_1 and *its* (a_2's) subsequent growth into a tree. Hence, Forbes thinks that among the class of worlds under consideration there will be a world that resembles w_2 except that a_1 is planted at L_2 and develops into an oak tree [For85, p. 138]. Call this world, w_3. It follows that:

(4_{F}) There is a world w_3, at which a_1 (planted at L_2) produces an oak tree and a_2 (planted at L_1) produces distinct oak tree.

(5_{F}) So, either: (i) the a_1-tree at $w_3 = t_1$ or (ii) the a_2-tree at $w_3 = t_1$ or (iii) the a_1-tree at $w_3 \neq t_1$ and the a_2-tree at $w_3 \neq t_1$.

(5_{F}.i) the a_1-tree at $w_3 = t_1$

(i) t_1 at w_2 shares its intrinsic features with the a_2-tree at w_3. (by choice of w_3)

(ii) So, $t_1 =$ the a_2-tree at w_3. (by NI and (C))

(iii) So, the a_2-tree at $w_3 =$ the a_1-tree at w_3 (by NI and transitivity of '$=$')

(iv) Contradiction. ((4_{F}) and iii.)

[7]By 'discrete' here, I mean that the collections of propagules have no propagule in common. So a set of propagules, P is discrete from a set of propagules P' just in case $P \cap P' = \emptyset$.

In order to show that cases (5_{F}.ii) and (5_{F}.iii) will also result in contradiction, Forbes introduces a fourth world. He says that it is plausible that t_1 at w_1 *could have been* just like the a_1-tree at w_3. Growing at L_2, being composed of the same matter, having the same shape, etc. Consider the class of possible worlds where this obtains and choose from this class a world at which there is no a_2-tree [For85, p. 140]. Call this world, w_4. In other words, select a w_4 such that, t_1 exists at w_4 and shares its intrinsic features (at w_4) with the a_1-tree at w_3. Now, evaluate the remaining cases:

(5_{F}.ii) The a_2-tree at $w_3 = t_1$

(i) The a_1-tree at w_3 shares its intrinsic features with t_1 at w_4. (by choice of w_4)

(ii) The a_1-tree at $w_3 = t_1$ (from (i) by NI and (C))

(iii) So, the a_1-tree at $w_3 =$ the a_2-tree at w_3. (by NI and transitivity of '=')

(iv) Contradiction. ((4_{F}) and (iii))

(5_{F}.iii) The a_1-tree at $w_3 \neq t_1$ and the a_2-tree at $w_3 \neq t_1$.

(i) The a_1-tree at w_3 shares its intrinsic features with t_1 (at w_4). (by choice of w_4)

(ii) So, the a_1-tree at $w_3 = t_1$. (by NI and (C))

(iii) The a_2-tree at w_3 shares its intrinsic features with t_1 (at w_2). (by choice of w_3)

(iv) So, the a_2-tree at $w_3 = t_1$. (by NI and (C))

(v) Contradiction ((5_{F}.iii), ii. and iv.)

(6_{F}) So, Not-(5_{F}.i) and not-(5_{F}.ii) and not-(5_{F}.iii).

(7_{F}) Contradiction. ((5_{F})and (6_{F}))[8]

[8]This reconstruction of Forbes's argument is adapted from his [For85, pp. 138–140].

It follows that (1_{F}) is false and so the origin of t_1 from a_1 is either strongly or weakly essential to t_1 at w_1. Forbes then generalizes and concludes that origin essentialism (either weak or strong) holds for organisms under NI and NBI.[9] Yet, this conclusion is false.

4.3 NI and NBI do not Entail Origin Essentialism

NI and NBI, alone, do not entail origin essentialism. This can be demonstrated by providing a model M^F, in which NI and NBI hold but in which origin essentialism is false. Let the following be true in M^F:

(1_{M^F}) t originates from a set of propagules p_1 at w_1.

(2_{M^F}) t originates from a set of propagules p_2 at w_2, where p_2 is discrete from p_1.

(3_{M^F}) w_2 is accessible from w_1.

So described, origin essentialism is false (of t) in M^F. Taking NBI′ to express NBI in M^F, NBI holds in M^F if there is an intrinsic feature that satisfies:

NBI$_o$ [(f is an intrinsic feature of t at $w_1 \lor f$ is an intrinsic feature of t at w_2)$\land$((f is an intrinsic feature of t at w_1 $\land f$ is an intrinsic feature of t at w_2)$\leftrightarrow t = t$)]

NBI$_o$ is the open sentence that results from taking the consequent of NBI′, removing the existential quantifier and assigning the relevant object and worlds, from the description of M^F, to all free variables except f. Thus, if an intrinsic feature which satisfies NBI$_o$ can be identified, NBI′ (i.e. NBI) holds in M^F.

From the description of M^F it can be inferred that ‘originates from p_1 or p_2’ is true of t at both w_1 and at w_2. It seems then that t has the disjunctive feature of *originating-from-*(p_1 or p_2) (call this feature: F^*) at both w_1 and at w_2. Furthermore, F^* appears to be an

[9] Note: Forbes views his argument to be for strong origin essentialism. Given NI, NBI is inconsistent with weak origin essentialism. Forbes demonstrates this inconsistency in his [For83, pp. 236–238]. This feature of Forbes's argument is not particularly relevant to the criticisms I advance below, and so I will not pursue it. Robertson [Rob98] criticises Forbes's argument on this basis.

intrinsic feature of t at both worlds. Firstly, it does not seem that F^* is causally isolated from t existing at either w_1 or w_2[10] and so nothing Forbes has said precludes that F^* is an intrinsic feature of t (at w_1 and w_2).[11] Secondly, F^* pertains to the origin of t both at w_1 and at w_2 and so what Forbes *does* say suggests that F^* should be regarded as an intrinsic feature of t (at w_1 and w_2). Thus, one can assign F^* to f in NBI_o. NBI_o is true, relative to the assignment of F^* to f and so NBI′ (i.e. NBI) holds in M^F.

Given the assumption that F^* is an intrinsic feature of t (at w_1 and w_2), M^F is a model in which NI and NBI hold and origin essentialism is false. Even if one is disinclined to agree that F^* is an intrinsic feature of t, the fact remains that origin essentialism does not follow from NI and NBI. The above clearly illustrates that NI and NBI entail only that there is *some* intrinsic feature that will satisfy NBI_o, they do not require that the feature relate to t's originating from a certain set of propagules. Hence, even if one denies that F^* is an intrinsic feature of t, it remains that NI and NBI will hold in any model M' such that origin essentialism is false in M', as long as: for any object o and any pair of worlds w and w' in M', at which o exists, o has some intrinsic feature F' at w and w' (and $o = o$ is true at all worlds in M'). F' need not be related to o's originating from some set of propagules.[12]

4.4 NI, NBI and w_4 Entail Origin Essentialism

Forbes's argument does not show that origin essentialism is a consequence of NI and NBI, because origin essentialism is *not* a consequence of NI and NBI. Rather, Forbes's argument shows that origin essentialism is a consequence of NI, NBI and an additional assumption. Namely, the assumption that w_4 is a possible world. Without the added assumption that w_4 is a possible world, Forbes's argument cannot proceed beyond (5_{F}.i). Yet, this added assumption is implausible.

[10]It is not obvious how t could lack F^* at either w_1 or w_2 without there being a causal impact on t's existence at w_1 or w_2.

