CONTINGENT IDENTITY, RIGID DESIGNATION, AND COUNTERPART THEORY

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Murali Ramachandran (460071)

Declaration

I declare that this thesis is my own unaided work. It is submitted for the degree of Doctor of Philosophy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

Candidate:

Murali Ramachandran

Signature:

Date: 24 January 2020

Abstract

This thesis is concerned with the coherence or otherwise of *contingent identity*: the possibility of certain objects being identical, but not *necessarily* identical. The overwhelmingly dominant view, at least since Saul Kripke's influential book, *Naming and Necessity*, is that the idea of contingent identity is simply incoherent. In that book Kripke puts forward compelling—many think conclusive—considerations in support of the view that any (genuine) identity statement must be necessarily true if true at all.

Chapter 1 introduces Kripke's key notion of *rigid designation*, which is explicated in part by distinguishing the ways *names* and (*definite*) *descriptions* refer, and the attendant case for his famous *Necessity of Identity* thesis. A key notion which emerges in elaborating rigidity is that of *invoking*; important differences between invoking and (rigidly) designating will emerge in later chapters.

Kripke's Necessity of Identity thesis is meant to encompass identity statements involving *kinds*, not just *individuals*—e.g. statements such as "water is H_2O", "gold is the element with atomic number 79", "light is a stream of photons", and "lightning is an electrical discharge". But this dissertation will focus on the issue of whether the thesis is correct, or, at any rate, obligatory, as far as identity statements involving individuals (particular objects, entities) are concerned. My aim in this dissertation is to show that it is not. I am going to argue that while Kripke's considerations are forceful against the most prominent conception of contingent identity, *contingent self-identity* as I call it, there is a different conception of contingent identity, one which piggy-backs on the possibility of *contingent distinctness*, that survives.

But that is merely to say that there is a variety of contingent identity that is consistent with Kripke's considerations; this is not yet motivation for *endorsing* such contingent identity, for holding that there *are* such identities. Two attempts to defend contingent identity are considered: Gallois (**Chapter 2**) attempts to accommodate contingent identity across worlds and contingent identity over time (*occasional identity*) by 'restricting' Kripke's notion of rigidity in various ways, while Chandler (**Chapter 3**) defends it in the course of an attack on Kripke's famous thesis that names are rigid designators. I argue that neither are successful as far their stated aims go; but Chandler's case highlights a crucial component for defending contingent identity (distinctness): the *mixed designation view*, as I call it. This holds that a rigid designator of an object *x* may on occasion *non-rigidly* designate a possibly distinct object *y*. I try and make sense of this by way of

considering what I call *tethered designators*, which involve an invoking expression but which may designate an object that is distinct from the invoked one. This leads to the introduction of the notion of a *counterpart* of an object, and the basic idea behind *counterpart theory*: that modal facts about an object α may be *made true* by non-modal facts about another object, β (β is in that sense a counterpart of α).

Chapter 4 then introduces David Lewis's original counterpart theory, which is motivated by his *modal realism*, and two alternative approaches from Graeme Forbes and Murali Ramachandran—(I allude to myself in the third-person when discussing published material)—respectively. Their various takes on contingent identity and related issues are explored. Counterintuitive results arising from allowing an object to have more than one counterpart at a world appear inevitable. A marriage of Forbes' approach and Ramachandran's is floated at the end of the chapter that minimizes counterintuitive results.

Chapter 5 begins by noting that a convincing case for contingent identity across worlds is still wanting. It provides one by way of considering Chisholm's modal paradox; objections to the Chandler–Salmon strategy of rejecting the S4-axiom [$\Diamond\Diamond\psi \rightarrow \Diamond\psi$] are pursued; I argue that this strategy does not address variations of the paradox, and that a proper solution needs to endorse contingent identity and to look to counterpart theory for a suitable logic. However, only a many-one counterpart theory—i.e. one which allows many objects at one world to have a common counterpart at another, but disallows an object having more than one counterpart at any world—is called for. I propose a development of the Forbes-Ramachandran (FR-) approach arrived at the close of Chapter 4 which incorporates *many-one counterpart models*. My proposal removes the remaining counterintuitive results from the FR-approach.

In the final sections of the chapter I give (very) brief motivations for endorsing *occasional identity* and what I call *sortal-relative contingent identity*, and go on to suggest how the FR-approach, enriched with many-one counterpart models, might be modified so as to accommodate them.

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CHAPTER 1
NAMES, RIGIDITY, AND THE NECESSITY OF IDENTITY

This chapter introduces Kripke's (1980) key notion of rigid designation and attendant theses leading up to his argument from rigid designation for the necessity of identity. We begin by way of outlining—really, skimming through—some significant differences between *names*, e.g. 'London', 'Nixon', 'the Titanic', and *definite descriptions*, e.g. 'the tallest spy', 'the inventor of bifocals', 'Smith's murderer' identified by Kripke (1971; 1980). An individual (or object) *x* is designated by a (definite) description 'the *F*' in virtue of *x being uniquely F* (in the context).[1] E.g. *x* is the referent of 'Smith's murderer' if and only if *x* murdered Smith and no one else did. Names, Kripke argues, do not refer in this manner. He presents a number of forceful objections against so-called *descriptivist* accounts of how names refer and what they mean. More specifically, his targets are: (a) accounts which take a name to refer to an individual *x* by virtue of *x* uniquely satisfying a set (or 'weighted majority')[2] of descriptions that the speaker and her audience or community associate with the name; and (b) accounts that take the associated descriptions to also specify the *meaning* of the name in question.

1.1 Names and Descriptivism

Pre-theoretically at least, there is indeed a difference between picking out an object by a name and picking it out by a description. Consider e.g. (1) and (2):

(1) John Ford directed *The Quiet Man*.

(2) The director of *The Searchers* directed *The Quiet Man*.

Intuitively, the phrase 'The director of *The Searchers*' describes the individual it designates—it picks out John Ford by way of specifying a property he alone possesses, namely, the property of having directed *The Quiet Man*. The name 'John Ford', on the

[1] 'Smith's murderer' is treated as definite description because it is equivalent to 'the murderer of Smith'.

[2] Searle's (1958) 'cluster' theory takes there to be a number of descriptions to be associated with a name. Not all the descriptions have to be satisfied by the referent—just the weighted majority. Likewise, different speakers need not associate precisely the same descriptions in order to communicate: having a weighted majority in common is enough.

face of it, does not offer a *description* of him. This is presumably what is behind Mill's (1847, chapter II) contention that names have denotation (reference) but not connotation. On Mill's view, names are considered merely as tags for their bearers: the meaning of a name, in so far as it can be said to have a meaning, is just the bearer of the name. This is precisely the sort of view Kripke argues for, despite it facing difficulties that descriptivist accounts appear able to easily circumvent.

How is the referent determined? First, if names do not have descriptive content, how do we manage to use them to refer to individuals? In some situations, we can *demonstrate* (*point to*) the individual we are talking about—though in such a case it may be unnatural to use a name rather than a demonstrative ('she', 'you', 'that table', etc.). In many cases, however, we are in no position to point out the individual we are referring to with a name. Consequently, if somebody were to ask me who I meant by 'John Ford' in sentence (1), I might well resort to a description such as 'the director of *The Searchers*'. And, as we have noted, there seems no difficulty in seeing how the referent of this description is determined: it picks out John Ford precisely because he is the unique individual who directed *The Searchers*. So, taking names to refer by way of the satisfaction of associated descriptions appears an obvious solution.

How can identity statements be informative? Secondly, if the names involved in a true identity statement have no descriptive content, how is the potential informativeness of some such statements to be explained? Consider e.g. (3) and (4) (ignore the fact they are fictional names):

(3) Superman is Clark Kent.

(4) Clark Kent is Clark Kent.

If the content of a name is merely its bearer, then (3) and (4) affirm precisely the same thing of the same individual. Yet, Lois Lane would surely find (3) comparatively informative. One who asserts (3) apparently asserts something different from someone asserting (4). This needs some explanation on the Millian vie. But taking names to have the same meaning as some associated description would appear to resolve the problem: the names 'Superman' and 'Clark Kent' *do* differ in content for they are clearly associated with different descriptions (e.g. 'the guy in the fancy outfit who can fly' and 'the awkward, nerdy reporter', respectively).

How can negative existential statements make sense? Finally, there is the problem of how existence-denying statements involving names can be coherent. Consider (5)–(7):

(5) Father Christmas does not exist.

(6) Santa Claus does not exist.

(7) Superman does not exist.

If the content of a name is merely its bearer, what, if anything, does a statement like (5) affirm, where there is no bearer? And (5) would appear to affirm the same thing as (6) but not the same thing as (7)—*how is this possible*? Again descriptivisit theories seem to have an easy way out; they can maintain that 'Father Christmas' and 'Santa Claus' have the same descriptive content which is different from the descriptive content of 'Superman'. To assert (5) is to affirm that no object or individual satisfies the descriptive content of 'Father Christmas'.

In the face of this *prima facie* strong case for descriptivism, Kripke presents novel and persuasive, if not decisive, objections against taking the descriptivist route. We will mention some of these, just to give an idea of differences between names and descriptions; what is most pertinent for our purposes is a *modal* objection that is underpinned by the central distinction between *rigid* and *nonrigid* designation.

1.1.1 Semantic objections

The descriptivist account of reference takes a name to refer to an object *x* in virtue of *x* uniquely possessing properties, or the weighted majority of properties, specified by a set of descriptions associated with the name. Kripke presents three sorts of counterexamples to this view.

Many satisfiers. First, a name *n* may refer even though the descriptions commonly associated with *n* are satisfied by *many* objects. For example, the description most ordinary speakers associate with the name 'Aristotle' might be 'Greek philosopher from long ago'. But that description applies to many individuals, not just Aristotle.

No satisfiers. Secondly, a name *n* may refer even though the descriptions commonly associated with *n* are not satisfied by *any* object. Kripke gives the nice example of Jonah:

> Biblical scholars, as I said, think that Jonah really existed. It isn't because they think that someone ever was swallowed by a big fish or even went to Nineveh to preach. These conditions may be true of no

> one whatsoever and yet the name ‘Jonah’ really has a referent. (Kripke 1980, p. 87)

Wrong satisfier. Finally, a name *n* may refer to an object *x* even though the descriptions commonly associated with *n* are uniquely satisfied by some *other* object! Kripke’s Gödel–Schmidt example brings out the point nicely. Kurt Gödel is commonly believed to have discovered (proved) the incompleteness of arithmetic; take ‘the person who discovered the incompleteness of arithmetic’ to be the description commonly associated with the name ‘Gödel’. But now suppose that, unbeknownst to us, that it was Gödel’s colleague, Schmidt, who in fact made the discovery, and that Gödel murdered Schmidt and claimed the discovery for himself. In this case, the description commonly associated with the name ‘Gödel’ is uniquely satisfied by Schmidt, whereas we would presumably still maintain that the name itself refers to Gödel.

1.1.2 An epistemic objection

This objection is directed against the view that the *meaning* of a name is given by the associated description(s). Kripke’s counterexample takes the candidate description for the name ‘Aristotle’ to be ‘pupil of Plato and teacher of Alexander the great’. If that description does indeed specify the literal meaning (semantic content) of the name, the following statement:

(8a) Aristotle taught Alexander the Great (AG).

should not differ in meaning from

(8b) The pupil of Plato and teacher of AG taught AG.

But (8b) is analytic and knowable *a priori*, whereas (8a) is clearly only knowable *a posteriori*.

1.1.3 A modal objection

There is also this modal difference between (8a) and (8b). (8a) expresses a *contingent truth*; e.g. had history gone differently, Aristotle might have died as a child and never have got to teach AG. But (8b) expresses a *necessary truth*; had history gone differently, it would still be trivially true that the pupil of Plato and teacher of AG taught AG.

It is this sort of disparity Kripke appeals to when introducing his central notion of rigidity, which we’ll consider just after a few words about his own account of names.

1.2 A 'Causal' Theory of Names

How *do* names refer, then, if not by way of associated descriptive content being satisfied? Kripke's proposal, albeit sketchy and vague, appears to offer a satisfying explanation of our intuitive verdicts in the counterexamples to descriptivism just mentioned. Here's Kripke's initial gloss:

> Someone, let's say, a baby, is born; his parents call him by a certain name. They talk about him to their friends. Other people meet him. Through various sorts of talk the name is spread from link to link as if by a chain. A speaker who is on the far end of this chain, who has heard about, say, Richard Feynman, in the market place or elsewhere, may be referring to Richard Feynman even though he can't remember from whom he first heard of Feynman or from whom he ever heard of Feynman […] [A] chain of communication going back to Feynman himself has been established, by virtue of his membership in a community which passed the name on from link to link. (1980, p. 91)

So, there is something like a 'causal' story here. A name is initially *introduced*, as a name of a particular individual or thing, *a*. The name is subsequently used, not just by its introducer(s), in communicating facts (or maybe even falsehoods) about that individual *a*. These and later tokens of the name refer to *a* in virtue of 'piggybacking' on earlier uses which refer to *a*. There are 'chains' of uses of a name, then, stemming from introductory uses leading to uses by speakers who may have scant or incorrect information about the name's referent. But reference is preserved along these chains, precisely because of the 'piggybacking' (or anaphoric) nature of names.[3]

Of course, much more needs to be said to make this approach fly. For example, while it squares nicely with some objections to descriptivism, it does not yet provide an explanation of how identify statements involving names can be informative, or of why negative existential statements can appear to differ in content. But my goal in this section was simply to give some background to Kripke's discussion of rigidity.[4] I think we have enough background now to attend to that.

1.3 Introducing Rigidity

Consider the following pair of statements:

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[3] McCulloch (1989, p. 281 ff.) articulates a narrative of this sort in more detail.

[4] For the record, I think Evans's (1973) development of Kripke's original idea is the way to go.

(9a) Someone other than the US President in 2010 might have been the US President in 2010.

(9b) Someone other than Barack Obama might have been Barack Obama.

Seeing that the US President in 2010 was in fact Barack Obama—in other words, that the description and the name *corefer*—one might expect them to have the same truth value. Yet, (9a) is true, or at any rate has a true reading: the person who *actually* is US President in 2010, Barack Obama, might not have been the US President in 2000; whereas (9b) seems plainly false or absurd. Sure, Barack Obama might not have been *called* 'Barack Obama', and might have had very different character traits; but that would not be a situation in which the actual Barack Obama was not Barack Obama. Roughly, the description 'the US President in 2010' can pick out a different individual in another *possible* (or *counterfactual*) situation—namely, *whoever happens to be* the US President in 2010 in *that* situation. By contrast, 'Barack Obama' cannot but designate its actual referent, Barack Obama. In this sense, the name 'Barack Obama' is a *rigid* designator, whereas the (definite) description 'the US President in 2010' is *nonrigid*.

Kripke offers a general characterization of rigidity in terms of *possible worlds*:

> Let's use some terms quasi-technically. Let's call something a *rigid designator* if in every possible world it designates the same object, a *nonrigid* or *accidental designator* if that is not the case. Of course, we don't require that objects exist in all possible worlds […] a designator rigidly designates a certain object if it designates that object wherever the object exists (Kripke 1980, pp. 48-49).

However, it is important to note that, for Kripke, possible-worlds talk is *figurative*: it is simply a means of codifying modal statements such as (9a) and (9b) so as to make logical relations between them more perspicuous (see e.g. Kripke 1980, pp. 44-48). Even in that technical regard, though, this characterization is not quite right. Suppose Kumar is Meena's only son, but also that Meena has an inherited medical condition which necessarily precludes her from having more than one child—not even twins, triplets, etc. In that case, the description 'Meena's son' comes out a rigid designator of Kumar, since in any world where he exists, Kumar will be Meena's son. But, Meena might have had a different partner, and, thereby, had a son (an only son) who is *not* Kumar; 'Meena's son' will designate that son, and not Kumar, at such a world. Thus, it comes out possible for a term to be a rigid designator of distinct possible individuals, albeit individuals who cannot co-exist. Kripke would certainly not regard such a term as rigid: rigidity demands *no variation of reference* across worlds.

This ‘no-variation’ idea is captured by an intuitive test for rigidity Kripke proposes (1980, pp. 48-49). Replace the singular term we are testing, α, in the schema below:

(Test) Something [someone] other than α might have been α.

If the resulting statement seems true, or to have an uncontroversial true reading, the expression is *nonrigid*; if, on the other hand, the resulting statement seems false (absurd, contradictory), the expression is *rigid*. Names (e.g. *Obama*, *London*, *the Eiffel Tower*), demonstratives (e.g. *this*, *that cat*), and indexicals (e.g. *she*, *you*, *it*) come out Test-rigid as it were. Importantly, as Kripke acknowledges, some descriptions come out Test-rigid too (e.g. ‘the sum of 2 and 4’, ‘the positive square root of 25’).[5] But, *generally*, descriptions are Test-nonrigid (e.g. ‘the tallest spy’, ‘the Queen of England’, ‘the man who shot Liberty Valance’). And, returning to our earlier example, ‘Meena’s son’ evidently comes out Test-nonrigid, since someone other than Meena’s son, Kumar, might have been Meena’s son.

However, (Test) is flawed too: some descriptions come out Test-rigid which should not be counted as such. Mathematical descriptions such as ‘The sum of 2 and 4’ and ‘the positive square root of 25’ are not problematic. But, consider e.g. ‘the (biological) father of Abel’ (an example from Hughes 2004, pp. 21-22); one may be of an essentialist bent and hold that no one other than the (biological) father of Abel might have been the (biological) father of Abel; but, this is not sufficient to render the description rigid, since, for example, it will fail to refer to Abel’s father in counterfactual situations where he exists but has no children.

Let us introduce some additional terminology.

(Defn1) A term *invariably designates* a certain object *x* if it designates *x* whenever it designates anything at all. Call such a term an *invariantly rigid* (or, simply, *invariant*) designator.

(Defn2) A term *exhaustively designates* a certain object *x* if it designates *x* whenever *x* exists. Call such a term an *exhaustively rigid* (or, simply, *exhaustive*) designator.

[5] This may give (false) hope to descriptivists. They may resort to rigid (or ‘rigidified’) descriptions to fend off Kripke’s main objections. But, as we will see in §1.3.2, there is a fundamental difference between how names and descriptions refer that descriptivism cannot accommodate.

The possible-world characterization mistakenly takes mere exhaustive designation to be sufficient for rigidity, while the intuitive test mistakenly takes mere invariant designation to be sufficient. What Kripke clearly (or perhaps not so clearly!) intends is this:

(RIG) A term is a rigid designator if, and only if, it both invariably and exhaustively designates some object.

This is the notion of rigidity we will adhere to in the thesis. Let me mention two features in anticipation of what is to come. First, (RIG) is neutral on the issue of *how* reference is secured by expressions. If Kripke's rebuttal of descriptivism is correct, for instance, names do not refer in the same way descriptions do, i.e. by way of 'unique satisfaction' of the descriptive predicates. And, secondly, (RIG) also leaves open the question of whether a rigid designator of an object *x* designates *x* at worlds where *x* does not exist.

The considerations motivating (RIG) point towards a fundamental thesis in Kripke's project, what we shall call the *rigidity of names thesis* (Kripke 1980, p. 48):

(RNT) Names are rigid designators.

RNT) has wide metaphysical and epistemological ramifications. For example, a central alleged consequence, certainly as far this thesis is concerned, is this:

(M=) Any true identity statement involving names, [*a* = *b*], is necessarily true.

This apparently underwrites Kripke's necessity of identity thesis:

(N=) *Identity* holds necessarily if at all.

And, drawing parallels between names and *natural kind* terms (*tiger*, *gold*, *water*), Kripke (1980 Lecture III) goes onto argue that theoretical identifications, such as [*water is* H_20], are necessarily true if true, and then that minds are not identical with brains! Sadly, these later claims fall outside the purview of this thesis; RNT, (M=), and (N=) are the pertinent theses, and, in particular, the derivation of (M=) from RNT, the topic of §1.5.

1.4 *De Jure* Rigidity

1.4.1 De facto and de jure rigidity

While descriptions are generally rigid, we have noted there are exceptions, e.g. 'the sum of 2 and 4'; 'the only woman who *could have been* Kumar's mother' might be another. In the 1980 Preface, Kripke distinguishes the sense in which rigid descriptions are rigid from the sense in which names are. Here is what he says in an important footnote:

> **Footnote 21a**
> I also ignore the distinction between '*de jure*' rigidity, where the reference of a designator is *stipulated* to be a single object, whether we are speaking of the actual world or of a counterfactual situation, and mere '*de facto*' rigidity, where a description 'the *x* such that *Fx*' happens to use a predicate '*F*' that in each possible world is true of one and same unique object (e.g., 'the smallest prime' rigidly designates the number two). Clearly my thesis about names is that they are rigid *de jure*, but in the monograph I am content with the weaker assertion of rigidity. (Kripke 1980, p. 21, fn. 21)

The claim about de facto rigidity just echoes the view that descriptions refer by way of *satisfaction*: whether a description is rigid or not, it refers to an object *x* at some world *w* by virtue of *x* being the only object (in the contextually salient circumstances) that is *F* in *w*. Whether the description can be satisfied by different objects in different counterfactual circumstances is an independent, metaphysical, matter. By contrast, setting aside the question of *how* they refer, what appears to be true of names is that they cannot but refer to their actual referents; their rigidity is *guaranteed* by their linguistic nature, by *semantics* if you will. This is what Kripke presumably means when he says their reference "is *stipulated* to be a single object".

De jure rigidity is *semantically guaranteed* rigidity, then; at any rate, this is how we shall understand it. Names are not the only terms which are de jure rigid; demonstratives ('*that over there*', '*this cat*') and indexical expressions ('*I*', '*she*') are also rigid de jure. But so too are 'rigidified' descriptions such as 'the *actual* US President in 2000'; this description is semantically guaranteed to pick out no one other than the person who is US President in the *actual* world: thus, it de jure rigidly designates Barack Obama. Similarly, 'the individual identical with Barack Obama', given the rigidity of names, de jure rigidly designates Obama too.

There is, then, a further distinction we can make: between descriptive and non-descriptive de jure rigid designators.

1.4.2 Object-invoking de jure rigidity

Kripke's explication of the rigidity of names by appeal to *counterfactual truth-conditions* in the Preface (Kripke 1980, pp. 6-7) is pertinent here. Adapting his example, consider the following pair of statements:

(10a) Barack Obama is married.

(10b) The US President in 2010 is married.

What would have to be the case for the propositions they actually express, call them (PrA) and (PrB), respectively, to be true in some counterfactual situation? Well, (PrB) will be true if, in that situation, there was exactly one US President in 2000 and that individual was married. By contrast, (PrA) will be true if, and only if, *Obama himself* was married in that situation; thus, the very individual Obama is *invoked* (*mentioned*) in the counterfactual truth conditions of (10a). Indeed, one might say that Obama himself figures in the proposition expressed by (10a). No *particular* individual figures in the proposition expressed by (10b).[6]

The point holds even if we 'rigidify' the definite description in (10b) in either of the following ways:

(11) The *actual* US President in 2000 is married.

(12) *That* person who was US President in 2000 is married.

While the propositions expressed by these statements are true at a world only if Obama himself is married in the world, neither *invokes* any particular individual.[7]

So, rigid designators fall into three camps for Kripke:

- De facto rigid: e.g. 'the smallest prime', perhaps 'the only woman who *could have been* Kumar's mother'.
- Descriptive de jure rigid: e.g. 'the *actual* inventor of bifocals', '*that* person, whoever it was, who murdered Smith'.
- Object-invoking de jure rigid: names, demonstratives, and indexical terms appear to fall into this category.[8]

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[6] Sainsbury (1979, p. 113 ff.) talks of *entity-invoking* uses of descriptions in explicating their *referential* (as opposed to *attributive*) uses. Though closely related to how I am using the term 'invoke', there are differences; the idea of the referent figuring in the literal truth-conditions of a statement is not part of his story. The referential/attributive is, of course, the distinction famously made by Donnellan (1968).

[7] The fact names are object-invoking while even rigidified descriptions are not is, so far as I can see, a decisive blow to descriptivism.

[8] It is perhaps worth noting that while name-tokens piggy-pack on earlier tokens to secure their reference, demonstrative and indexical tokens are typically 'stand alone' referring expressions—though some can, on occasion, be used anaphorically, as e.g. 'she' is in "The Queen is unhappy; she is quite beside herself".

1.4.3 Obstinacy

But, perhaps the more significant distinction is that between the first two and the third, between *descriptive reference* and *invoking reference* as it were: between an object being singled out by virtue of its (uniquely) *satisfying* a certain predicate and its being *invoked*. This divide is pertinent to a question flagged earlier: whether a rigid designator of an object *x* designates *x* at worlds in which *x* does not exist. Following Salmon (1981, pp. 31-4), let us say it is *obstinately* rigid if it does, *persistently* rigid if it does not. Rigid descriptions, given that they refer only to objects which satisfy them, are all unquestionably persistently rigid. And the consensus on what we are calling object-invoking terms appears to be that they are obstinately rigid.[9] Here is Kripke (1980):

> **Footnote 21b**
> Since names are rigid *de jure*—see p. 78 below—I say that a proper name rigidly designates its referent even when we speak of counterfactual situations where that referent would not have existed (1980, p. 21, fn. 21)
>
> **Pertinent passage from p. 78:**
> If you say ‘suppose Hitler had never been born’ then ‘Hitler’ refers here, still rigidly, to something that would not exist in in the counterfactual situation described (1980, p. 78).

But I wonder whether this is really the best way of looking at things. Suppose (pointing to a cat) I assert:

(13) That cat is hungry.

There is (or need be) no question that the demonstrative ‘that cat’ refers in this case. But it would seem peculiar to ask what *it* designates at (or with respect to) other times or other counterfactual circumstances. To claim that this demonstrative- token refers to the same cat at all times or worlds, or that it still rigidly designates the actual cat even when we use to describe counterfactual situations where that cat does not exist, seems downright infelicitous. It surely simple refers to a particular cat, *period*. This appears to me to be the correct thing to say of invoking-terms generally. We may agree that what a token of an invoking-term refers to does not pivot on the modal context in which the token appears;

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[9] Apart from Kripke, other advocates include Salmon (1981), Smith (1987), Soames (2002) Branquinho (2003), and Hughes (2004). Note a small anomaly: rigid descriptions of necessary existents, such as ‘the sum of 2 and 3’, come out obstinately rigid. But they still are not object-invoking, which we understand in terms of object-dependent truth-conditions. Let this blip slide.

but this is not to agree that it, that very token, refers to the same thing in all modal contexts. These considerations suggest that the notion of rigid designation felicitously applies only to descriptions, and not to names or other object-invoking terms at all! We do not relinquish explanatory power if we take this route; for example, the thrust of the p. 78 passage above is not diminished if we delete the phrase ‘still rigidly’. There is, on this taxonomy, referring by invoking and referring by describing; but it is only in the latter case that we can talk of the term being nonrigid, de facto rigid or de jure rigid.

However, I merely float the above as an alternative, perhaps more perspicuous, way of looking at rigidity. Nothing of significance hangs on whether we take this line or go with convention. So, henceforth, let us stick with the orthodox taxonomy.

1.4.4 Descriptive names and object-invoking descriptions

A couple of caveats. Consider first so-called *descriptive names*: names which are introduced descriptively, not by ostension. Suppose, *pace* Evans (1979, p. 181), we introduce the name ‘Julius’ with the following stipulation:

(D) Let us use ‘Julius’ to refer to whoever invented the zip.

Clearly, if ‘Julius’ does refer to an individual *x*, it is by virtue of *x* uniquely satisfying the associated description, ‘the inventor of the zip’. So, descriptivism as regards *how* reference is secured is correct for ‘Julius’. But it would be a mistake, according to Kripke—see e.g. his discussion of the name ‘Neptune’ (1980, p. 79, fn. 33)—to take the description to give the *meaning* of the name. Even though we may use a description to *fix the reference* of name, this should not confused with giving the meaning of the name. For, the name is rigid whereas the description is not. Witness:

(14) Julius is the inventor of the zip if anyone is.

(14) is analytic and expresses a necessary truth. By contrast, (14), in Kripke’s eyes (1980, p. 56), is, or expresses, a *contingent a priori* truth;[10] it is contingent because the zip might have been invented by someone other than the actual inventor. ‘Julius’ must be functioning as a rigid designator on this reading of (14). But, since it secures its referent

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[10] The existence of *contingent a priori* and *necessary a posteriori* truths are further novel results, albeit disputed results, stemming from (RNT) according to Kripke.

by way of description-satisfaction, 'Julius' is not an object-invoking term in our sense; it is descriptively de jure rigid.[11] This is one point of departure from earlier demarcations.

A second caveat concerns countervailing descriptions. Suppose that in a room with many tables I point to a particular table and assert:

(15) The table is broken.

The description 'the table' in this context is most naturally read as equivalent to the demonstrative '*that* table'; and, on the face of it, if one were to specify the counterfactual truth conditions of the utterance, one would need to mention that very table. So, it would not be untoward to count this description-token as an object-invoking de jure rigid designator.

So be it. Philosophers of language and linguists are apt to obsess about providing *unified* analyses of linguistic expressions, and are thereby led to shoehorn countervailing examples to fit their theories. But we can afford to be flexible. What matters to us is the existence of the various kinds of rigid designators that have been outlined. We can then demarcate linguisitc expressions according their compliance with the various characterizations of reference and rigidity rather than by their linguistic category. Little is lost for our purposes.

1.5 The Necessity of Identity

The main purpose of this section is to outline three sorts of arguments advanced, or, at any rate, suggested, by Kripke (1980) for his *necessity of identity* thesis:

(N=) Identity holds necessarily if at all.