[11]Recall Forbes's description of intrinsic and extrinsic features given in §4.1.

[12]For some suggestions as to possible F's, see [Mac87, p. 186].

4.4.1 w_4: The Sceptic's Reply

The sceptic that Forbes is arguing against should deny that w_4 is a possible world. The sceptic accepts NI and NBI but denies origin essentialism. By accepting NBI, the sceptic acknowledges that NBI imposes constraints on possibility. When w_3 is introduced, Forbes provides a descriptive account of the world which makes no commitments with respect to the identities of the a_1 and a_2 trees at that world. Additionally, the description of w_3 makes no assumption(s) about which, if any, intrinsic features are shared between the a_1-tree at w_3 and t_1 at w_1.[13] Based on the description of w_3 and the previous assumption that the a_2-tree at w_2 is identical with t_1 (statement (2_{F})), the sceptic concludes that the a_2-tree at $w_3 = t_1$. By hypothesis, the a_1-tree and the a_2-tree at w_3 are distinct. Hence, from NI and NBI, the sceptic will arrive at the conclusion that there is no world at which t_1 shares its intrinsic features with the a_1-tree at w_3. Hence, the sceptic will deny Forbes's contention that t_1 *could have been* such that it shares its intrinsic features with the a_1-tree at w_3. In other words, NI and NBI are incompatible with Forbes's stipulation of w_4 (given statements (1_{F})–(3_{F}) and the description of w_3) and so the sceptic should deny that w_4 is a possible world.[14]

In order to block the sceptic's reply, it needs to be shown that the assumption that w_4 is possible is independently plausible or uncontroversial. Yet, quite the opposite appears to be true. Adding the assumption that w_4 is a possible world to Forbes's argument allows one to derive the much stronger, and highly implausible, conclusion that there are no contingently had features. That is, there is no x such that x exists at some world w and x has a feature F contingently at w.

[13] Had the intrinsic features of the a_1 and a_2 trees (at w_3) been specified in the description of w_3, the sceptic may have been compelled to deny that w_3 is a genuinely possible world. For instance, if Forbes had specified w_3 such that the a_1-tree at w_3 shares its intrinsic features with t_1 at w_1 and the a_2-tree shares its intrinsic features with t_1 at w_2. So specified, NBI entails that w_3 impossible.

[14] Note: if Forbes had provided a descriptive account of w_4 which did not presuppose the identity of the a_1-tree there, the sceptic could acknowledge that there is such a world but would insist that NBI entails that the a_1-tree at $w_4 \neq t_1$.

4.4.2 w_4: An Implausible Assumption

With the added assumption that w_4 is a possible world, the structure of Forbes's argument can be used to show that objects do not have features contingently.[15] To see why, consider the following analogue of Forbes's argument:

- Let o be an object at a world w'_1.
- Let o have feature P at w'_1.

(1_A) Suppose that o has P contingently at w'_1. (for *reductio*)

(2_A) So, there is a world w'_2, accessible from w'_1, such that o lacks P at w'_2.

Now, following Forbes's procedure in his original argument, select an appropriate analogue of w_3, w'_3 such that:

(3_A) There is a world w'_3 at which there is an object that has P and a distinct object that lacks P and at which the object that lacks P shares its intrinsic features with o at w_2.

(4_A) Either: (i) the P-object at $w'_3 = o$ or (ii) the P-lacking-object at $w'_3 = o$ or (iii) the P-object at $w'_3 \neq o$ and the P-lacking-object at $w'_3 \neq o$

As in Forbes's argument, case (4_A.i) will result in contradiction because (C) and the selection of w'_3 yield the conclusion that the the P-lacking-object at $w'_3 = o$. In order to derive contradictions in cases (4_A.ii) and (4_A.iii), introduce an analogue of w_4, w'_4 such that o exists at w'_4, has P and shares its intrinsic features at w'_4 with the P-object at w'_3. Given the assumption that w'_4 is possible, one can derive contradictions in cases (4_A.ii) and (4_A.iii) just as Forbes does in his original argument. Thus, it must be the case that:

[15] Robertson [Rob98, pp. 743–744] touches on this problem in an analogue of Forbes's argument wherein she replaces the origins of the trees from different acorns with the trees having different leaf-colours. She then runs Forbes's argument as before and derives the conclusion that having a specific leaf-colour (at a certain world) is an essential feature of an oak tree (at that world). I give a more generalized version of this above.

(5_A) Not-(4_A.i) and not-(4_A.ii) and not-(4_A.iii)

(6_A) Contradiction. ((4_A) and (5_A))

It follows that (1_A) is false and so, o does not have P contingently at w'_1. This generalizes, roughly, to: *no object has one of its features contingently.* Such a conclusion is highly implausible. Hence, the assumption that w'_4 is possible is highly implausible.

In order for Forbes's assumption that w_4 is possible to be considered more plausible than the assumption that w'_4 is possible, there must be something which distinguishes these two assumptions. I cannot see a relevant difference between the two assumptions other than the features involved (originating from a_1 in the case of w_4 and having P in the case of w'_4). Hence, there must be something about the feature of *originating from* a certain set of propagules, that other features (like P) lack, and which warrants the assumption that w_4 is possible. Yet, there does not seem to be any non-circular reason for supposing that there is such a distinction between *origin* and other features (like P). Hence, it would seem that the assumption that w_4 is possible is on equal footing with the assumption that w'_4 is possible.

The assumption that w_4 is possible is not more plausible than the assumption that w'_4 is possible. The assumption that w'_4 is possible is implausible given that it leads to the conclusion that no object has a feature contingently. Hence, Forbes's assumption that w_4 is possible must also be implausible. Trivially then, the assumption that w_4 is possible is not independently plausible (nor uncontroversial) and so, the sceptic should reject it.

A Brief Interlude: NI, NBI and the Necessary Sufficiency of Origin

The objections I have presented above warrant rejecting Forbes's argument for origin essentialism, but before I conclude this chapter I would like to briefly explore the connection between Forbes's argument and the *necessary sufficiency of origin.* This issue is interesting and becomes quite salient where one interprets NBI as entailing NBI_1 and (an appropriate analogue of NBNI_2) NBNI_1. For this reason, I think that it is an issue worth examining (briefly).

Where NBI is interpreted as entailing NBI_1 and NBNI_1, it seems to follow from Forbes's argument that an object's *origin* (at a world) is necessarily sufficient for the identity of that object (at that world). Where NBI is interpreted as entailing NBI_1 and NBNI_1 and origin essentialism holds, the *origin* of an object o, at a world w, must be a non-shareable intrinsic feature of o at w (i.e. there is no object distinct from o, at any world accessible from w, that has the same origin as o at w). To see why, suppose the origin of o (at w), call it F, is an intrinsic feature of another object o', at a world accessible from w, w'. The conjunction of NBI_1 and NBNI_1 entails an analogue of NBI′:

$$\forall x \forall y \exists f \forall w \forall w'[((x \text{ exists at } w) \wedge (y \text{ exists at } w')) \rightarrow ((f \text{ is an intrinsic feature of } x \text{ at } w) \vee (f \text{ is an intrinsic feature of } y \text{ at } w') \wedge (f \text{ is an intrinsic feature of both } x \text{ at } w \text{ and } y \text{ at } w' \leftrightarrow x = y))]$$