These will serve as points of reference when we come to consider (in later chapters) attempts to accommodate the opposite view that identities may hold merely contingently.

1.5.1 The Hesperus–Phosphorus dialectical challenge

The first sort of argument takes the form of a dialectical challenge. The names 'Hesperus' and 'Phosphorus' were introduced by the ancient Greeks, ostensibly for different objects: for, respectively, an object visible in the sky in the evening, and an object visibile in the

[11] We may allow, though, that the name can *become* invokingly rigid once it has gained currency and further things about the invention of zips are uncovered.

sky in the morning. But, as we now know, Hesperus *is* Phosphorus, the planet we call *Venus*. However, one might think, *Hesperus might not have been Phosphorus*. Kripke thinks otherwise (1980, p. 102 ff.)

What, he asks, would a possible world have to be like for Hesperus *not* to be Phosphorus? It is true that if Hesperus had not been visible in the morning it would not have ended up being named ‘Phosphorus’ (‘the Morning Star’): but that would merely be a situation in which Hesperus was not *called* ‘Phosphorus’; it would not be a situation in which Hesperus was not in fact identical with the planet named Phosphorus *in the actual world*, i.e. Venus. On reflection, we *cannot* envisage or describe a situation where Hesperus was not Phosphorus: for, that would have to be a situation in which Venus existed but was distinct from *itself*. The idea of an object being distinct from, of not being identical to, *itself* is surely incoherent.

Some defenders of contingent identity may well accept contingent self-identity, or, at least, be committed to it inadvertently—as we’ll see in chapter 2, Gallois (1986; 1998) is so committed. For my part, I side with Kripke in finding the idea incoherent. However, to telegraph my intentions, I think there is a different sort of contingent identity which remains unscathed by the Hesperus–Phosphorus dialectic. Roughly, whereas contingent self-identity requires one possible object to be two (or more) objects at some world (yuk!), contingent *distinctness* requires distinct possible objects to be one and the same object at some world; at such a world those (possibly distinct) objects would be contingently identical. It is contingent identity in this sense, as subordinate partner to contingent distinctness as it were, which shall be defended here.[12]

1.5.2 The argument from rigid designation

A defender of contingent identity holds that certain (actually or possibly) true identity statements may be merely contingently true. But not all candidate identity statements will do. Take the following example suggested by Kripke (1980, p. 98):

(C1) The inventor of bifocals is identical with the first Postmaster General of the US.

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[12] The idea of a *counterpart* of an object, and its purpose, will be briefly introduced in chapter 3, where we explore Chandler’s (1975) attempted refutation of (RNT) . Counterpart theory proper is introduced, and examined in more detail, in chapter 4.

If it is true, it is only contingently true. But, that wouldn't bode contingent identity. For, the descriptions involved are *nonrigid*; they may both designate Benjamin Franklin in the actual world, but designate different individuals, *a* and *b*, respectively, at another world, neither of whom are Benjamin Franklin. Thus, no individuals need be contingently identical for (C1) to be true.

What is needed, then—by advocates of contingent identity—is an identity statement [α = β] where 'α' and 'β' are both rigid designators. But, Kripke argues, "If '*a*' and '*b*' are rigid designators, it follows that '*a* = *b*', if true, is a necessary truth" (1980, p. 23). *Pace* Langford and Ramachandran (2000, pp. 519-20), we can flesh out Kripke's thinking as follows:

Argument from rigidity

1. 'α' and 'β' are rigid designators .... premise
2. 'α = β' is true .... premise
3. 'α' and 'β' corefer .... from (2)
4. Whatever 'α' and 'β' refer to,they refer to at all worlds .... from (1)
5. 'α' and 'β' corefer at every world ....from (3) and (4)
6. 'α = β' is true at every world .... from (5)
7. 'α = β' is necessarily true .... from (5)

Step 4 does not follow from step 1 if 'α' and 'β' are persistently rigid designators (of contingent exitents—see fn. 7); so, let us take rigidity here to be object-invoking or obstinate rigidity—or, more simply, just take 'α' and 'β' to be names. This argument then takes us from (RNT) to (M=):

(RNT) Names are rigid designators.
(M=) Any true identity statement involving names, [*a* = *b*], is necessarily true.

If we further hypothesize that every possible object has a name or is nameable, it is difficult to see how (M=) could be true without (N=) also being true:

(N=) *Identity* holds necessarily if at all.

That hypothesis (about nameability of possible objects) may well be false, but, if so, it will surely be for reasons—not least the causal inaccessibility of nonactual worlds and merely possible objects—that are irrelevant to the conclusion; so, I think we must grant the move from (M=) to (N=).

How, then, can the argument from rigidity be faulted or circumvented? I shall mention three strategies which emerge from the defences of contingent identity we will be considering (but these are likely to remain obscure until we get to consider them in their context). First (the topic of chapter 2) Gallois (1986; 1998) argues that defenders of contingent identity will want to *relativize truth to worlds* (or *times*); on his approach, which introduces a notion of *restricted rigidity*, it may true *at a world w* that [α = β] holds, and, so, that at w: ′α’ and ‘β’ rigidly designate the same individual(s), and, further, that at w: ‘α’ and ‘β’ corefer at every world. But this does not actually entail that for every world *w*′, at *w*′: ‘α’ and ‘β’ corefer. Chandler (1975) (the subject of chapter 3), on the other hand, argues against (RNT) itself. This is the second strategy. But I contend Chandler’s attack on (RNT) is misdirected; what his objection illustrates, rather, is the coherence of maintaining that a name, or obsitanely rigid designator, of an object *x* may nevertheless non-rigidly designate a possibly distinct object *y* at some world! It thereby blocks the move from step 3 to step 4 of the the argument. This is the third strategy.

As I say, these points should be at least a bit clearer when we come to discuss their background.

1.5.3 The argument from Leibniz’s law

The argument from rigidity for (N=) is what Kripke presses in the original lectures; but in the Preface he downplays its significance and promotes an argument from Leibniz’s law, which basically affirms that identical objects have precisely the same properties:

(LL) $a = b \rightarrow (\varphi(a) \rightarrow \varphi(b))$

Here is Kripke’s gloss:

> Waiving fussy considerations deriving from the fact that *x* need not have necessary existence, it was clear from $(x)\Box(x = x)$ and Leibnitz’s law that identity is an ‘internal’ relation: $(x)(y)(x = y \rightarrow \Box x = y)$ (Kripke 1980, p. 3).

Let us focus on this simple variation:

Argument from (LL)

1. $\alpha = \beta$ .... premise
2. $\Box\alpha = \alpha$ ....trivially truth

3. $\lambda x(\Box\alpha = x)\alpha$ .... from (2)

   i.e. α possess the property [*being necessarily identical with* α]

4. $\lambda x(\Box\alpha = x)\beta$ .... from (3) and (LL)

   i.e. β possess the property [*being necessarily identical with* α]

5. $\Box\alpha = \beta$ .... from (4)

Chandler (1975) does not address this argument—his goal is to refute (RNT) rather than defend contingent identity *per se*. Gallois (1986; 1998), however, does: again, he relies on relativizing truth to worlds and times, and endorses a so relativized version of (LL). So, while it may be true at a world *w* that α and β have precisely the same properties, it does not follow that they do at other worlds. The approach I recommend (in chapter 5) takes (LL) to not apply where modal or temporal properties are concerned: it therefore prohibits the move from step (3) to step (4).

In this chapter I have sought to provide the background to, and an overview of, Kripke's notion of rigid designation, and the attendant case for the necessity of identity. Let us turn now to challenges to Kripke.

CHAPTER 2
GALLOIS VERSUS KRIPKE:
THE PROBLEM OF RESTRICTING RIGIDITY

Preamble

A defender of contingent identity presumably maintains at least the satisfiability of

(C=) $\Diamond\alpha = \beta \wedge \Diamond\alpha \neq \beta$

(Possibly α is β and possibly α is not β)

where 'α' and 'β' are object-invoking desginators, such as names, or, at any rate, obstinately rigid designators. (See §1.5.2 for the reasoning.)

This chapter examines Gallois' (1986; 1998) motivation and defence of contingent identity, first (§2.1) contingent identity across worlds, and then (§2.2) contingent identity over time, or *occasional identity* as he dubs it. Central to his defence is a revised conception of rigidity, what he calls he calls *restricted rigidity* in Gallois (1986) and (*temporal*) *quasi rigidity* in Gallois (1998). He defends the coherence of contingent identity by showing that identity statements between restrictedly (or quasi) rigid designators *can* come out merely contingently true. I will be questioning whether restrictedly (quasi) rigid designators are necessary for, or, indeed, adequate to, that task.

Much of the material here is gleaned from Ramachandran (1992; 1993), Langford and Ramachandran (2000, 2011), and Gallois' responses (1993a; 1993b; 2001; 2011). But objections are developed further and new objections are offered.

I begin with Gallois' (1986) case for contingent identity across worlds, which I shall call *modal contingent identity*.

2.1 Contingent Identity Across Worlds

2.1.1 A Defence of Modal Contingent Identity

Here is Gallois' contingent identity scenario (1986, p. 58). W is a possible world in which a ship named 'Mary', originally made from a collection of planks C, is refurbished by way of gradual plank replacement. The resulting ship is made up of an entirely different collection of planks, C_1. This ship is christened once more—don't ask me why, not my story—with the name ‘Alice’. W_1 is a possible world that contains two ships of the same design as Mary: $Mary_1$, made up from the collection of planks C, and $Alice_1$ made up from the collection of planks C_1. Now, says Gallois:

> There is a consideration in favour of identifying Mary with $Mary_1$. After all, Mary and $Mary_1$ are constituted from exactly the same planks organized in exactly the same way. The same consideration tells in favour of identifying Alice with $Alice_1$. If we make these identifications then ‘Alice’ and ‘Mary’ designate the same ship in W but distinct ships in W_1. That is, ‘Mary is identical with Alice’ is contingently true [in W] ... (Gallois 1986, p. 58).

However, as we saw in §1.5.2, an identity statement may be contingently true *without* this requiring any objects to be contingently identical—namely, when one of the referring expressions involved is a *non-rigid* designator. So, in order for the contingent truth of “Mary is identical with Alice” to be indicative of a contingent identity, ‘Mary’ and ‘Alice’ have to be rigid designators. So, Gallois seeks to defend the coherence of the following claim:

> Mary is contingently identical with Alice [in W], and in the contingently true identity sentence “Mary is identical with Alice”, “Mary” and “Alice” function as rigid designators. (1986, p. 60)

Restricted rigidity

The key is a revised conception of rigidity that Gallois proposes, *restricted rigidity* he calls it, which supposedly:

(a) respects Kripke’s decree that rigid designators *designate the same object in all possible worlds*; and, importantly,

(b) is *extensionally adequate*—i.e. is such that all and only those terms we presently regard as rigid come out as such.

A term is restrictedly rigidity if it meets the following ‘Rigid Designation Condition’ (1980, p. 60):

RDC: (d)(x)(W)(d rigidly designates x in W $\leftrightarrow$

(y)(U)(d designates y in U $\rightarrow$ in W: x = y)).[13]

[13] Where I write ‘*d* designates *y* in W’ Gallois would write ‘*d* (*as used in* W) designates *y* in W’. I shall take this qualification as granted in what follows.

Informally, a term *d* restrictedly rigidly (RR-) designates an object, *x*, in a world, *W*, if and only if whatever object *d* designates in any world *U* is identical with *x* in *W*. This is contrasted with *unrestricted rigidity* (Gallois 1980, p. 63):

URDC: $(d)(x)(W)(d$ rigidly designates x in $W \leftrightarrow$
$(y)(U)(d$ designates y in $U \rightarrow$ (in W: $x = y \wedge$ in U: $x = y)$
(*d* rigidly designates *x* in W if and only if whatever object *d* designates in any world *U* is identical with *x* in *W and in U*.)

Unlike unrestrictedly rigid designators, RR-designators of the same object need not corefer in *every* world. We can, for example, hold that the names 'Mary' and 'Alice' both RR-designate Mary in W, but that in W_1 'Mary' designates $Mary_1$ while 'Alice' designates $Alice_1$. Both names qualify as RR-designators of Mary in *W* because $Mary_1$ and $Alice_1$ are identical with Mary *in W*. Thus, Gallois contends (pp. 62-63), RDC allows us to hold (1)-(5) below *without having to deny* (6):

(1) In W: Mary = Alice
(2) In W: $Mary_1$ = Mary
(3) In W: Alice = $Alice_1$
(4) In W: $Mary_1$ = Alice
(5) In W: $Mary_1$ = $Alice_1$
(6) In W_1: $Mary_1 \neq Alice_1$

Gallois apparently wishes to preserve the idea (EQW) that *identity* is an *equivalence* relation *within worlds*:[14]

(Eq1) $(W)(x)$(in W: $(x$ exists $\rightarrow x = x))$ (Weak-) Reflexivity
Or: $\Box(x)(x$ exists $\rightarrow x = x)$
(Eq2) $(W)(x)(y)$(in W: $(x = y \rightarrow y = x))$ Symmetry
Or: $\Box(x)(y)(x = y \rightarrow y = x)$
(Eq3) $(W)(x)(y)(z)$(in W: $(x = y \wedge y = z) \rightarrow x = z))$ Transitivity
Or: $\Box(x)(y)(z)((x = y \wedge y = z) \rightarrow x = z)$

I agree with Gallois on this score: I don't think we can be said to talking about *identity* if we jettison even the equivalence of identity within worlds. So, I consider the enforcement

[14] I shall count a relation as an equivalence relation even if it is only *weakly reflexive*. And I am using '(*x*)' instead of '$\forall x$' for ease of comparison with original texts.

of (EQW) as an *adequacy requirement* of sorts for any satisfactory account of contingent identity.[15]

Leibniz's Law

Let us turn to Gallois' take on Leibniz's law. Here is a schema representing the law:

(LL) $a = b \rightarrow (\varphi(a) \rightarrow \varphi(b))$

(If *a* is identical with *b*, then whatever is true of *a* is true of *b*.)

But, a defender of contingent identity is entitled to insist on a world-relativized version; Gallois would accept the following:[16]

(LL_W) In W: $(a = b \rightarrow (\varphi(a) \rightarrow \varphi(b)))$

(Or, equivalently: In W: $a = b \rightarrow$ (in W: $\varphi(a) \rightarrow$ in W: $\varphi(b)$))

This says: if *a* is identical with *b* in a world W, then whatever property *a* has in W, *b* also has in W, or, whatever is true of *a* in W is also true of *b* in W. It is instructive to see how Gallois would respond to a candidate counterexample to (LL_W). Suppose in W_1 the planks $Alice_1$ is made from are all yellow, and the planks $Mary_1$ is made from are all red. There is supposedly a case for identifying Alice with $Alice_1$; if we make this identification, then it would seem true of Alice *in W* that she is made of yellow planks in W_1. But, exactly similar considerations lead to the conclusion that it is true of Mary *in W* that she is red in W_1. So, we end up with both (Y) and R):

(Y) In W: in W_1: Alice is yellow.