Hence, if o' and o both have F (at their respective worlds) and origin essentialism holds, the following statement should be true:

$$[(o \text{ exists at } w \wedge o' \text{ exists at } w') \rightarrow (F \text{ is an intrinsic feature of } o \text{ at } w \wedge F \text{ is an intrinsic feature of } o' \text{ at } w') \leftrightarrow o = o']$$

However, this statement is false (by hypothesis, $o \neq o'$, but F is an intrinsic feature of o and o' at their respective worlds). Hence, F must not be an intrinsic feature of any object but o. Yet, that means that *having*-F is sufficient for the identity of o (at worlds accessible from w). [16]

The fact that origin essentialism together with NBI_1 and NBNI_1 entail that an object's *origin* is necessarily sufficient for that object's identity is problematic for reasons similar to those discussed in §3.4. Indeed, Forbes rejects the necessary sufficiency of origin for a reason

[16] See [Mac87] for a more detailed discussion of this.

analogous to the reason that Salmon gives for rejecting (V). Forbes does not think that it is correct to infer that an *oak tree* which originates from a set of propagules a' (at some world) is identical with a *carrot* that originates from a' (at another world). Thus, he proposes the weaker view that: originating from a certain set of propagules *and* being the same kind of thing is sufficient for an object's identity [For85, pp. 146–148] under NI and NBI.[17]

Forbes's proposal that it is the conjunction of an object's *origin* and *kind* that is sufficient for that object's identity is no less problematic than the stronger view. Identical twins represent a counterexample against Forbes's proposal. Each twin originates from the same set of propagules as the other and is the same kind of thing as the other. Yet, each twin is a distinct object.

In order to maintain his view, Forbes must show that even identical twins originate from unique sets of propagules. The most reasonable way to do this is to identify a twin's unique set of propagules as the set of propagules which results after the fission of the original set and from which the twin develops. To illustrate, suppose an acorn a_3 develops into twin trees, t_3 and t_4 at a world w. In order for this to occur, at some stage in the development process, the set of propagules that constitute a_3 will divide into two sets of propagules a'_3 and a^*_3, and these will each produce a single tree. If a'_3 develops into t_3 and a^*_3 develops into t_4, then a'_3 is the unique set of propagules from which t_3 originates (at w) and a^*_3 is the unique set of propagules from which t_4 originates (at w). Hence, a unique set of propagules can be identified for twins.

Mackie points out that the above response does not solve the problem posed by twins, it merely pushes it back a step. The conclusion of Forbes's argument is meant to generalize. The acorns a_1 and a_2 are supposed to act as proxy for any discrete sets of propagules from which a biological entity may develop. Likewise, each tree acts as proxy for any biological entity which develops from some set of propagules. Mackie observes that the unique sets of propagules from which twins develop are, themselves, made of biological entities that develop

[17]Notice this is rather like Salmon's weaker version of (V), (V′).

from propagules. Hence, by making the appropriate substitutions into Forbes's argument, it ought to follow that the origin of a twin's *propagules* (at some world) is essential to those propagules (at that world). Yet, this means that even if unique sets of propagules can be identified when considering the twins as biological entities, it does not seem that this can be done when one considers their (the twins') propagules as biological entities. In terms of the above illustration, a_3 develops into a_3' and a_3^* through the process of cell division. Then a_3' develops into t_3 and a_3^* develops into t_4. When one assigns t_3 or t_4 to the *entity* position, Forbes's proposal is satisfied; however, when one assigns a_3' or a_3^* to the *entity* position, Forbes's proposal will fail because *originating from* a_3 is shared at w by a_3' and a_3^* and both are the same kind of thing [Mac06, p. 53]. Hence, originating from a certain set of propagules (at some world) *and* being the same kind of thing is not, in general, sufficient for identity.[18]

Where NBI is interpreted as entailing NBI_1 and NBNI_1, the fact that, in general, an object's *origin* (and *kind*) is not sufficient for that object's identity means that Forbes's argument is unsound. Together, NBI_1 and NBNI_1 entail that where F is an essential intrinsic feature of an object, o, at a world w, F is also sufficient for the identity of o at w. *Origin* (and *kind*) is not, in general, sufficient for identity. Hence, it is not the case that, in general, an object's *origin* (and *kind*) is an essential intrinsic feature of that object under NI and NBI (where NBI is interpreted as entailing NBI_1 and NBNI_1). As Forbes's argument yields the opposite conclusion, his argument must be unsound.

4.5 Forbes's Argument Fails

Forbes's argument for origin essentialism is not persuasive. He claims that one cannot consistently hold to NI and NBI while denying origin essentialism; yet, as I have shown, this is incorrect. Origin essentialism does not follow from NI and NBI. Origin essentialism

[18] Mackie suggests that one way Forbes might try to respond is by making the matter out of which propagules are composed essential to the identity of those propagules, however she rejects that position as implausible [Mac06, p. 53].

follows from NI, NBI and the additional assumption that w_4 is a possible world, however, that assumption should be rejected. Firstly, the assumption is *prima facie* inconsistent with NI and NBI (and the prior steps in Forbes's argument) and secondly, admitting the assumption into Forbes's argument leads to highly implausible consequences. Hence, Forbes has not shown that endorsing NI and NBI requires a commitment to origin essentialism. Therefore, even granting NI and NBI, Forbes has not offered a convincing argument for origin essentialism.

In [Mac06], Mackie objects to principles that entail necessary sufficiency conditions for identity, like Forbes's NBI and the *necessary sufficiency of origin*, and offers a defence of origin essentialism that is intended to avoid recourse to such principles [Mac06, pp. 113–114]. Instead, Mackie draws on a non-standard model of possibility and argues that it is the intuitive appeal of that model which leads to the acceptance of origin essentialism. In the following chapter I discuss Mackie's argument.

Chapter 5

Origin Essentialism from Branching Possibilities

Penelope Mackie offers a defence of origin essentialism that appeals to a certain branching model of possibility. The argument proceeds by showing that origin essentialism holds in such a model and so if one adopts the model as an accurate means of assessing possibilities concerning objects, one should also adopt origin essentialism. This means of supporting origin essentialism was first offered by J. L. Mackie in his [Mac74]. Later, a more refined version of the argument was developed by P. Mackie in her [Mac98] and [Mac06] (hereafter, I will use 'Mackie' and 'P. Mackie' to refer to Penelope Mackie and 'J. L. Mackie' to refer to J. L. Mackie).[1] Below, I will discuss this attempt to defend origin essentialism, focussing primarily on P. Mackie's version of the argument. I begin by following Mackie in her exposition and development of the branching model of possibility for objects and then present Mackie's argument for origin essentialism that is based on that model. Next I offer three objections to the argument. One pertaining to the adequacy of the branching model for assessing metaphysical possibility and two relating to the origin theses that the model supports. Finally, I show that attempts to overcome these difficulties, by revising the branching model, are unsuccessful. I conclude that the branching model of possibility for objects does not make a good foundation for a persuasive argument for origin essentialism.

5.1 The Branching Model of *Possibility*

Mackie's thesis is, roughly, that when people assess whether something is possible for an object, they generally do so using a certain kind of *branching model* and that model entails

[1] It is worth mentioning that P. Mackie (unlike J. L. Mackie in [Mac74]) does not, herself, endorse the argument. Rather, she offers the argument as a reason for why many find origin essentialism intuitively appealing [Mac98, p. 60].

origin essentialism. Mackie divides the possibilities for an object into two categories: *realized possibilities* and *unrealized possibilities* [Mac06, p. 104]. To illustrate, (assuming reflexivity) if Φ is true of an object o, at the actual world, then it is possible, at the actual world, that Φ is true of o. Under such circumstances, Φ constitutes, a *realized possibility* for o (at the actual world). In contrast, Φ is an *unrealized possibility* for o at the actual world just when Φ is not true of o at the actual world, but it is possible, at the actual world, that Φ is true of o. A branching model represents these sorts of possibilities in a tree-like structure. Where Φ is an unrealized possibility of o at the actual world, a branching model represents this with a line AB, made up of (discrete) points of time beginning at point A and ending at point B, such that AB represents the history of o at the actual world. There is also another line that branches off from some point (of time) T, on AB, forming a new line TC such that Φ is true of o at some moment after T on line TC and not true of o at that moment on line TB. Such a model represents an alternative history for o (i.e. alternative to the history of o at the actual world) with the line ATC.

Consider a (somewhat) less abstract illustration of a branching model of possibility. Suppose that it is an unrealized possibility for Nixon that he never goes into politics. In a branching model, this possibility can be represented as follows. Let H_N be a line representing Nixon's actual world history, such that H_N begins at the moment at which Nixon actually comes into existence t_0, ends at the moment just before Nixon actually ceases to exist t_n, and at a given moment on H_N the things true of Nixon at that moment are the things actually true of Nixon at that moment. Accordingly, at some moment t_m, on H_N, it is true of Nixon that he goes into politics. Since (by supposition) it is possible that Nixon never went into politics, there is a line H'_N, that begins at t_0 on H_N but branches off from H_N, at some moment t_l, such that t_l is prior to t_m, and at all moments on H'_N it is not true, of Nixon, that he goes into politics. That is, H'_N represents an alternative history for Nixon, in which he never goes into politics. So described, the branching model consisting of H_N and H'_N

represents the unrealized possibility for Nixon that he never goes into politics.

5.1.1 Sketching the Branching Model

Mackie contends that the branching model that people naturally use to assess possibilities for objects imposes certain constraints on branching which, together, entail origin essentialism. She attributes this branching model to Kripke.[2] Kripke writes:

> Ordinarily when we ask intuitively whether something might have happened to a given object, we ask whether the universe could have gone on as it actually did up to a certain time, but diverge in its history from that point forward so that the vicissitudes of that object would have been different from that time forth. *Perhaps* this feature should be erected into a general principle about essence. [Kri81, p. 115, fn. 57][3]

Mackie interprets Kripke, roughly, as follows. For any actual object (that is, any object that exists, at some time or other, at the actual world) o, where something Φ is not true of o at the actual world, it is *possible* that Φ is true of o just in case there is a possible world w, such that the history of w is like the history of the actual world until some moment t, at which Φ is true of o at w (and Φ is not true of o at t at the actual world) [Mac98, p. 61].

There are two key features of the branching model of possibility concerning objects attributed to Kripke (hereafter, *the branching model*) that Mackie makes explicit. Firstly, concerning any actual object o, ways that o might have been different are restricted to *divergences from* the history of o at the actual world. Secondly, branching only occurs in a *forward* direction. That is, alternative histories for o *branch off* from the actual history of o at some moment and into the future *not* into the past [Mac98, p. 61]. These two features

[2] As does J. L. Mackie, [Mac74, p. 553].

[3] Mackie quotes this passage from Kripke (with the last sentence omitted) in [Mac98, pp. 60–61] and [Mac06, p. 95].

are integral to deriving origin essentialism from the branching model and so Mackie spells them out in greater detail.

5.1.2 The Branching Model's Constraints

Mackie begins her exposition of the two key features of the branching model by noting that the model is exemplified by the following principle:

> (B) For any actual x, *being* F, at a time t, is an unrealized possibility for x just in case: ($\mathrm{i_B}$) x is not F at t and ($\mathrm{ii_B}$) there is some time during the actual history of x at which it is a future possibility that x should be F at t. [Mac06, pp. 104–105][4]

To illustrate, consider whether *being a communist in 1969* is an unrealized possibility for Nixon according to (B). It is safe to assume that Nixon was not a communist in 1969 (at the actual world) and so, it is safe to assume that ($\mathrm{i_B}$) is satisfied. What about ($\mathrm{ii_B}$)? It is not too difficult to envisage a scenario according to which ($\mathrm{ii_B}$) is satisfied. Perhaps there was a time t, early in Nixon's life, when he might have met someone who would lead him to become sympathetic toward communism and to later adopt the position and hold it in 1969. If this, or some other scenario, *does* satisfy ($\mathrm{ii_B}$), then, according to (B), *being a communist in 1969* is an unrealized possibility for Nixon. Otherwise, according to (B), *being a communist in 1969* is not an unrealized possibility for Nixon.

Assuming that there are unrealized possibilities for actual objects, (B) imposes the following constraints on the branching model:

> (B1) Branching can occur and only occurs into the future.[5]

> (B2) For any actual object x, any complete alternative (possible) history for x must

[4]Note: This is a slightly generalized version of Mackie's formulation and in Mackie's formulation, the tense, 'at t', does not appear.

[5]Mackie calls this, "*the assumption of open futures*" [Mac06, p. 105].

have some segment (of some duration) that overlaps with the actual history for x. [Mac06, p. 108][6]

If (B) holds, it imposes (B1) on the branching model. Only the *unrealized possibilities* of objects result in a branching off from an object's actual history. According to (B), *being* Φ at t is an unrealized possibility of an object x just when x is not Φ at t at the actual world and there is some time in the actual history for x, t' such that t' is prior to t and at t' it is possible that x should be Φ at t. In the branching model, possibilities that do not actually obtain are represented with branches off of actual history into alternative histories. Thus, it is possible at t' that x is Φ at t just in case there is a branch off of the actual history of x between t' and the moment before t such that on that branch x is Φ at t. Since such a branch branches off from actual history at some time before t and the branch contains t, the branching occurs into the future.[7] Thus, if there are unrealized possibilities for objects that result in branching, branching occurs into the future.

If (B) holds, it imposes (B2) on the branching model. Condition (ii_B) requires that there is always at least one moment in the actual history of any object prior to, or from which, any branching off into an alternative history occurs. Accordingly, any complete alternative history for an object will have some segment (small or large) that overlaps with that object's actual history. Hence, if (B) holds, it imposes (B2).[8]

[6]Note: these are generalized versions of Mackie's formulations of the constraints on branching.

[7]To put this another way, in terms of the branching model, something is possibly true, but not actually true, between two times in actual world history just in case there is a branch off of actual world history between those two times such that, on that branch, the thing is true (at a time between those two times). (B) makes the arrow of time work rather like accessibility between worlds works in the Kripke models discussed in chapters 2 and 3. That is, for a moment t, the moments that occur after t are, in a sense, *unrealized possibility*-accessible to t, but the moments that occur prior to t are not. So, to say that, "it is possible at t that P is true at t^*", where P is not *in fact* true at t^*, is roughly the same as saying, "there is a branch off of actual history at or after t but before t^* such that P is true at t^* on that branch".

[8]Mackie explores the intuitive appeal of (B1) and (B2) (and the branching model more generally) in [Mac06, pp. 103–114].