(R) In W: in W_1: Mary is red.

But now we appear to have a counterexample to (LL_W): apparently different things are true of Mary and Alice *in W*, even though they are identical in W.

This consequence is avoided by way of the following, *prima facie* plausible, *predication principle* that Gallois accepts:

(PP) In W: *a* exists $\rightarrow$ (In W: $\varphi(a) \leftrightarrow$ In W: $(\exists x)(x = a \wedge \varphi(x))$)

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[15] In Chapter 4 we will see that Graeme Forbes's (1982) canonical counterpart theory gives up on the transitivity, and even the reflexivity, of identity within worlds, as both $[\Diamond(x = y \wedge x = z \wedge y \neq z)]$ and $[\Diamond(x \neq x)]$ come out satisfiable.

[16] In some places I take the liberty of attributing principles and arguments to Gallois that he does not *explicitly* provide but which I contend—trust me—follow from his discussion, and which I am confident he would accept.

Informally: If *a* exists in a world, then something is true of *a* in W if and only if it is true of *an* object identical with *a* in W. This principle enables us to derive the conclusion that in W it is true of Mary that she is yellow in W_1:

(1)	In W: Mary = Alice	hypothesis
(Y1)	In W: λ(in W_1: *x* is yellow)*x* is true of Alice	from (Y)[17]
(Y2)	In W: λ(in W_1: *x* is yellow)*x* is true of an object identical with Mary in W	from (1) and (Y1)
(Y3)	In W: λ(in W_1: *x* is yellow)*x* is true of Mary	from (Y2) and (PP)
(Y4)	In W: in W_1: Mary is yellow	from (Y3)

Likewise, we can derive [In W: in W_1: Alice is red]. Thus, (PP) does secure the validity of (LL_W): anything true of Mary in W is true of Alice in W, and vice versa.

However, this line of reasoning does commit Gallois to the following *prima facie* counterintuitive result:

(M) In W: in W_1: $Mary_1 \neq Mary_1$

We have seen Gallois maintains the following:

(1) In W: Mary = Alice
(2) In W: $Mary_1$ = Mary
(3) In W: Alice = $Alice_1$
(6) In W_1: $Mary_1 \neq Alice_1$

Now, it seems one can reason as follows:

(M1)	In W_1: λ(in W_1: $Mary_1 \neq x$)*x* is true of $Alice_1$	from (6)
(M2)	In W: $Alice_1$ = $Mary_1$	from (1)-(3) and (EQW)
(M3)	$Mary_1$ exists in W	(because Mary does and (EQW))
(M4)	In W: λ(in W_1: $Mary_1 \neq x$)*x* is true of something identical with $Mary_1$ in W	from (M1)-(M3)
(M)	In W: in W_1: $Mary_1 \neq Mary_1$	from (M4) and (PP)

Gallois may object that (M) does not in fact come out true on his theory because different tokens of a name must be substituted by the same name when applying (PP). But this

[17] 'λ(in W_1: *x* is yellow)*x*' is to be read as a predicate specifying the property of *being yellow in W_1*.

appears to be a mere technical fix which does not remove the underlying problem. For example, we can use parallel reasoning to derive:

(7) In W: in W_1: Mary ≠ Alice

Given that 'Mary' and 'Alice' are names of one and the same object (in W), (7) would seem to licence the conclusion:

(8) In W: in W_1: Mary is not identical with *itself*.

This does not sit comfortably with the thought that the refelexivity of identity is a conceptual truth, which should hold *necessarily at all worlds*.

We will pursue the issue of contingent self-identity from a different angle in §2.1.3. For now, let me say the following about Gallois' case: I agree that (1)-(6) may be consistently held along with the view that the names 'Mary' and 'Alice' are restrictedly rigid in Gallois' sense. So, *if* this notion of restricted rigidity is viable, as Gallois contends, we must grant that he has demonstrated at least the *coherence* of contingent identity. For, he will have shown that(C=) is satisfiable by way of showing the satisfiability of:

(C=)* In W: $\alpha = \beta \wedge$ In W′: $\alpha \neq \beta$

where 'α' and 'β' are rigid designators.

But, RDC is not viable.

2.1.2 The Problem of Contingent Distinctness

To begin with, as pressed in Ramachandran (1992, pp. 142-43), Gallois' rigid designation condition (RDC) prevents one from expressing the contingent *distinctness* of objects. Suppose Meena and Aruna are qualitatively identical but numerically distinct ships in the actual world, W:

(MA) In W: Meena ≠ Aruna

Meena is made up of a collection of planks D_1 while Aruna is made of a collection of planks D_2, of the same shape and size as those in D_1, and arranged (put together) in precisely the same way. Now, suppose there is a ship, Boris, in another possible world W_2 which is originally made up of the planks in D_1, arranged exactly as they are in Meena in W; Boris's planks are gradually replaced with planks from D_2 until, eventually, *all* the planks are from D_2, arranged in precisely the same way those very planks are arranged in

Aruna in W. There is a case for identifying Meena with Boris, and a case for identifying Aruna with Boris. However, it would go against (EQW) to maintain that these identities hold in the actual world, W, since Meena and Aruna are, by hypothesis, distinct ships in W; we must, rather, maintain:

(M_1) In W_1: Meena = Boris

(A_1) In W_1: Aruna = Boris

Now, given his stance on Mary and Alice, Gallois is surely committed to the following view:

> Meena is distinct from Aruna [in W], *but only contingently*. In the *contingently false* sentence “Meena is identical with Aruna”, “Meena” and “Aruna” function as rigid designators.

The problem is, RDC does not permit this position. Since ‘Meena’ (supposedly) RR-designates Meena in W, whatever it designates in any other world must be identical with Meena in W. Likewise, since ‘Aruna’ (supposedly) RR-designates Aruna W, then whatever it designates in any world must be identical with Aruna in W. But, then, ‘Meena’ and ‘Aruna’ cannot corefer to an object at any world, since that object would have to be identical with *both* Meena and Aruna in W; which is not possible given (EQW) and (MA). We are forced, then, to hold that ‘Meena is identical with Aruna’ is false in *every* world, i.e. *necessarily* false.

Thus, one cannot affirm the contingent distinctness of any objects if RDC is correct. Responding to this objection, Gallois (1993a) proposes the following alternative to RDC:

RDC#: $(d)(x)(W)(d \text{ rigidly designates } x \text{ in } W \leftrightarrow$
$(W')(y)(d \text{ designates } y \text{ in } W' \rightarrow (\exists z)(\text{in } W\text{: } x = z \wedge \text{ in } W'\text{: } z = y))$.

Let’s see how this is supposed to resolve the problem. Consider the following five statements which come out inconsistent going by RDC:

(#1) “Meena” rigidly designates Meena in W.

(#2) “Aruna” rigidly designates Aruna in W.

(#3) “Meena” designates Boris (= Meena) in W_1.

(#4) “Aruna” designates Boris (= Aruna) in W_1.

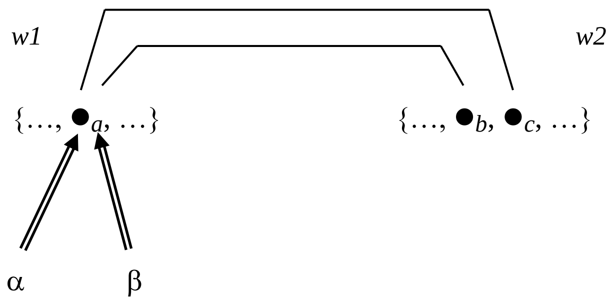
(MA) In W: Meena ≠ Aruna

RDC# presents no obstacle to maintaining that “Meena” and “Aruna” both designate Boris in W_1. For example, for ‘Meena’ to do so, there must be an object which (i) in W is identical with what “Meena” rigidly designates in W, namely Meena, and which (ii) in W_1 is identical with what “Meena” designates there, namely Boris. There is indeed such an object: *Meena*. Hence, (#1)–(#4) are not incompatible with (MA) by RDC#.

So, the problem of affirming contingent distinctness on RDC *is* avoided by settling on RDC# instead.[18] However, the following objections apply irrespective of whether one accepts RDC or RDC#.

2.1.3 Contingent Self-Identity

In our discussion of Leibniz’s law earlier (§2.1.1) we identified a potential problem concening contingent *self*-identity. But there is perhaps a more direct way of showing that Gallois is committed to contingent self-identity. Consider the following diagram illustrating Gallois’ picture of contingent identity:



α and β both rigidly designate *a*

‘α = β’ is contingently true

Figure 2.1 Contingent Self-Identity

Let us suppose ‘α’ and ‘β’ are (non-descriptive) names; *a* is an object in world *w1*, *b* and *c* objects in *w2*; the double-lined arrows (from α and β to *a*) signify the rigid-designation relation, and the lines connecting *a* to *b* and *c* signify ‘identification’. We have two singular terms, α and β rigidly designating one and the same object, *a*, at *w1*, but designating (what are) distinct objects at *w2*, each of which is ‘identified’ with *a*. So, the

[18] The following alternatiive to RDC# may also serve Gallois’ purpose—(indeed, it may turn out to be equivalent to RDC#):

RDC†: $(d)(x)(W)(d$ rigidly designates x in $W \leftrightarrow$
$(W')(y)(d$ designates y in $W' \rightarrow$ (in W: $x{=}y \vee$ in W': $x{=}y$)).

What “Meena” designates in W_2, Boris, is identical with Meena in W_2, so RDC† is not violated.

statement "α is identical with β" comes out contingently true in *w1*. (For Gallois' original example, take *w1* = W, *w2* = W_1, α = 'Mary', β ='Alice', *a* = Mary = Alice, *b* = $Mary_1$, and *c* = $Alice_1$.)

But notice that Figure 2.1 also serves to represent the commitments of anyone who maintains that Hesperus is only contingently identical with Phosphorus: 'Hesperus' and 'Phosphorus' are names of one and the same possible object just as 'Mary' and 'Alice' are. So, it follows from our discussion of the Hesperus–Phosphorus dialectic (§1.5.1), where we concluded that affirming the contingent identity of Hesperus and Phosphorus *is* tantamount to affirming that Venus is contingently identical to itself, that Gallois does indeed sanction contingent self-identity. This is so even if his semantical principles preclude the satisfiability of [In W: Venus ≠ Venus] (see the discussion of Leibniz's law in §2.1.1).

For the record, Gallois (1986, p. 72 ff.) does defend:

(5*) Mary might not have been Mary.

But (5*) is read as affirming that [something identical with Mary, *x*, is such that for some world *W**, in *W**: *x* ≠ Mary]. This is consistent with (EQW), whereas I am pressing the charge that Gallois must allow that at some world Venus is not Venus.

Elsewhere, (Gallois 1993b, pp. 160-61), Gallois does question the truth of [□*a* = *a*]. He distinguishes two readings. On the first reading what is being affirmed is that '*a* = *a*' *necessarily expresses a truth*; this is trivially true given the logical 'stability' convention that different tokens of a name in a sentence or argument are treated as having the same referent. On the second reading, what is affirmed is that "the truth *actually expressed by* '*a* = *a*' *is necessary*" (1993b, p. 161, my emphases). For that to be the case, he continues, the following has to be true:

(G) Anything that is actually referred to by "*a*" is identical with *a* in any world in which *a* exists.

But, "[o]f course, to insist on (G) is to beg the question against an advocate of contingent identities" (1993b, p. 161, '(G)' replaces his '(7)').

So, Gallois commits himself here to the satisfiability of [◊(*a* exists ∧ *a* ≠ *a*)]; the trouble is, this requires there to be a world *W* such that [At *W*: *a* exists and *a* ≠ *a*]; but this is precluded by (EQW), since it amounts to the denial of weak-reflexivity.

It rather looks as if Gallois' approach does not permit a coherent position on contingent self-identity.

2.1.4 The Compatibility Claim

We come now to an inescapable problem for Gallois' approach, identified by Ramachandran (1993), which I think demonstrates the inadequacy of Gallois' brand of restricted rigidity. The root of the problem is the truth of the following *compatibility claim* (Ramachandran 1993, p. 157):

> (CC) A term's RR-designating an object *x* at one world is compatible with it designating an object *y* at another world where *x* exists but is distinct from *y*.

In Gallois' original example, for instance, we have 'Mary' being a RR-designator of Mary in W. But in W, Mary = Alice = $Mary_1$ = $Alice_1$; so, whatever is identical with Mary in W is also identical with $Alice_1$ in W (and *vice versa*). Consequently, 'Mary' comes out a RR-designator of $Alice_1$ in W too. However, according to Gallois, in W_1 'Mary' designates $Mary_1$ *and does not designate* $Alice_1$, even though $Alice_1$ exists there. So, Gallois is obliged to concede (CC), whether he goes for RDC or for RDC#.

(CC) throws up what I shall call *the specificity* problem. It is natural to think of a statement of the form 'α is *F*', where 'α' rigidly designates an object *x*, to be making a claim *about x*—to the effect that *it* is F. ByRDC and by RDC#, 'Mary' RR-designates Mary, Alice, $Mary_1$, *and* $Alice_1$—that is, *each and every one of them*—in *W*. And the same goes for 'Alice'. The question then arises, what does the contingent truth of 'Mary is identical with Alice' in *W signify*? The contingent identity of *Mary* and *Alice*? Of $Mary_1$ and $Alice_1$? Of *Mary* and *Mary* perhaps?

We can put the problem another way. Let *a* and *b* be any contingently identical objects; then, any RR-designator of *a* will be an RR-designator of *b* since *a* is, by hypothesis, actually identical with *b*. How in that case can we express (affirm) the contingent identity of *a* and *b* without at the same time affirming the contingent identity of *a* and *a*, which we may, quite reasonably, want to deny?

Moreover, because RR-designators of an object *x* may fail to designate *x* at worlds where *x* exists, it would seem that the necessary (contingent) truth of a statement of the form 'α is identical with β', where 'α' and 'β' are RR-designators of objects *x* and *y* respectively, no longer requires, or signifies, the necessary (contingent) identity of *x* and *y* specifically.

These are striking limitations of restricted rigidity. Any satisfactory remedy would surely require falsifying (CC), so that e.g. 'Mary' comes out RR-designating Mary but not Alice$_1$ (in W). But this would be to give up on Gallois' version of Leibniz's law, according to which *whatever* is true of Mary in W is true of *anything* identical with Mary in W. Gallois is not prepared to give up something so central to his theory:

> Another response to Ramachandran's argument [... would be to] deny that Leibniz's Law holds within a world. In W1, where *a* is identical with *b*, *a* may have the property of being designated by the RR designator "*a*" without *b* sharing that property. [... But] abandoning Leibniz's Law would by itself provide a solution to the very puzzle cases that motivate a defence of the contingency of identities. If one is prepared to revoke Leibniz's Law the contingency of identities has no work left to do. In this way abandoning Leibniz's Law would undermine the rationale for invoking contingent identities. (Gallois 1993a, p. 152)

Gallois (1993b) concedes that RDC# commits him to (CC) but denies my claim above that the necessary (contingent) truth of 'α is identical with β', where 'α' and 'β' are RR-designators of objects *x* and *y* respectively, does not in fact require the necessary (contingent) identity of *x* and *y*. However, his argument in this connection is just the argument against [$\Box a = a$] we considered at the end of §2.1.3; so I think he has missed the point of the specificity objection altogether. At any rate, he fails to address it.