5.1.3 The Branching Model

In short, the branching model for the possibilities concerning an object x has two main features. First, a line representing the actual history of x, H such that H begins at the moment at which x comes into existence and ends at the moment just before x ceases to exist [Mac06, p. 104]. Second, branches off of H that represent complete alternative (possible) histories for x such that no branch violates (B1) or (B2).

5.2 Mackie's Branching Argument

Mackie's branching argument shows that origin essentialism is a consequence of the branching model and can be rendered as follows. Let x be an object and let H represent the actual history for x.

(1_{B}) H begins at the moment at which x actually comes into existence, t.

(2_{B}) For any branch off of H, H^*, there is some moment t^*, prior to the moment at which H^* branches off from H, such that H^* overlaps with H at t^* and all moments on H prior to t^*. (given (B1) and (B2))

(3_{B}) Since there is no moment on H prior to t, either $t^* = t$ or t is prior to t^*.

(4_{B}) So, all branches off of H overlap with H at t.

(5_{B}) Hence, the things true of x at the moment of its origin are true of x in all of its histories (actual and alternative).

(6_{B}) Therefore, the things true of x at the moment of its actual origin are essential to x.

It follows that if one adopts the branching model as the means of accurately assessing possibilities concerning objects, one is committed to the origin thesis expressed in (6_{B}).[9]

[9] Mackie gives a schematic summary of her argument in [Mac06, p. 113].

5.3 Objecting to the Branching Argument

I will mention three problems with Mackie's branching argument. First, the branching model fails to accommodate certain intuitively plausible metaphysical possibilities. Second, the branching model does not support origin essentialism for possible but non-actual objects. Third, the origin theses entailed by the branching model are highly implausible.

5.3.1 The Branching Model is Inadequate

One may be inclined to reject the branching model as an accurate means of assessing metaphysical possibilities concerning objects on the grounds that not all intuitively genuine metaphysical possibilities can be represented in the branching model. To illustrate, consider the following modal claims:

(1_{G}) x might have failed to exist.

(2_{G}) Instead of coming into existence at moment t, x might have come into existence at the very instant before t, t'.

Surely there is an actual x for which the above express genuine unrealized possibilities. Yet, the branching model cannot make sense of this.

The branching model is constrained by (B1) and (B2) which entail that (1_{G}) or (2_{G}) expresses a genuine unrealized possibility for x only if there is a branch off of the actual history of x such that it is true of x (at some moment on that branch) that x fails to come into existence or that x comes into existence at t' (respectively). Yet, there can be no such branches because the point of branching would need to occur prior to the moment at which x comes into existence. Thus, the branching model entails that there is no x for which (1_{G}) or (2_{G}) expresses a genuine unrealized possibility but, surely, that is false. Hence, there are intuitively genuine metaphysical possibilities concerning objects that the branching model cannot accommodate. On this basis, one may reject the branching model and, thereby, the soundness of Mackie's branching argument.

5.3.2 Origin Essentialism is a General Principle

The second reason that one might be inclined to reject the soundness of Mackie's branching argument is that it fails to support origin essentialism for all possible objects; rather, it entails origin theses for (all and) only actual objects. To see this, consider a metaphysically possible, but non-actual, object o. Suppose that there is a time t, in the history of the actual world, such that it is possible at t that o comes to exist in manner A (i.e. the origin of o is A, whatever that is taken to involve) *and* it is possible at t that o comes to exist in manner B, where B *varies totally* from A. In other words, suppose that it is possible at t that origin essentialism is false of o. This can be consistently modelled by a branching model M^B, without violating (B1) or (B2). Let M^B consist of the history of the actual world H, and let there be some moment on H, t', such that t' is after t and at t' branching occurs in two directions, call them, H_1 and H_2. At the first moment after t' on H_1 let o have origin A and at the first moment after t' on H_2 let o have origin B. Further, let o exist only on H_1 and H_2 after t' in M^B (i.e. o does not exist on H: o is a possible, but non-actual, object). Origin essentialism is false of o in M^B because it is metaphysically possible for o to originate in manner A and in manner B. Furthermore, M^B does not violate (B1) or (B2). Branching occurs and occurs only into the future and, as o is not an *actual* object, both H_1 and H_2 can be taken to be complete alternative (possible) histories for o without violating (B2). Therefore, the branching model, as constrained by (B1) and (B2), does not support origin essentialism for all metaphysically possible objects; rather, it entails origin theses for (all and) only metaphysically possible and actual objects.

One may be inclined to reject the view that origin essentialism holds for (all and) only actual objects on the grounds that that view requires one to make seemingly arbitrary metaphysical distinctions. To see why, consider the view in terms of possible worlds. In terms of possible worlds, there are two ways in which the view might be interpreted and both are potentially worrisome. Firstly, the view can be taken as the claim that origin essentialism holds but only relative to the actual world. That is, for any x if x has origin O at the actual world, then O is essential to x at the actual world and for any world w such that w is not the actual world, if x has origin O' at w (where O' may or may not vary totally from O), then O' is not essential to x at w. As far as metaphysical possibility is concerned, it does not seem that one could be justified in distinguishing between metaphysically possible worlds (i.e. the actual world and w) in this way. Indeed, there does not appear to be any plausible reason to adopt such a view independently of a prior commitment to analysing metaphysical possibility for objects with the branching model.

The second way of interpreting the view that origin essentialism holds only for actual objects is no less worrisome than the first. In terms of possible worlds, the view can be taken as the claim that origin essentialism holds but only for objects that exist at the actual world. That is, for any x and any world w, if x has origin O at w, then O is essential to x at w if and only if x exists at the actual world. Under this interpretation, the view does not require an unjustified distinction between metaphysically possible worlds, it requires an unjustified distinction between metaphysically possible objects. To illustrate, suppose x exists at the actual world and y does not. Further, let x have origin O at w and let y have origin O' at w. According to the current interpretation, O is essential to x at w and O' is not essential to y at w. Again, independently of a prior commitment to analysing metaphysical possibility with the branching model, there seems to be no reasonable way of justifying such a result.

One may take the above as a reason to reject the view that origin essentialism holds for (all and) only actual objects. Since the branching model entails the view that origin essentialism holds for (all and) only actual objects, rejecting that view requires one to abandon the branching model. Thereby rendering Mackie's branching argument ineffectual.

5.3.3 Implausible Origin Theses

Lastly, one might object to the soundness of Mackie's branching argument on the grounds that the origin theses which *are* entailed by the branching model are implausibly strong.

Colin McGinn objects to J. L. Mackie's formulation of the branching argument for this reason. McGinn writes:

> [B]efore his coming to exist, Nixon was not subject for the possibility that he should come to exist differently; there is no earlier situation containing Nixon with with respect to which actuality might have turned out otherwise than it did. Now, aside from other criticisms one could make of this principle, the following seems decisive against it: it entails that *everything* true of Nixon at the moment of his creation is necessarily true of him. Not just the exact time and place of birth, but also that he started to be in a room containing a vase of geraniums, indeed (if existence be a property) that he is a necessary existent...The suggested supplementary principle seems to lead rapidly from the frying pan to the fire. Its troubles should also alert us into suspicion of any view that lets the necessity of origin attach to the *circumstances* of origin. [McG76, p. 130]

McGinn's thinks that the conclusion of the branching argument should be rejected. For any given actual object x, the branching model of possibilities for x consists of, at least, a line that represents the actual history of x, H_x, where H_x begins at the moment at which x (actually) comes into existence t, and for any moment on H_x the things true of x at that moment on H_x are the things that are actually true of x at that moment. (B1) and (B2) entail that any and all branches off of H_x overlap with H_x at moment t. It follows that everything true of x at t is necessary of x (according to the branching model). Yet, surely, this is incorrect.