2.1.5 Loose Ends

Two final issues.

Extensional adequcy

First, on Gallois' claim that his characterization of rigidity is *extensionally adequate*, i.e. that all and only those expressions we presently count as rigid come out rigid by his chracterization. In support of this claim, he points out that what were deemed nonrigid descriptions before still come out nonrigid by his criterion. Consider the description 'the US President in 2010'; this is was considered nonrigid by Kripkeans, and it comes out so by RDC#: it designates Obama in the actual world W and Hillary Clinton at a world W′ where she won the prior election; but there is no individual *z* that is identical with Obama in W and identical with Clinton in W′.

But Gallois' criterion for extensional adequacy is surely too limited. If what we required was that all and only those expressions we presently regard as *rigidly designating a certain object*, *x*, come out as rigidly designating *x*, then RDC# is not extensionally adequate. For example, 'Mary' comes out rigidly designating $Alice_1$ in W, despite the fact that it designates something, but not $Alice_1$, in Wi, even though $Alice_1$ exists there. Thus, 'Mary' neither invariably nor exhaustively designates $Alice_1$; on the conception of rigidity we settled on in Chapter 1 (§1.3), 'Mary' certainly would not be regarded as a rigid designator of $Alice_1$.

Rigidity proper

Finally, I wish to make some remarks on a variant of RDC proposed by Ramachandran (1992, p. 143):

$$\text{RDC*: } (d)(x)(W)(d \text{ rigidly designates } x \text{ in } W \leftrightarrow$$
$$(W')(y)(d \text{ designates } y \text{ in } W' \rightarrow \text{in } W'\text{: } x = y)).$$

RDC required that whatever object *y* a rigid designator of *x* in *W* designates at a world *W′* is identical with *x in W*; RDC* requires instead that *y* is identical with *x in W′.*

RDC* precisely captures what we have been calling *invariant rigidity* (§1.3): rigid designators of an object *x* invariably designate *x*; that is, they designate *x* at every world where they designate anything at all. RDC* thereby avoids the specificity problem; it makes perfect sense, and is unproblematic, to hold that any statement involving (such) a rigid designator of an object *x* is *about x*.

Moreover, as Ramachandran (1992, p. 143) notes, RDC* accommodates contingent distinctness, and, so, contingent identity (see §1.5.1). For example, in our Meena–Aruna scenario (§2.1.2) it allows that'Meena' and 'Aruna' rigidly designate Meena and Aruna, respectively, and that "Meena is distinct from Aruna" is merely contingently true. What it does not accommodate is Gallois' view that 'Mary' and 'Alice' are rigid designators and that "Mary is identical with Alice" is contingently true. I take this to be a welcome result, since, as we have seen (§2.1.3), Gallois' position amounts to an endorsement of (yucky) contingent self-identity.

RDC* allows us to talk of rigid designators *per se,* without having to relativize rigidity to worlds. For, the 'in W' in RDC* does no work whatsoever; RDC* is simply equivalent to:

RDC!: $(d)(x)(d$ rigidlydesignates $x \leftrightarrow$

$(W)(y)(d$ designates y in $W \rightarrow$ in W: $x = y))$

Where RDC* falls short is in not ensuring that rigid designators *exhaustively* designate their referents. Rigidity proper, the notion of rigidity we arrived at at the end of §1.3, can be captured as follows:

(RigP) $(d)(x)(d$ rigidlydesignates $x \leftrightarrow$

$((W)(y)(d$ designates y in $W \rightarrow$ in W: $x = y)) \wedge$

$(\mathrm{W})(x$ exists in $\mathrm{W} \rightarrow d$ designates x in $W))$

(RigP) is the key to defending the conception of contingent identity I favour.

2.2 Occasional Identity

Gallois' (1990) picture of *occasional identity*, to which we now turn, comes with the same sorts of problems. But Gallois is rather more slippery in protecting the termporal analogue of restricted rigidity he advocates, *quasi-rigidity* as he calls it, in the face of the specificty problem. So that will be my central focus here. I shall borrow freely from two papers I have co-written with Simon Langford—Langford and Ramachandran (henceforth, L&R) (2000) and (2011).[19]

2.2.1 Gallois' Defence of Occasional Identity

A candidate example

Gallois' working example of occasional identity (1990, chapter 3) involves amoebic division (fission). We have an amoeba about to undergo division at time T_1, call it AMOEBA; at a later time T_2 one member of the resulting pair is living in a pond, call it POND, while the other, SLIDE, is being examined on a slide under a microscope. Gallois wishes to maintain that POND and SLIDE, obviously distinct at T_2, are identical at T_1:

(1) At T1: SLIDE = POND

(2) At T2: SLIDE ≠ POND

(1) is underpinned by the following line of thought:

[19] I hereby acknowledge Simon Langford's priceless contribution to this thesis and thank him!

(3) At T1: SLIDE = AMOEBA

(4) At T1: AMOEBA = POND

(5) So, at T1: SLIDE = POND

(5) follows from (3) and (4) given the temporal analogue of Gallois' view, noted in §2.1, that identity is an equivalence relation within worlds; in fact, all we need is the *transitivity* of identity with respect to all times (Gallois 1998, p. 70):

TransiT: $(x)(y)(z)(t)[(\text{at } t\text{: } x = y \wedge \text{at } t\text{: } y = z) \rightarrow \text{at } t\text{: } x = z)$

The truth of (1) and (2) is meant to be indicative of *occasional identity*: POND and SLIDE are occasionally (or temporarily) identical at T_1. But, as we have noted (§1.5.2 and §2.1.1), for the truth of (1) and (2) to signify contingent identity—and occasional identity evidently *is* an instance of contingent identity—the names therein must be rigid (in this case, *temporally rigid*) designators.

Introducing Quasi rigidity

The trouble is, Gallois maintains, temporal rigidity à la Kripke (henceforth, *K-rigidity*) rules this out. This is how Gallois characterises K-rigidity:

> A designator is temporally rigid [K-rigid] only if anything it designates at any time is always identical with anything it designates at any other time (Gallois 1998, p. 73).

(1), together with the fact that 'SLIDE' designates SLIDE at T_1, entails that 'SLIDE' also designates POND at T_1. Now, if 'SLIDE' were K-rigid, this would require that 'SLIDE' designates POND at T_2 as well. But this is clearly false.

So, in order to maintain that (1) and (2) jointly entail the occasional identity of certain objects, Gallois (1990, p. 73) introduces the notion of a temporal *quasi rigid designator*:

(QRig) *d* is a (temporally) quasi-rigid designator only if it satisfies the following condition (N): if *d* designates *x* (at some time) and *y* (at some time), then *x* is sometime identical with *y*.
$[d \text{ is quasi-rigid} \rightarrow (\forall t_1)(\forall t_2)\ (d \text{ designates } x \text{ at } t_1 \wedge d \text{ designates } y \text{ at } t_2) \rightarrow (\exists t)(\text{at } t\text{: } x = y))]$

According to him, one may consistently hold (1) and (2) along with the view that the names 'SLIDE' and 'POND' are quasi-rigid. For example, the quasi-rigidity of the name 'SLIDE' is not jeopardized by the fact that 'SLIDE' designates POND at T_1 and designates

SLIDE, *but not* POND, at T_2; for, all that is required by (QRig) is that POND and SLIDE are identical at *some* time—and this is secured by (1).

However, as L&R (2000, p. 522) argue, (QRig) only provides a *necessary* condition for quasi-rigidity (N), and Gallois (1998) nowhere provides a *sufficient* condition. So, for all he has said, a term d may satisfy (N) yet still fail to be quasi-rigid. Hence, Gallois has yet to establish that (1) and (2) are consistent with the quasi-rigidity of the names therein.

Gallois evidently disagrees with the last claim:

> If "POND" and "SLIDE" satisfying that necessary condition ensures that the conjunction of (1) and (2) entails an occasional identity, there is no need to add to it to produce a necessary and sufficient condition for quasi-rigidity. (Gallois 2011, p. 191).

I have a two-prong response. The first point I should like to make is I have no quarrel with the following view:

(Con) (1) and (2) are consistent with the view that the names therein satisfy condition (N).

But, given that (N) may not be sufficient for quasi-rigidity, (Con) does not entail that (1) and (2) are consistent with the quasi-rigidity of the names. So, I repeat, *that* consistency claim has yet to be established.

My second point is that it also remains to be established whether (N) even ensures that the conjunction of (1) and (2) entails an occasional identity. Gallois and I are agreed that the truth of (1) and (2) signifies contingent (or occasional) identity only if the names involved are rigid designators, albeit not rigid by Kripke's lights. That, after all, is why Gallois bothers to introduce the notion of quasi-rigidity. So, since the satisfaction of (N) does not guarantee quasi-rigidity, its being satisfied by the names in (1) and (2) does not guarantee that their conjunction entails an occasional identity.

So, *contra* Gallois, I think he *does* need to provide necessary and sufficient conditions for quasi-rigidity in order to defend the existence of occasional identities.

Finally, there is (to my mind) a straightforward counterexample to (QRig) from L&R (2011). Here is the scenario:

> Gallois allows that occasional identity may obtain by way of *fusion* as well as *fission*. In that case, he should allow the following elaboration of his original example. SLIDE and POND are the results of fission—

> AMOEBA's *dividing*; suppose POND "fuses" at a later time with another amoeba, from a marsh say (call it MARSH), yielding a *single* amoeba, POSH. (L&R 2011, p. 180)[20]

The figure below depicts the situation.

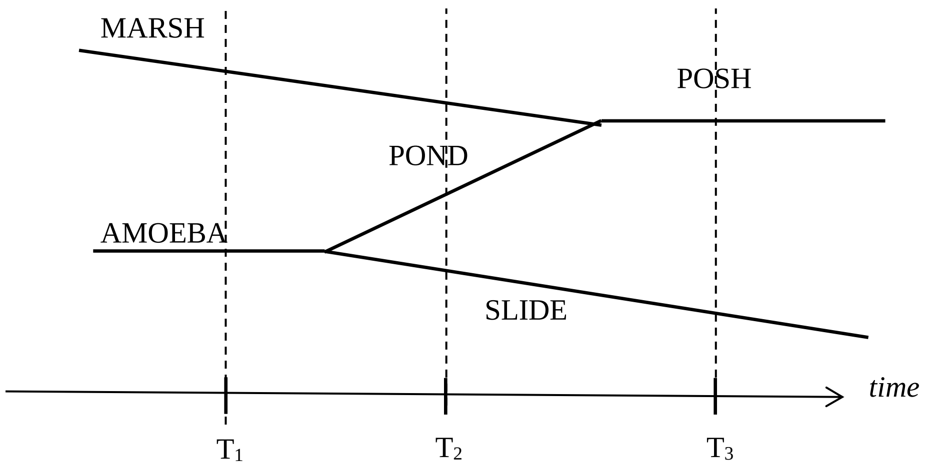


Figure 2.2

Now, here are statements about designation which I think Gallois is compelled accept:

(i) 'POND' is a quasi-rigid designator.

(ii) 'POND' designates SLIDE at T_1.
(because at T_1: POND = AMOEBA = SLIDE)

(iii) 'POND' designates MARSH at T_3.
(because at T_3: POND = POSH = MARSH)

By (QRig), it follows from (i)-(iii) that:

(iv) SLIDE and MARSH are identical at some time.
(∃*t*)(At *t*: SLIDE = MARSH)

But, as is evident from Figure 2.2:

(v) SLIDE and MARSH are *never* identical.

It is difficult to see how any of (i)-(iii) can be questioned given Gallois' narrative. So, we do appear to have a *reductio* of (QRig) here.[21]

[20] Let's not let our biological knowledge of amoebas get in the way of a neat example!

Gallois (2011) does have a response to this counterexample, one which appeals to a time-relativized notion of quasi-rigidity and a time-relativized reading of (iv). We will consider that response after considering some other characterizations of quasi rigidity he might resort to.

2.2.2 On Quasi-Rigidly Designating *x*

So, what is it for a term *d* to be a Q-rigid designator of an object *x*? This section runs through points made in L&R (2000; 2011) and offers rejoinders to Gallois' (2001; 2011) responses. I consider these characterizations—some of which, you will see, are total non-starters—so as to block all escape routes but one, what I consider Gallois' 'best hope'. In §2.2.3 I argue that even this does not serve Gallois' purpose, and that he ultimatey relies on the unacknowledged assumption that names are invariant designators.

Characterization #1

Here is an obvious extrapolation from (QRig) (considered in L&R 2000, p. 522 ff.):

(QR1) A term d quasi-rigidly (Q-rigidly) designates x if, and only if, d designates y at some time only if x is at some time identical with y.
[(d)(x)(d quasi-rigidly designates x ↔
(y)(t1)(d designates y at t1 → (∃t)(at t: x = y))]

But, this givs rise to the specificity problem we noted in §2.1.4. For example, by (QR1), the name 'POND' comes out quasi-rigidly designating not just POND, but also AMOEBA and SLIDE. It Q-rigidly designates SLIDE, for instance, because whatever it designates at any time, e.g. POND and AMOEBA, is indeed identical with SLIDE at some time; for, at T_1, POND = SLIDE = AMOEBA.

And, as before, there is the attendant problem of what statements involving rigid designators, in particular, names, are *about*. One would think that a sentence is about the objects rigidly designated by the terms therein. Since both 'POND' and 'SLIDE' Q-rigidly designate POND, SLIDE, and AMOEBA, the truth of (1) and (2) cannot be taken to simply indicate the occasional identity of POND and SLIDE. Their truth presumably also indicates the occasional identity of POND and AMOEBA, and of POND and POND itself! Relatedly, we surely want to affirm that POND and SLIDE are *distinct* at T_2; but the statement "POND is

[21] L&R (2011, pp. 180-81) also present this example as a counterexample to a different characterization of quasi-rigidity, (Q3)—to be considered shortly.

distinct from SLIDE at T_2" now comes out also affirming that POND is distinct from itself at that time.

In responding to this sort of complaint, Gallois (2011) writes:

> One does not need a way of affirming the occasional identity of POND and SLIDE without affirming the occasional identity of AMOEBA and SLIDE. Moreover, if one needs a way to affirm the occasional identity of POND and SLIDE without affirming the occasional identity of POND with POND, there is such a way. (p. 193)

The thinking behind the first claim, as far as I can make out, is that such expressive power is not required for the limited project of defending his thesis that there are occasional identities.[22] As I argued in the previous section, however, without a palusible sufficient (and possibly also necessary) condition for quasi-rigidity, the thesis stands unfounded.