There are some things true of an object at the moment at which it comes into existence that are not necessarily true of that object. For any given actual object, many of the things true of the object at its moment of origin seem metaphysically inconsequential. Additionally, there are things true of the object at its moment of origin which are, surely, *not* necessary of it. It does not seem that it should be of metaphysical importance to Nixon that he comes into existence in a room containing a vase of geraniums and yet, the branching argument entails that it is metaphysically necessary (of Nixon). Intuitively, it seems true that Nixon might not have existed but the branching argument entails that that is metaphysically impossible (of Nixon).[10] The result that everything true of an object at the moment at which it comes into existence is essentially true of that object is implausibly strong. Hence, the conclusion of the branching argument should be rejected.[11]

5.4 Mackie's Response

Mackie addresses each of the above three objections by attempting to resolve the dilemma that she takes McGinn's criticism to pose. She considers the following question:

> Is it the case that a possible world w, contains the actual object o only if w branches off from the actual world at some time *after* o comes into existence at the actual world?

[10]It is worth mentioning that there is a difference between something's being necessarily true of an object and something's being essential to an object (though the former entails the latter). With respect to Nixon's existence, I take it that McGinn is objecting to the former and not the latter. Recall the definition of an essential feature given on p. 1: "a feature F is *essential* to x at w just in case it is not possible (in a metaphysical sense) at w for x to exist without having F". If *existence* is a feature of Nixon, it follows trivially from this definition that *existence* is essential to Nixon. What McGinn is objecting to is that the branching model entails that: necessarily, Nixon exists. More formally and where 'E' means "existence", McGinn is objecting to branching model on the grounds that it, falsely, entails that, $\Box E(x)$, holds for any actual x and not on the grounds that it entails that, $E(x) \rightarrow \Box\forall y(x = y \rightarrow E(y))$, holds for any actual x.

[11]McGinn rejects the branching argument on this basis and goes on to offer his own, alternative, argument for origin essentialism. Roughly, his argument is that there is an analogy between identity over time and identity across possible worlds. He traces the identity of an organism, through time, to the biological material from which the organism develops and extends this across possible worlds. To illustrate, if the rules for identity across time entail that a person p, is identical to the particular sperm s, and a particular egg e, from which they developed, then the semantics for '=' will entail that p is identical with s and e at all possible worlds. Thus entailing that the origin of p from s and e is essential to p. Space will not permit me to discuss McGinn's argument here. For criticisms against McGinn's argument see e.g. [Joh77] and [Mac06, pp. 99–103].

Mackie points out that if one answers, *yes*, to this question, then one is faced with McGinn's reason for rejecting the branching argument for origin essentialism. Yet, if one answers, *no*, then it would seem that the link between the branching model and origin essentialism will be severed [Mac98, pp. 61–63]. If o exists at w and w branches off from the actual world at some moment *before* o comes to exist at the actual world, the branching model does not preclude o from having an origin at w that varies totally from its origin at the actual world. This dilemma must be resolved if the branching model is to be, convincingly, used to support of origin essentialism.

5.4.1 Amending the Branching Model

In order to resolve the dilemma McGinn's criticism represents, Mackie begins with an appeal to the origin theses advanced by Kripke. She says:

> Kripke's thesis of the necessity of origin (and the thesis that commands intuitive support) is not the thesis that all features of an individual's origin are essential to it. Rather, it is a selective thesis: some of an individual's origin properties are essential; others are not. [Mac98, p. 63]

Mackie claims that since Kripke's origin theses hold only that certain features of an object's origin (at a world) are essential to that object, the branching model should be taken to entail that a possible world containing an actual object o, must match the history of the actual world up until the time that o comes into existence in certain relevant respects. Specifically, those features of the origin of o that are deemed to be essential to o (e.g. the sperm and egg from which o develops) [Mac98, p. 63].

This seems to conform with what Kripke has in mind with respect to the branching model. He says:

> Note that the time in which the divergence from actual history

> occurs may be sometime before the object itself is actually created. For example, I might have been deformed if the fertilized egg from which I originated had been damaged in certain ways, even though I presumably did not yet exist at the time. [Kri81, p. 115, fn. 57]

In Kripke's example, the *branching off* from the history of the actual world occurs prior to when the relevant object comes into existence, and yet, certain things are held fixed. Namely, the particular sperm and the particular egg from which the relevant object, in fact, develops remain the sperm and egg from which the relevant object *possibly* develops.

In order to support a given origin thesis, the branching model need only entail that if a possible world w contains an actual object o, then the history of w matches the history of the actual world with respect to those events and objects that the origin thesis deems to be essential to o (at the actual world). For example, if an origin thesis T, holds that it is essential to a person p, that p develop from the particular sperm s, and the particular egg e, from which p actually develops, then the branching model supports T if the branching model entails that a world w contains p only if, at w, s and e fuse and develop into p. That is, the branching model supports T if it entails that a world containing p will match the history of the actual world with respect to its containing s and e and the events that allow s and e to unite and develop into p.

5.4.2 The *Revised* Branching Model

Accordingly, to avoid McGinn's criticism while still supporting origin essentialism, Mackie suggests amending the branching model in two ways. First, the actual history of an object should begin at some moment prior to the moment at which the object comes into existence. Secondly, (B2) should be qualified by some clause R, such that R imposes certain restrictions on the sorts of facts or events in an object's *actual history* that are to be held fixed. Thus, in the revised branching model, (B2) is replaced with:

(B2′) For any x, any complete alternative (possible) history for x must have some segment (of some duration) that overlaps with the R-restricted actual history for x.

where the R-restricted actual history for x consists of some, but not all, of the things that are true of x at a given moment in the actual history for x. For instance, if R is defined so as to include the genetic material from which x develops (if x is an organism) but exclude other things true of x, then the R-restricted actual history for x will include things like developing from a certain sperm and egg but exclude things like the colour of the walls in the room in which x is born.[12]

Prima facie Mackie's revisions of the branching model appear to resolve the dilemma posed by McGinn's criticism as well as the other objections presented in §5.3.[13] One might reason that if the history of an object begins at some moment prior to the moment at which that object comes into existence, then the branching model can accommodate modal claims like (1_{G}) and (2_{G}). To illustrate, suppose the actual history for x is represented by a line H such that H begins at a moment t and x comes into existence at some moment t' on H, where t' is after t. This model can represent the possibility that x fails to exist with a line H' such that H' branches off from H at some moment prior to t' and at all moments on H', x does not exist.

If the revised branching model can be made to entail origin essentialism, it seems that it can be made to entail origin essentialism for possible but non-actual objects. Notice that, unlike (B2), (B2′) applies to all metaphysically possible objects, not merely actual objects. If the history of an object begins at some moment prior to the moment at which the object comes into existence, then it is no longer nonsensical to claim that the alternative histories

[12] These revisions are based on what Mackie says in [Mac06, pp. 97–98].

[13] On closer examination it turns out that at least one of the objections presented in §5.3 will remain unresolved. See §5.5.

for possible but non-actual objects have some segment that overlaps with the history of the actual world. Accordingly, given an appropriately defined R, it seems that the revised branching model can be made to entail origin theses for possible but non-actual objects.[14]

5.4.3 A Problem with the *Revised* Branching Model

Mackie's revisions to the branching model appear to overcome certain difficulties; however, they raise a new one: it is not clear why R should be defined so as to include certain things true of an object during its actual history and not others. Why should the R-restricted actual history for Nixon be defined to include his developing from a certain sperm and egg while excluding the fact that he "started to be in a room containing a vase of geraniums"? It would be problematically *ad hoc*, at best, or question begging, at worst, to support a given origin thesis by simply defining R such that the revised branching model requires an overlap of just those features and events that will entail that that origin thesis is correct. Unless some explanation is offered as to why R is to be defined in a certain way, it would appear to be unsound to appeal to the revised branching model to support a given origin thesis.

Mackie is aware that her revisions to the branching model give rise to the above difficulty and admits that the branching model does not explain why certain features of an object's origin are essential to that object instead of others [Mac06, p. 98]. Hence, the branching

[14]For example, consider a possible but non-actual object o_1, and suppose (for *reductio*) that it is metaphysically possible that o_1 is the child of actual people Tom and Jane at moment t' and possible that o_1 is the child of actual people Gary and Barb at moment t'. Further, grant that this entails that it is possible for o_1 to have origins that *vary totally* from one another. Let H be a line representing the history of the actual world. Further, let t be a moment on H such that t is prior to t' and at t it is possible that o_1 should be the child of Tom and Jane at t' and also possible that o_1 should be the child of Gary and Barb at t'. So, there is a line H' such that H' branches off of H at a moment after t and prior to t' and o_1 is the child of Tom and Jane at t' on H'. There is also a line H^* such that H^* branches off from H at a moment after t and prior to t' and o_1 is the child of Gary and Barb at t' on H^*. (B2$'$) entails that o_1 has an actual history. Since, o_1 is a non-actual object, the actual history for o_1 must begin at a moment prior to the moment at which o_1 comes into existence (in any complete alternative history for o_1). Let the actual history for o_1 begin at t (on H). Let R be defined so as to include the parents to whom and individual is, or will be, born and exclude all other things true of an individual during its actual history. So defined, the R-restricted actual history for o_1 on H' does not overlap with a segment of the R-restricted actual history for o_1 on H^*. Hence, either H' or H^* is not a complete alternative (possible) history for o_1. The supposition that it is possible for o_1 to have two origins that *vary totally* from one another is false according to the revised branching model given an appropriately defined R. Therefore, the revised branching model can be made to entail origin theses for possible but non-actual objects.

model, alone, is insufficient to support particular (selective) origin theses (like Kripke's). Still, Mackie maintains that one must appeal to the branching model if one wants to offer a plausible defence of origin essentialism [Mac06, p. 99].

5.4.4 A Revised Branching Argument

Mackie thinks that the revised branching model can be used to support origin essentialism; however, she does not explicitly reveal how this is to be done. Mackie may think that the revised branching model can be used to support origin essentialism itself, as opposed to particular (selective) origin theses. The revised branching model is constrained by (B1) and (B2′). Accordingly, any complete alternative history for an object x must have segment that overlaps with the R-restricted actual history for x. R can be defined in a number of ways but, however it is defined, its definition must be such that at a given moment in the R-restricted actual history for x the thing(s) true of x are some but not all of the things that are true of x at that moment in the actual history for x. Thus, one might reason that for any plausible definition of R, the things true of x in the R-restricted actual history for x will correspond to the things deemed essential to x according to some (selective) origin thesis or other. Hence, for any plausible definition of R, the revised branching model with that definition of R will support some (selective) origin thesis or other. Therefore, assuming there *is* some plausible definition of R, the revised branching model can be used to support origin essentialism itself.

5.5 The Revised Model Fails

Despite Mackie's revisions to the branching model, the branching argument for origin essentialism remains unconvincing. One reason for this is mentioned by Mackie, herself. For any specific formulation of (B2′), there will be grounds for one to object to the manner in which R is defined. As Mackie observes, for any definition of R, "it is hard to see that it can provide a principled, non-ad hoc, basis for the attribution of essential properties to persisting individuals." [Mac06, p. 116]. In other words, it is unclear that there *is* any plausible definition for R. Hence, it does not seem that the revised branching model can be used to support origin essentialism itself (in the manner suggested above). Also, and for the same reason, it remains the case that the revised branching model will not convincingly support particular (selective) origin theses. Yet, there is a further problem.

Even if there was a plausible and non-arbitrary definition for R, the revised branching model remains subject to the objection raised in §5.3.1: it fails to accommodate certain metaphysical possibilities concerning objects. To see why, suppose that there is a plausible non-arbitrary definition for R such that the R-restricted actual history for a person x, includes the union of the sperm and egg from which x develops but excludes other things true of x at the moments in its actual history.[15] Now, let p be a person with actual history H_p, and let a sperm s, and an egg e, unite at time t, on H_p, and subsequently develop into p. Surely, it is metaphysically possible that s and e might have, instead, united at the instant before t, t' and subsequently developed into p. Indeed, it seems that this would be quite compatible with Kripke's origin thesis. Furthermore, there does not seem to be a non-arbitrary reason to suppose that the actual history of p does not extend back to a moment on H_p such that it is a future possibility at that moment that s and e unite at t' and subsequently develop into p. Yet, by (B2$'$), under the current definition of R, there is no branch off of H_p on which s and e unite at t' because there would be no segment of such a branch that overlaps with the R-restricted actual history for p: on such a branch it would not be true of p that s and e unite at t and subsequently develop into p. Hence, the revised branching model fails to accommodate certain intuitively genuine metaphysical possibilities concerning objects.

In order to avoid the above difficulty, one must either reject that the actual history of an object begins prior to the moment at which that object comes into existence, or else reject the restriction R. If one rejects the former, then the branching model fails to

[15] This definition of R is meant to correspond to Mackie's take on Kripke's origin thesis.

accommodate certain intuitively genuine metaphysical possibilities concerning objects for the reasons discussed in §5.3.1. Thus, one would be justified in rejecting the branching model as a means of accurately assessing possibilities concerning objects. Alternatively, if one rejects the restriction R, then one will again be faced with McGinn's criticism of the branching argument. In either case, the revised branching model fails as a basis for accepting origin essentialism.

5.6 The Branching Argument Fails

Mackie's branching argument does not constitute a persuasive defence of origin essentialism. The argument relies on one's accepting the branching model as the means of accurately assessing possibilities concerning objects. Yet, the branching model fails to accommodate certain metaphysical possibilities and so it is not clear that the model *is* a means of accurately assessing possibilities concerning objects. Worse still, even if one *did* accept the branching model, the origin theses entailed by the model are highly implausible. Though Mackie revises the branching model in an effort to avoid those difficulties, it seems that the model will remain subject to at least one of them. Therefore, the branching model is inadequate as the basis for a persuasive defence of origin essentialism.

Chapter 6

Concluding Remarks

Each of the arguments for origin essentialism that I have examined has failed to establish the view. Given the inadequacy of the various attempts to defend origin essentialism, one might wonder why the view has not been abandoned. The most likely reason is that origin essentialism remains intuitively appealing to those who choose to maintain the view. But, is it the case that their intuitions actually support origin essentialism and not some other thesis about origin? Before concluding my discussion I will mention an interesting point that Mackie makes regarding this question.