The second claim, that there is way of affirming the occasional identity of POND and SLIDE without at the same time affirming the occasional identity POND with POND rests on Gallois' enforcement of an 'identity convention' he proposes elsewhere (Gallois 2005).[23] The convention stipulates that repeated tokens of a name in a linguistic context must have the same reference. This convention ensures that

(3) At T_2: POND ≠ POND

cannot come out true. But this merely rules out *one way of affirming* the occasional identity of POND with itself. My initial objection was that (2) itself affirms the occasional identity of POND with itself, given that what a sentence is *about* are the objects quasi-rigidly designated by its terms. If so, Gallois does not avoid occasional self-identity merely by prohibiting the likes of (3).[24]

Demonstratives raise fresh worries (L&R 2011, p. 178, counterintuitive result #4). Suppose the scientist examining SLIDE at T_2 exclaims:

(4) This amoeba is about to divide!

[22] I take it that Gallois cannot possibly mean that a language with such limitations on what it can express is adequate *tout court*.
[23] We have come across this convention before (§2.1.3, p. 28).
[24] We saw in §2.1.3 that Gallois' stance on contingent self identity wavers, and probably leads to incoherence.

Clearly, that token of ‘this amoeba’, D, designates SLIDE at T_2. Equally clearly, D does *not* designate POND at T_2. Now, ask yourself, does D designate anything at T_1? If we allow that a name tokened at one time can designate objects at other times, then it seems reasonable to allow that D does designate SLIDE at T_1. But it then thereby also designates POND and AMOEBA at T_2 too. This gives rise to a highly counterintuitive result: that D quasi-rigidly designates POND. For, all that is required by (QR1) for D to Q-rigidly designate POND is that it is identical *at some time* with whatever it designates at any time; presumably, at T_1 it is identical with any such object.

So, we arrive at the view that when the scientist utters (4) to affirm that SLIDE is interesting, she is at the same time also affirming that POND, a distinct amoeba she is entirely unaware of, is interesting! Moreover, when she uttered (4), she was Q-rigidly designating POND even though she was not designating POND!

Gallois (2011) makes the following response to this objection:

> At t_2, the person viewing SLIDE uses “This” to Q-rigidly designate it. It follows that anything that person uses, the same (token) demonstrative to Q-rigidly designate at t_2 will be identical with SLIDE. It does not follow that anything that is identical with SLIDE at some time is designated, let alone Q-rigidly designated, by “This” at t_2. So, it does not follow from POND being, at some time, identical with SLIDE that “SLIDE” designates POND. Hence, the person looking through the microscope need not be using “This” to designate something she is not aware of. (Gallois 2011, p. 196; I have added quotation marks around the token of ‘this’ in the final sentence)

Clearly, Gallois takes L&R’s objection to be directly targeting his own—I would add, vague and crucially-incomplete—position; but the objection is merely targeting (QR1) as it stands. The quoted passage suggests that Gallois, not unreasonably, takes it to be a necessary condition for a term d to Q-rigidly designate an object x at a time t that d designate x a t. I entirely agree. But this is not an explicit requirement in (QR1). So, I contend the objection holds good as far as (QR1) is concerned.

Characterizations #2 (see L&R 2011, p. 178)

Gallois (2001) puts forward the following alternative to (QR1) which relativizes quasi-rigidity to times:

$$\text{(QR2)}\quad (x)(y)(d)(t)(d \text{ quasi-rigidly designates } x \text{ at time } t \leftrightarrow (d \text{ designates } y \rightarrow (\exists t')(\text{at } t'\!: x = y)))$$

[*d* Q-rigidly designates *x* at time *t* iff if *d* designates *y*, then *x* and *y* are identical at some time]

But (QR2) cannot be correct since it allows that *d* designates *y simpliciter*. Presumably, simple designation must be relativized to times too. Here is one possible way:

(QR2a) $(x)(y)(d)(t)(d$ quasi-rigidly designates x at time $t \leftrightarrow$
$(d$ designates y at $t \rightarrow (\exists t')(\text{at } t'\text{: } x = y)))$

[*d* Q-rigidly designates *x* at time *t* iff if *d* designates *y* at *t*, then *x* and *y* are identical at some time]

(QR2a) has the unwelcome consequence of counting descriptions which even Gallois would count as non-rigid, such as 'the US President', as quasi-rigid at various times. For example, that description comes out Q-rigidly designating Barack Obama at 2010. The reason is that it designates one, and only one, individual in 2010—namely, Obama; so this is the only candidate for 'y'; and it is trivially true that y (i.e. Obama) is identical Obama at some time! Likewise, the same description, 'the US President', comes out Q-rigidly designating Donald Trump at June 2017.

Clearly, (QR2a) falls spectacularly foul of Gallois' own requirement that any characterization of rigidity must be extensionally adequate.—i.e. accord with our present verdicts on which terms are rigid (non-rigid).

Here is a second way that one might relativize the token of '*d* designates *y*' in (QR2) (L&R 2011, p. 179):

(QR2b) $(x)(y)(d)(t)(d$ quasi-rigidly designates x at time $t \leftrightarrow$
$((\exists t_1)(\text{at } t_1\text{: } d \text{ designates } y) \rightarrow (\exists t_2)(\text{at } t_2\text{: } x = y)))$

[*d* Q-rigidly designates *x* at time *t* iff if *d* designates *y* at some time, then *x* and *y* are identical at some time]

But, the right hand side of the bi-conditional here is precisely the same as the right-hand side of the bi-conditional in (QR1); so, it gives rise to the same sorts of counterintuitive results. 'POND' comes out Q-rigidly designating POND, SLIDE and AMOEBA both at time T_1 and at time T_2, and so too does the token of the demonstrative 'This amoeba' in (4).

Characterizations #3 (see L&R 2011, pp. 179-80)

The idea here is to ensure that a term cannot Q-rigidly designate an object at a time without designating it at that time by stipulation:

(QR3) $(x)(y)(d)(t)(d$ quasi-rigidly designates x at time $t \leftrightarrow$

$(\boldsymbol{d}$ **designates** $\boldsymbol{x}$ **at** $\boldsymbol{t} \wedge ((\exists t_1)(\text{at } t_1\text{: } d \text{ designates } y) \rightarrow (\exists t_2)(\text{at } t_2\text{: } x = y))))$

[*d* Q-rigidly designates *x* at time *t* iff (*d* designates *x* at $t \wedge$ (if *d* designates *y* at some time, then *x* and *y* are identical at some time))]

On this characterization, 'POND', 'SLIDE' and 'AMOEBA' still come out Q-rigidly designating each other at time T_1, but this is what Gallois wants, since these amoebae are identical with each other at that time. Importantly, 'SLIDE' and 'POND' come out Q-rigidly designating just SLIDE and POND, respectively, at T_2, thanks to the designation requirement. Likewise, the previously problematic token of the demonstrative 'this amoeba' no longer comes out Q-rigidly designating POND.

Unfortunately, the Figure 2.2 scenario (p. 33), which served as counterexample to (QRig), is a counterexample to (QR3) too. As we have noted, 'POND' remains a Q-rigid designator of SLIDE at T_1; in the Figure 2.2 scenario 'POND' designates MARSH at T_3; (QR3) then dictates that SLIDE and MARSH are identical at some time, which is manifestly false.

Gallois (2011) escapes this objection by giving a time-relativized reading of the sentence 'SLIDE and MARSH are identical at some time'—he relativizes it to to time T_1:

(SM1) At T_1: SLIDE and MARSH are identical at some time.[25]

This response does not save (QRig) or (QR3) taken strictly as stated—something Gallois does not explicitly acknowledge—but it points to a characterization of quasi-rigidity that squares well with his most recent statement on occasional identity (Gallois 2011). Before we consider that, however, while we are in the vicinity, I should like to point out what is wrong with the following variation on (QR3):

(QR3#) $(x)(y)(d)(t)(d$ quasi-rigidly designates x at time $t \leftrightarrow (\boldsymbol{d}$ **designates** $\boldsymbol{x}$ **at** $\boldsymbol{t}$

$\wedge ((\exists t_1)(\text{at } t_1\text{: } d \text{ designates } y) \rightarrow$ **at** $\boldsymbol{t}$: $x = y)))$

(*d* Q-rigidly designates *x* at time *t* iff (*d* designates *x* at $t \wedge$ (if *d* designates *y* at some time, then **at *t*:** *x* and *y* are identical)).

[25] Here is a simple route to (SM1):

At T_1: at T_3: POND = MARSH

At T_1: POND = SLIDE

So, at T_1: at T_3: SLIDE = MARSH

Hence, at T_1: SLIDE and MARSH are identical at some time.

This is the temporal twin of Gallois' 'modal' rigidity condition (RDC) (on p. 19), and it gives rise to an analogous problem: namely, it prevents one from expressing the occasional distinctness of SLIDE and POND *at* T_2. For, by (QR3#), if the names 'SLIDE' and 'POND' are Q-rigid, then anything they co-designate at a world (e.g. AMOEBA), must be identical with both SLIDE and POND at T_2; but this would violate the equivalence of identity at times. (See §3.1.2 for a discussion of the problem for RDC.)

Gallois' best hope

Here, finally, is the characterization of quasi-rigidity that I think best fits his stated views:

(QR3*) $(x)(y)(d)(t)(d$ quasi-rigidly designates x at time $t \leftrightarrow$ (***d* designates *x* at *t***
$\wedge$ $((\exists t_1)$(at t_1: d designates y) $\rightarrow$ **at *t***: $(\exists t_2)$(at t_2: $x = y$))))
[*d* Q-rigidly designates *x* at time *t* iff (*d* designates *x* at *t* $\wedge$ (if *d* designates *y* at some time, then **at *t*:** *x* and *y* are identical at some time))]

The question I should like to pursue now is: what does Q-rigidity *so understood* buy him? I'll be arguing, *not much*!

2.2.3 On Entailing Occasional Identity

At first sight, Q-rigidity appears to ensure that the following triad of statements do jointly entail that there are occasional identities:

TRIAD A

(1) At T_1: SLIDE = POND

(2) At T_2: SLIDE ≠ POND

(Q^{SP}) 'SLIDE' and 'POND' Q-rigidly designate SLIDE and POND, respectively, at T_1 and at T_2.[26]

Moreover—an apparent advance over Gallois' original position—Triad A actually entails that SLIDE and POND themselves are occasionally identical at T_1; so, the specificity problem is avoided.

But wait—it is not Q-rigidity which secures these results! Just consider Triad B, the result of replacing (Q^{SP}) with (D^{SP}) below:

[26] (Q^{SP}) takes into account Gallois' shift to a time-relativized notion of Q-rigidity.

(D^{SP}) ‘SLIDE’ and ‘POND’ designate SLIDE and POND, respectively, at T_1 and at T_2.

Triad B, comprising (1), (2) and (D^{SP}), also entails that SLIDE and POND are occasionally identical at T_1. Hence, Q-rigidity is superfluous to the derivation of the desired consequences.

The critical Triad to examine is this:

TRIAD C

(1) At T_1: SLIDE = POND

(2) At T_2: SLIDE ≠ POND

(Q^{SP}) ‘SLIDE’ and ‘POND’ are Q-rigid designators at T_1 and at T_2 (Or: ‘SLIDE’ and ‘POND’ are functioning as Q-rigid designators in (1) and (2)).

Does Triad C entail that there are occasional identities? My view is that it does—but only because names, as they are used in ordinary language, and as Gallois and I have used them, have a special feature *going beyond* mere Q-rigidity which guarantees that the entailment holds. Mere Q-rigidity, I contend, is not enough.

Consider the following form of Triad, where ‘α’ and ‘β’ are singular terms:

TRIAD D

(αβ1) At T_m: $\alpha = \beta$

(αβ2) At T_n: $\alpha \neq \beta$

($Q^{\alpha\beta}$) ‘α’ and ‘β’ are Q-rigid at T_m and at T_n. (Or: ‘α’ and ‘β’ function as Q-rigid designators in (αβ1) and {αβ2)).

Now, what would it be for such a Triad to entail the existence of occasional identities? Here is a plausible answer which Gallois should have no quarrel with:

Occasional Identity Entailment (O=E)

A Triad of the form of Triad D entails that there are occasional identities if, and only if, it entails that there are objects *x* and *y* such

> that at some time *x* is identical with *y*, and at some time *x* is distinct from *y*.[27]

I am going to present an example of a Triad which, given (O=E), does *not* entail contingent identities.

Consider the following variation of the Figure 2.2 scenario (on p. 33).

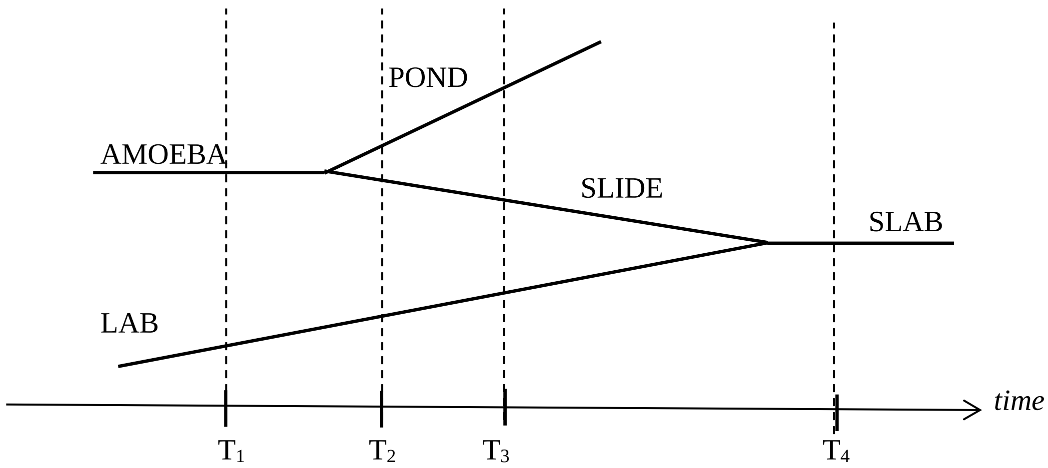


Figure 2.3

T_1 is prior to AMOEBA's fission; T_2 and T_3 are post fission of AMOEBA, but prior to the fusion of SLIDE and LAB, an amoeba created in laboratory which later fuses with SLIDE to produce a single amoeba, SLAB. Now, here are important further facts (which are not reflected in the diagram):

- At T_2, our scientist, Sally, is examining SLIDE under a microscope in a laboratory, L.
- At time T_3, Sally is examining POND with special equipment—let's not get into details—at POND's own habitat, the pond.
- At time T_3, LAB is being examined in laboratory L by a different scientist—Harry, if you must know.
- At time T_4, SLIDE = LAB = SLAB
- No other amoebas are examined at any time by Sally or in lab L.

[27] As Gallois says, "In order for the conjunction of (1) and (2) to state an occasional identity that conjunction should imply: (OIT) $(\exists x)(\exists y)(\exists t)(\exists t')[\text{at } t: x = y \wedge \text{at } t': x \neq y]$" (2011, p. 189).