Mackie thinks that what appears to be taken as the basis for the intuitive support of origin essentialism would be more accurately construed as the basis for the intuitive support of a weaker, non-essentialist, view. The basis for thinking that one's intuitions support origin essentialism appears to consist in the difficulty that one faces when trying to imagine an object originating in a manner that *varies totally* from the manner in which it actually originates.[1] When considering possibilities for Queen Elizabeth II, Kripke writes, "One can imagine...that various things in her life could have changed: that she should have become a pauper; that her royal blood should have been unknown, and so on...But what is harder to imagine is her being born of different parents. It seems to me that anything coming from a different origin would not be this object." [Kri81, p. 113]. In this passage, Kripke moves from claiming that it is difficult to imagine Elizabeth II being born of different parents to the endorsement of an origin essentialist claim. As there does not appear to be an obvious logical connection between these claims, one might think that it is intuition that connects

[1] A slightly more accurate characterization of Mackie's view is that the difficulty one faces when trying to imagine the denial of origin essentialism is the basis for the intuitive support of overlap conditions like her (B2) and (B2′) and that the intuitive appeal of origin essentialism consists in, or arises from, the intuitive appeal behind such requirements.

them: the basis for thinking that one's intuitions support origin essentialism consists in the difficulty one faces when trying to imagine its denial.

Mackie does not think that one's difficulty in imagining the denial of origin essentialism means that one's intuitions *support* origin essentialism. She points out that an anti-(origin) essentialist might also admit to experiencing such difficulty, without admitting that origin essentialism has intuitive appeal. She says, "And even those who reject the necessity of origin thesis may concede that to envisage an individual as having a different origin is harder, or involves a greater departure from actuality, than to envisage its having a different subsequent history. This weaker thesis might be called 'the tenacity of origin'." [Mac06, p. 93]. The tenacity of origin is the view that similarities with respect to certain features of an object's origin (like its material or biological composition) are *normally* maintained across possible worlds at which the object exists [Mac06, pp. 116–117]. That is, it is not *impossible* for an object to have an origin that *varies totally* from its actual origin (or its origin at some world w), it is just that there are relatively few possible worlds at which such an occurrence obtains. These worlds are few because they exhibit a greater departure from the actual world (or the history of the actual world) than worlds at which an object originates in a manner similar to its actual origin. The greater the departures from the actual world exhibited at a possible world, the more difficult that world is to imagine. Accordingly, one's difficulty in imagining the denial of origin essentialism can be explained without drawing the conclusion that one's intuitions support origin essentialism. Instead, Mackie thinks that it would be more appropriate to regard the tenacity of origin as the view that commands intuitive support.

The arguments for origin essentialism have been unsuccessful and, if Mackie is correct, it would be more accurate to say that intuition supports the tenacity of origin not its necessity; however, it does not follow from this that origin essentialism is false. Just as an argument is needed to establish origin essentialism, an argument is also needed to establish its denial.

Though it is certainly a worth while endeavour, exploring potential reasons to deny origin essentialism is beyond the scope of this thesis. Still, based on the points that have been raised in this discussion, it seems to me that, until such time as a persuasive argument in its favour is developed, endorsing origin essentialism would be premature.

Bibliography

[Ada79] Robert Merrihew Adams. Primitive Thisness and Primitive Identity. *The Journal of Philosophy*, 76:5–26, 1979.

[Bla52] Max Black. The Identity of Indiscernibles. *Mind*, 61:153–164, 1952.

[Bur96] John P. Burgess. Marcus, Kripke, and Names. *Philosophical Studies*, 84:1–47, 1996.

[Cha75] Hugh S. Chandler. Rigid Designation. *The Journal of Philosophy*, 72:363–369, 1975.

[CR06] Ross Cameron and Sonia Roca. Rohrbaugh and deRosset on the Necessity of Origin. *Mind*, 115:361–366, 2006.

[Div02] John Divers. *Possible Worlds*. Routledge, New York, 2002.

[For80] Graeme Forbes. Origin and identity. *Philosophical Studies*, 37:353–362, 1980.

[For81] Graeme Forbes. On the Philosophical Basis of Essentialist Theories. *Journal of Philosophical Logic*, 10:73–99, 1981.

[For83] Graeme Forbes. Thisness and Vagueness. *Synthese*, 54:235–259, 1983.

[For85] Graeme Forbes. *The Metaphysics of Modality*. Oxford University Press, New York, 1985.

[Joh77] Patricia Johnston. Origin and Necessity. *Philosophical Studies*, 32:413–418, 1977.

[Kri81] Saul Kripke. *Naming and Necessity*. Blackwell Publishing, Malden MA, 1981.

[Lin69] Leonard Linsky. Reference, Essentialism, and Modality. *The Journal of Philosophy*, 66:687–700, 1969.

[Mac74] J. L. Mackie. De What Re is de Re Modality? *The Journal of Philosophy*, 71:551–561, 1974.

[Mac87] Penelope Mackie. Essence, Origin and Bare Identity. *Mind*, 96:173–201, 1987.

[Mac98] Penelope Mackie. Identity Time, and Necessity. *Proceedings of the Aristotelian Society*, 98:59–78, 1998.

[Mac06] Penelope Mackie. *How Things Might Have Been*. Oxford University Press, New York, 2006.

[McG76] Colin McGinn. On the Necessity of Origin. *The Journal of Philosophy*, 73:127–135, 1976.

[PB99] Roy W. Parrett and Charles Barton. Personal Identity, Reductionism and the Necessity of Origins. *Erkenntnis*, 51:277–294, 1999.

[Pri82] M. S. Price. On the Non-Necessity of Origin. *Canadian Journal of Philosophy*, 12:33–45, 1982.

[Pri08] Graham Priest. *An Introduction to Non-Classical Logic*. Cambridge University Press, New York, 2008.

[Qui80] Willard Van Orman Quine. *From a Logical Point of View*. Harvard University Press, Cambridge MA, second revised edition, 1980.

[Qui13] Willard Van Orman Quine. *Word and Object*. The MIT Press, Cambridge MA, new edition, 2013.

[Rd04] Guy Rohrbaugh and Louis deRosset. A New Route to the Necessity of Origin. *Mind*, 113:705–725, 2004.

[Rei78] Lloyd Reinhardt. Metaphysical Possibility. *Mind*, 87:210–229, 1978.

[RF06] Teresa Robertson and Graeme Forbes. Does the New Route Reach Its Destination? *Mind*, 115:367–373, 2006.

[Rob98] Teresa Robertson. Possibilities and the Arguments for Origin Essentialism. *Mind*, 107:729–749, 1998.

[Sal79] Nathan Salmon. How Not to Derive Essentialism from the Theory of Reference. *The Journal of Philosophy*, 76:703–725, 1979.

[Sal89] Nathan Salmon. The Logic of What Might Have Been. *The Philosophical Review*, 98:3–34, 1989.

[Sal05] Nathan Salmon. *Reference and Essence*. Prometheus Books, Amherst NY, second edition, 2005.

[Sou74] R. B. De Sousa. Kripke on Naming and Necessity. *Canadian Journal of Philosophy*, 3:447–464, 1974.

[Sta12] Robert Stalnaker. *Mere Possibilities*. Princeton University Press, Princeton NJ, 2012.