The definite description λ = '**The amoeba being examined by Sally**' designates SLIDE at T_2 and POND at T_3, and nothing else (i.e. other than SLIDE and POND) at any time. So, since at T_2 SLIDE is identical with POND at some time (e.g. at T_1), we get:

(QET_2) λ is a Q-rigid designator at T_2.

The definite description μ = '**The amoeba being examined in laboratory L**' designates SLIDE at T_2 and LAB at T_3, and nothing else at any time. So, since at T_2 SLIDE is identical with LAB at some time (e.g. at T_4), we get:

(QLT_2) μ is a Q-rigid designator at T_2.

Here, then, is a Triad of the same form as Triad D which does not entail that there are occasional identities:

TRIAD E

($\lambda\mu$1) At T_2: $\lambda = \mu$

($\lambda\mu$2) At T_3: $\lambda \neq \mu$

($Q^{\lambda\mu}$) λ and μ are Q-rigid designators at T_2 and T_3 (Or: λ and μ are functioning as Q-rigid designators in ($\lambda\mu$1) and ($\lambda\mu$2))[28]

The fact is, what λ and μ designate at T_2—namely, only SLIDE—neither designates at T_3. So there are no *x* and *y* which are affirmed to be identical at one time but distinct at another, even though λ and μ are functioning as Q-rigid designators at the relevant times.

Hence my earlier claim that it is not merely the Q-rigidity of the names 'SLIDE' and 'POND' which is responsible for Triad A entailing contingent identities. I also claimed that the entailment went through because of an additional feature of names as they are generally used; that feature, taking 'SLIDE' as our exemplar, is this:

(DQ_S) If 'SLIDE' designates an object *x* at a time *t*, it is *because* *x* is identical with SLIDE at time *t*.[29]

[28] It should be clear from the context whether the descriptions λ and μ are being *used* or being *mentioned*.

[29] For example, Gallois says: "Because SLIDE is identical with POND at T_1, at that time 'SLIDE' quasi-rigidly designates POND" (2011, p. 197). Delete 'quasi-rigidly' and you have an instance of (DQ_S).

(I use 'DQ' to highlight the disquotation here: the name 'SLIDE' is mentioned in the antecedent but used in the consequent.) So, e.g. Gallois holds that 'SLIDE' designates POND at T_1 precisely because POND is identical with SLIDE at that time.

The 'because' in (DQ_S) is emphasized to signal that *it is in virtue of* the truth of the sentence which follows it that the antecedent holds; thus, it is a *sufficient* condition for 'SLIDE' designating *x* at time *t* that *x* is identical with SLIDE then. So far as I can see, Gallois would accept that sufficiency condition, in which case we are agreed on the following general principle (where '$\underline{\alpha}$' stands for the object named 'α'):

(DQ) A name α designates an object *x* at time *t* iff at *t*: $x = \underline{\alpha}$.

This is an important result, for (DQ) entails that names comply with both of the following Kripkean requirements for temporal rigidity:

(KR1) If *d* temporally rigidly designates *x*, then *d* designates *x* whenever *d* designates anything at all. (For, by (DQ), whatever a name of *x* designates at a time is identical with *x* at that time.)

(KR2) If *d* temporally rigidly designates *x*, then *d* designates *x* whenever *x* exists. (For, $x = x$ when, and only when, *x* exists; so a name of *x* will designate *x* whenever it exists.)

These are simply temporal versions of the *invariant* and *exhaustive* designation requirements, respectively, mentioned in Chapter 1, §1.3, and captured by (RigP) (p. 30).

This strikes me as sufficient for claiming that names are temporally rigid proper. Kripkeans may dispute this, but there is no need to settle that matter for now. Let us call terms which comply with (KR1) and (KR2) *timely* (*T*-) *rigid designators*. Thus, 'SLIDE' is a timely rigid designator because there is an object it T-rigidly designates, namely, SLIDE: it designates SLIDE whenever it designates anything, and whenever SLIDE exists. But this is compatible with it designating something at some time—e.g. POND—that it does not T-rigidly designate. Likewise, 'POND' T-rigidly designates POND, even though it designates something at some time, e.g, SLIDE, that it does not T-rigidly designate. We have here exemplifications of what I call the *mixed-designation phenomenon*, which is the subject of Chapter 3. By contrast, our definite descriptions λ and μ are not T-rigid designators: e.g. there is no object *x* which λ (μ) designates whenever it designates anything at all.

So, the T-rigidity of names is something Gallois should concede, given his own use of names. And it buys him what he wants: (1) and (2) jointly entail there are occasional identities; indeed, it buys him specificity too: (1) and (2) jointly entail that SLIDE and POND themselves are occasionally identical at T_1—not merely at some time or other.[30] There is no problem about specificity.

I close the chapter by pointing out a significant difference between Gallois' (1986) candidate example of contingent identity across worlds (discussed in §3.1) and his (1998) candidate example of occasional identity which we are presently considering.

2.2.4 Occasional Identity via Occasional Distinctness

'Mary' and 'Alice' were, by hypotheses, names introduced in *W* for one and the same ship, albeit at different times. Thus, the names were rigid designators of one and the same ship. Because of this, to affirm the contingent identity of Mary and Alice in *W* is to affirm the contingent self-identity of Mary (Alice). This is simply incoherent—so say I, and, I guess, all Kripkeans. This was the thrust of Kripke's Hesperus–Phosphorus dialectic (Chapter 1, §1.5.1) and §2.1.3.

The names 'SLIDE' and 'POND', however, were introduced post AMOEBA's fission as names of *distinct* amoebae; as we have noted, they T-rigidly designate different objects. Consequently, when we affirm (1) and (2) we are affirming of what are two objects at T_2 that *they* are one object at T_1. The situation is just like the Meena–Aruna example of modal contingent distinctness (in §2.1.2). This is not occasional self-identity. This is the identity one must affirm when one affirms the occasional distinctness of objects. We have here occasional identity *by virtue of* occasional distinctness. This is not obviously incoherent—certainly, not as obvious as maintaining that an object may be distinct from itself at sometime. So say I, and I do not think Kripkeans are obliged to disagree (as will be made clearer in Chapter 3).

This is not to say we have avoided committment to occasional self-identity *tout court*, because we have yet to pronounce on AMOEBA and its status post-fission. The status of

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[30] Clearly, I am arguing for a more robust notion of rigidity than the temporally-relativized one Gallois (2011) comes close to conceding:

> If all this is right, there is no need for the OIT theorist [i.e. defender of occasional identity] to invoke Quasi-rigidity. The OIT theorist can allow that the names "POND" and "SLIDE" are rigid so long as we are careful about the time when they are rigid (Gallois 2011, p. 196, bracketed comment mine).

the pre-fission individuals post-fission is a thorny problem for defenders of occasional-identity. But I think we can move the discussion of contingent identity forward without resolving that issue immediately.

CHAPTER 3
CHANDLER VERSUS KRIPKE:
NAMES AND MIXED-DESIGNATION

Preamble

Here are three key theses from Kripke (1980) that we noted in Chapter 1:

(RNT) Proper names are rigid designators.

(M=) Identity statements involving proper names are necessarily true if true at all—this is a metalinguistic version of the necessity of identity thesis, (N=) below.

(N=) Identity holds necessarily if at all.

Kripke takes (RNT) to entail (M=), and this in turn to support, if not entail, (N=). Chandler (1975) presents a challenge to all three theses by way of a supposed counterexample to (RNT). But initial discussants of Chandler's paper, e.g. Cook (1979), King (1978), and Nute 1978), have pointed out a questionable assumption in Chandler's reasoning, and—presumably as a result—Chandler's challenge to (RNT) is barely mentioned let alone discussed by contemporary Kripkeans.

In this chapter I will rehearse Chandler's case—which, as we'll see, involves a form of contingent identity—and argue that a variation on his putative counterexample to (RNT) circumvents the common objection and serves to make Chandler's point just as well. What has not been fully appreciated is that while his case is ostensibly against (RNT), it actually threatens the view that there are *any* rigid designators!

However, I think Chandler is mistaken in thinking that the said example threatens (RNT). Rather, what I shall argue is that it reveals how one may endorse (RNT) while denying (M=) and (N=)! I shall do this by way of defending a modified version of the following—*prima facie* surprising—view of Chandler's, which I shall call the *mixed designation view*:

(MDV) A term may rigidly designate one object *x*, while *non*-rigidly designating another, possibly-distinct object, *y*.

I will argue that (MDV) actually squares with the conception of rigid designators we settled on in Chapter 1—as terms which *invariantly* and *exhaustively* designate something (see §1.3, pp. 7-10). So, while not *refuting* theses (M=) and (N=), what Chandler's challenge to Kripke shows, I contend, is that a defender of (RNT) is not *compelled* to accept them.

Finally, in attempting to make sense of (MDV), render it coherent as it were, I shall introduce the fundamental idea behind counterpart theory as I see it. So, this chapter can also be seen as a convoluted lead-up to our more formal treatment of contingent identity in counterpart theory, the subject of Chapters 4 and 5.

3.1 Chandler's case against (RNT)

Let's kick off, then, with Chandler's alleged counterexample to (RNT), which plays on the famous *ship of Theseus* puzzle discussed in Hobbes (1655). Consider the following two worlds:

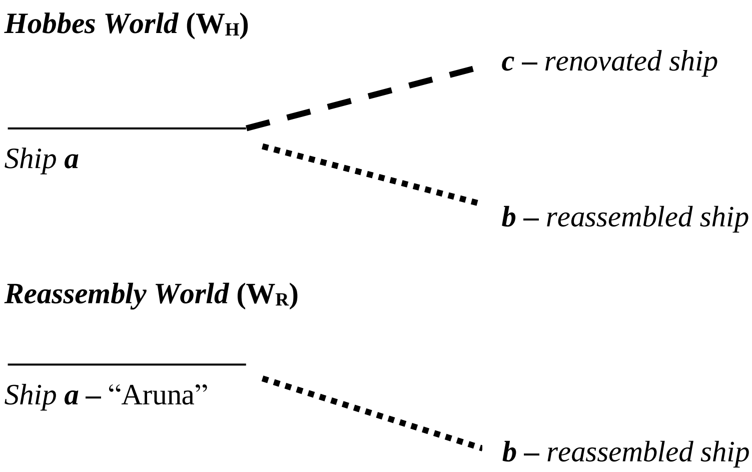

Figure 3.1

The Hobbes world (W_H) is a world where the planks of a ship, *a*, are removed one by one and replaced over a period of time, so that eventually we end up with a ship *c* (*the renovated ship*) made up of an entirely different collection of planks. But *a*'s original planks—which were stored in a warehouse as they were removed—are also reassembled, resulting in a ship *b* (*the reassembled ship*). The Reassembly world (W_R) is a world where ship *a* is merely dis-assembled and re-assembled. Let us suppose that ship *a* was christened "Aruna" in W_R.

Philosophers allow that gradual plank replacement *can* preserve identity, and that disassembly and reassembly also *can*. When both processes take place, as in the Hobbes world, many philosophers take the original ship to be identical with the renovated ship, the ship arising from gradual plank replacement, rather than the reassembled ship. This is the line that Chandler takes. But in that case, ‘Aruna’ is a name that designates ship *b* in world W_R, but which designates ship *c*, *and not ship b*, in world W_H. Hence, Chandler concludes, ‘Aruna’ is a proper name which is *not* a rigid designator—(RNT) is not generally true.

There is a parallel case for contingent identity—and, therefore, against Kripke’s necessity of identity thesis (N=)—in the background; since what Chandler appears to be maintaining is that *b* is identical with Aruna in the Reassembly world, W_R, but distinct from her in Hobbes world, W_H.

Obviously, Kripkeans will not accept this reading of the situation. They have a simple response, which is the common response from the early discussants I mentioned earlier—e.g. Cook (1979), King (1978), and Nute 1978): that to refer to the reassembled ships in the two scenarios as ‘*b*’ is *question-begging*; Chandler, they charge, has simply (and unnecessarily) assumed that the reassembled ships in the two worlds are one and the same ship. They (Kripkeans), on the other hand, take the phrase ‘the reassembled ship’ to be *nonrigid*: it designates a ship *b* (= *a*) in W_R but a *distinct ship* in W_H; so one should really use a different name, ‘*b**’, say for the reassembled ship in W_H. On this approach, *b* = *a* in both worlds, and hence, *b* is also *c*. So, ‘Aruna’ does designate *b* in both worlds.

As I say, I think it is this response which has led to Chandler’s case being largely forgotten: for some reason, philosophers have found it forceful. But, while this response may deomnstrate that Chandler has not *refuted* (RNT), it does not show that Chandler’s stance is *untenable*. For all that has been said, there is simply a stand-off between Chandler and the Kripkeans—we are not obliged to side with the latter.

One consideration which might be taken to favour the Kripkean camp is that Chandler’s stance evidently violates the *Only X and Y principle*: the view that whether an object X is identical with Y or not should depend only on the *intrinsic* relations they stand in to each other, and not, for example, on the occurrence of causally independent events or processes. For, Chandler’s position apparently dictates that whether *b* is identical with, or distinct from, *a* does pivot on whether *a*’s planks are replaced as they are removed or not, which is surely a causally independent issue.

But there is an equally forceful consideration in favour of the Chandler camp—namely, that the Kripkean stance violates what may be called the *Simply X principle*: that whether an object X *exists* or not should not depend on the occurrence of causally independent events or processes. Kripkeans, it seems, take the very existence of the reassembled ship in W_H, to depend on whether plank-replacement takes place or not: *that* ship would not have existed if Aruna's planks had been replaced as they were removed.

The stand-off remains. One way of tilting the balance in favour of Chandler, perhaps, would be to provide a comparable scenario but where there was more to be said for making the sorts of transworld-identifications necessary for Chandler's point.

3.1.1 A variation on Chandler's example

Suppose we have a *ship kit* which has instructions for making two quite different ships, say *the Titanic* and *the QE2*. However, the former design can be realized from the latter by removing some parts and rearranging others, say. In this sort of situation, it seems to me, one might well take it to be a sufficient condition for *being* the Titanic (or the QE2) that the parts are arranged thus-and-so. And one might still maintain, as before, that gradual plank replacement and rearrangement preserves ship identity (call this *the Renovation Principle*.)

Now, suppose in the actual world, *w**, we construct the QE2; then we completely disassemble it and construct the Titanic. There is little temptation to identify the Titanic with the QE2—this is not a case of disassembly and *reassembly*. So:

(C1) In *w** the Titanic and the QE2 exist and are distinct ships.

Next, consider a possible world, *w*, where we construct the Titanic *from* the QE2 by way of gradual plank replacement and rearrangement. By the Renovation Principle, we can conclude that the QE2 survives the renovation; but the post-renovation ship is the Titanic, given our sufficiency condition for *being* the Titanic. (See Figure 3.2 on the next page). We are thus led to the conclusion:

(C2) In *w*, the Titanic and QE2 exist and are identical.

We end up with just the sort of circumstances that Chandler was after: we have a name, 'the QE2', which designates the Titanic, in one world (*w*), but fails to designate it at another, namely w*, the actual world.

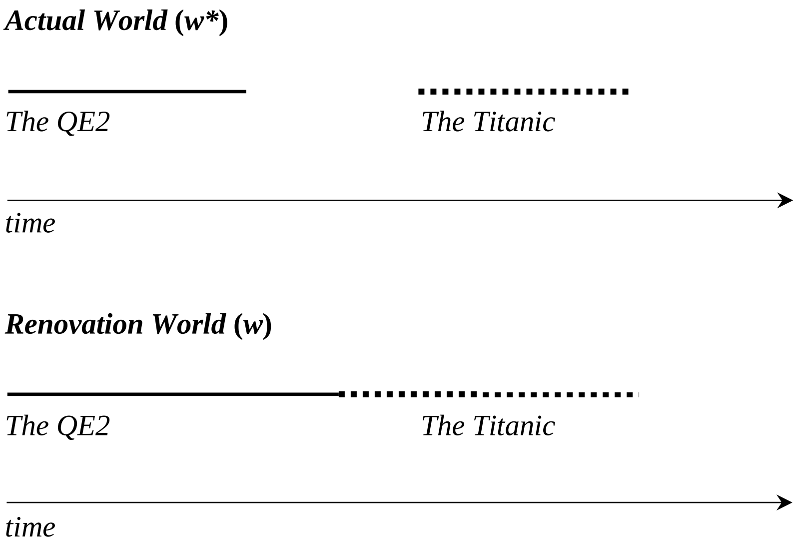

Figure 3.2

So, given what he says in the original case, Chandler should take this example to show that the name ‘the QE2’ is not a rigid designator, and that Kripke’s thesis (NRig) is thereby refuted.

And, as before, we have a case for contingent identity in the background: The QE2 and the Titanic, evidently distinct ships in the actual world, appear to be one and the same hip in the Renovation world.

There are two obvious responses Kripkeans might make a grab for. First, they could reject the view that the QE2 survives renovation in world *w*; but this position is difficult to square with their preparedness to maintain that Aruna survives renovation in the Hobbes world (see Fig 3.1 on p. 47), where there is also disassembly and reassembly of Aruna’s original parts. Or, secondly, they could deny that the Titanic exists in world *w*; but this is difficult to square with the design-sufficiency for being the Titanic, as proclaimed in the ship-kit’s manual. At any rate, there is surely *something* to be said for maintaining that the Titanic and the QE2 exist in both worlds, and that in world *w* they are one (and the same) ship; in which case, the original Kripkean charge that Chandler’s case rests on illicit transworld-identifications becomes moot.

Besides, there is yet another variation which just looks to objects and events in a single world that may serve Chandler’s purpose too.

3.1.2 A Chandleresque example without transworld identifications

We need consider only the following sort of Hobbes world (depicted in Fig. 3.3 below), which has become a familair sort of example in discussions of identity:[31]

Hobbes World **(W_H)**

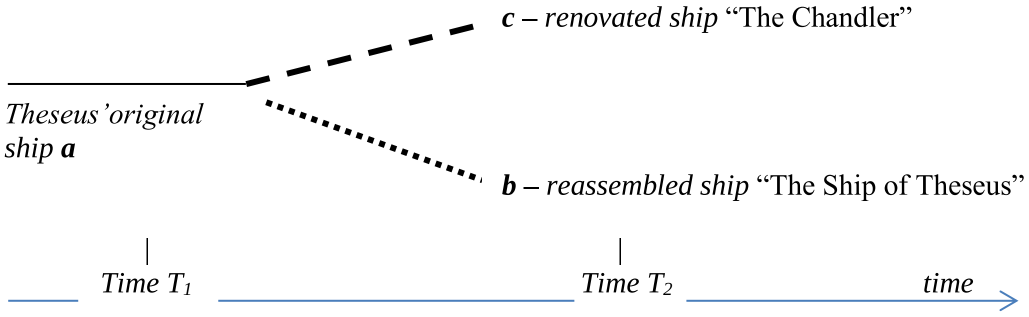

Figure 3.3

Suppose a collector sells the planks comprising Theseus' original ship (*a*) to a museum, and the museum has the ship reassembled exactly as it was when Theseus first set foot on it. They dub this ship (*b*) "The Ship of Theseus" and exhibit it as such. Another ship out at sea (*c*), which happens to be the product of gradual plank replacement from Theseus' original ship, is bought by a philosopher of logic and christened, "The Chandler".

Henceforth, I will use 'TST' (the underlining is significant) to refer to the name, "The Ship of Theseus", and 'TST' (without the underlining) to refer to the ship so named; likewise, 'TC' and 'TC' for the name "The Chandler" and for the ship so named, respectively; and, finally, 'TOSH' for Theseus's original ship. When I talk of rigidity in connection with this example, I mean *temporal rigidity*; precisely what this amounts to will emerge in §3.2.

Now, the museum, understandably, takes TST to be one and the same ship as TOSH; but the owner of TC, again, understandably, may well insist that her ship is. Clearly, different considerations ground their respective claims, but neither is obviously wrong. The trouble, of course, is that they cannot both be right if these are strict identity claims, for that would entail that TST and TC are one and the same ship, which they evidently are not.

One way of reconciling their views is to relativize identity to times and maintain that TST and TC, though distinct now at T_2, *were* identical (with each other and with TOSH) at T_1.

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[31] Found e.g. in Salmon (1981); Forbes (1985); Gallois (1998); and Sider (2001).

Given Chandler's endorsement of contingent identity, he should not balk at the commitment to *occasional identity* involved here.

The case against (RNT) is then analogous to earlier ones: TST is a name that designates TC at time T_1 but not at T_2; hence, it is not a rigid designator, and (RNT) is not generally true. The difference is, *transworld* identifications are not pertinent. Kripkeans will no doubt challenge one or other of the *intraworld* indentifications made here, of TC with TOSH or of TST with TOSH. But given that some motivation has been provided for both, simply appealing to the violation of the necessity of identity thesis, say, seems inadequate.

3.1.3 Against rigidity itself

Further, what has not yet been appreciated by discussants is that the threat is not only against Chandler's intended target, (RNT), the rigidity of names, but against *rigidity itself*. Consider the Figure 3.2 scenario again; take *any* alleged rigid designator of the QE2, *R*; *R* evidently does not desigate the Titanic in the actual world, but it does designate the Titanic in the Renovation world, *w*. Or, take *any* alleged rigid designator of the Chandler, TC, in the Figure 3.3 scenario; it evidently does not designate the ship in the museum, TST, at time T_2, but it does designate it at time T_1. So, on Chandler's reasoning, these alleged rigid designators are not rigid designators after all.

Consequently, if Chandler's case (or as modified by me) is successful, it pulls the rug from under not only (M=), the thesis that true identiy statements involving *names* are necessarily true, but also the more general:

(R=) True identity statements involving *rigid designators* are necessarily true.

I hope to have demonstrated Chandler's challenge to Kripke deserves more attention than it has received. Let us give it some more.

3.2 Chandler's argument re-targeted

Nevertheless, as I telegraphed in the preamble at the beginning of this chapter, I think the case against (RNT) here is unsound. While it is true that TST does not rigidly designate TC, there is something that it does rigidly designate, namely, TST. For, anytime at which TST designates something it designates TST, and it designates TST whenever TST exists. So, TST is temporally *invariant* and *exhaustive*; this is surely sufficient for TST counting as a rigid designator *of TST*. Likewise, the name 'The QE2' in the Figuer 3.2 scenario designates the QE2 invariantly and exhaustively—at least, nothing said so far precludes that this is the case. So, it too qualifies as a rigid designator of the QE2 by our criterion.

Hence, Chandler's considerations do *not* in fact tell against (RNT). What they threaten, rather, are (M=) and (R=), and, thus, indirectly, (N=), the necessity of identity thesis, by way of demonstrating the coherence of the following *mixed-designation view* as I call it:

> (MDV) A term may rigidly designate one object *x*, while *non*-rigidly designating another, possibly-distinct object, *y*.[32]

Let us focus on (R=). It dictates that an identity statement, '$\alpha = \beta$', where 'α' and 'β' are rigid designators, is necessarily true if true. Kripke's argument for this thesis is the argument from rigid designation, as presented by L&R (2000), we considered in §1.5.2:

Argument from rigidity

(1) 'α' and 'β' are rigid designators .... premise

(2) '$\alpha = \beta$' is true .... premise

(3) 'α' and 'β' corefer .... from (2)

(4) Whatever 'α' and 'β' refer to, they refer to at all worlds .... from (1)

(5) 'α' and 'β' corefer at every world .... from (3) and (4)

(6) '$\alpha = \beta$' is true at every world .... from (5)

(7) '$\alpha = \beta$' is necessarily true .... from (5)

Now, if (MDV) is correct, step (4) does *not* follow from step (3)—because one of the names may be a rigid designator and yet *non-rigidly* refer to *x*. The route to (R=), an important consideration in support of (N=), is therefore blocked.

Kripkeans will protest that the notion of rigidity (MDV) invokes is not rigidity proper, i.e. rigidity in the sense Kripke is operating with. On Kripke's conception, the objection runs, the following is true:

> (RigK) α is a rigid designator only if it rigidly designates *whatever* it designates in any world.

[32] Chandler (1975, p. 368) in fact says that a name may *directly* designate one ship while (at the same time) *indirectly* designating another ship it happens to be contingently identical with. This is how I understand (MDV); but I think the idea needs to be explicated more carefully; I attempt this in §3.3.

I concur that Kripke certainly takes (RigK) for granted, and that (MDV) cannot be true if (RigK) is. But I contend that the considerations Kripke advances in favour of the rigidity of names only support the weaker conception of rigidity we are operating with, namely:

> (RigC) α is a rigid designator if there is a possible object, *x*, which α invariantly and exhaustively designates.

To wit, consider Kripke's intuitive test for rigidity:

> (Test) Something [someone] other than α might have been α.

The fact is, a term which is rigid according to (RigC) will pass this test even if it is not rigid according to (RigK). For example, "The Chandler might not have been the Chandler" seems false, but TC clearly is not rigid by (RigK): for, it designates TST at some time but does not rigidly designate it. So, Kripkeans are not entitled to reject Chandler's counterexample by simply insisting that it is rigidity à la (RigK) which is at issue: their linguistic evidence simply does not discriminate between (RigK)- and (RigC)-rigidity.

And Kripke's (1980) Hesperus–Phosphorus challenge (§1.5.1) does not tell against (MDV). To remind you: he asks what would the world have to be like for Hesperus (*the Evening Star*) and Phosphorus (*the Morning Star*) to not be identical? Sure, Hesperus might not have been *called* 'Phosphorus'; it might not have been visible to the naked eye at that time of day which led to it being named Phosphorus; but that would not be a situation in which the thing we are calling 'Hesperus' and the thing we are calling 'Phosphorus' are not identical. That would have to be a situation (*per* impossible) where Venus exists but is not identical with *itself*.

But, defenders of (MDV) can actually agree with Kripke here. They are not committed to contingent self-identity. In our our example of occasional identity (Figure 3.3 on p. 51), for instance, the names TC and TST ('The Chandler' and 'The Ship Of Theseus', respectively) do *not* rigidly designate one and the same possible object; they name distinct ships that were identical at some time. Thus, in affirming the temporary identity of TC and TST at time T_1, one is not affirming of any ship that *it and itself* are occasionally identical; one is affirming of two temporally distinguishable ships, that is, ships which are distinguishable over time, that they are temporarily identical at some time.

So, the necessary identity of Hesperus and Phosphorus, and, more generally, the necessity of *self-identity*, is not in question here. The conception of contingent identity (MDV) makes available is simply not addressed by Kripke's argument from rigidity or his remarks about Hesperus and Phosphorus.

We come now to what I take to be the central problem about (MDV). Many, Kripkeans and non-Kripkeans alike, balk, or, at any rate, feign bafflement, at the very idea of 'multiple' designation which (MDV) calls on.[33] Surely, they press, singular terms designate a single object if they designate at all; and names are paradigmatic singular terms. In any case, they press further, why not take rigid designators to designate merely what they rigidly designate—why take them to designate something else non-rigidly, or indirectly, as well?

I would like to propose a modified version of (MDV) with a revisionary, but not implausible, take on designation and rigid designation which I think should suit Chandler's purposes.

3.3 Invoking, designating, and designating by way of invoking

Here are three inter-connected notions:

- **Invoking** – A statement S *invokes* an object *x* if *x* itself figures in the proposition expressed by, or in the specification of the counterfactual truth conditions of, S; what does the invoking will be (in Kripke's terminology) a *de jure rigid designator*. (The notion of 'invoking' was introduced in §1.4.2)

- **Designating** – One may designate (refer to) an object *x* either by invoking *x* or by use of a definite description, 'the *F*' (formally: [the *x*: *Fx*]), where *x*, and only *x*, is the pertinent *F* in the context.

- **Designating by way of Invoking (Tethered-Designation)** – As just noted, we can designate an object by invoking it; but we can also designate one object by way of invoking a different object; for example, 'Hitler's favorite barber' is a singular term which may designate an individual other than Hitler by way of invoking Hitler. (Of course, this is a variety of designation by way of definite description: [the *x*: *Ftx*].) I call such expressions *tethered designators*. (I shall reserve the phrase 'tethered designator' for singular terms of the form [the *x*: *Ftx*] where the term '*t*' is an

[33] This is precisely my experience when I have presented these ideas in talks.

object-invoking de jure rigid designator. Terms such as ‘The US President’s favourite barber’, which also involve ‘tethering’, will not concern us here.)

Ordinary names (e.g. *Kripke, London, Tibbles*), demonstratives (e.g. *this*, *that cat*, *that guy drinking martini*) and indexical expressions (*I*, *she*, *now*) count as *simple invoking terms*. The point I wish to highlight is that a tethered designator may contain a simple invoking term *without* designating the invoked individual (object), as is the case with the term ‘Hitler’s favourite barber’: clearly, this term need not designate Hitler, even though it undoubtedly invokes him. So, let us be clear:

(I≠D) To invoke an object is not (necessarily) to designate it.

To continue: a tethered designator, [the *x*: *Ftx*], may also rigidly designate an individual that it does not invoke: for example, ‘the only cat which *could have been* Tibbles’s biological mother’; presumably this rigidly designates a certain cat distinct from Tibbles. Moreover, in this class of rigid tethered designators, there will be some which are *semantically guaranteed* to be rigid: e.g. ‘Tibbles’s *actual* owner’, and, what is most important for us, terms of the form ‘the individual identical to *a*’: or, symbolically, [the *x*: $x = a$], where *a* is an invoking *de jure* rigid term.

So far, I have simply made observations which Kripkeans will grant. But here I wish to make a significant revisionary proposal: that we henceforth take any invoking term, *a*, to designate something at a world (or time) by virtue of that objected being denoted by (or *satisfying*) the tethered designator ‘[the *x*: $x = a$]’, i.e. ‘the individual identical with *a*’, at that world (time). This has the consequence that invoking terms are no longer *obstinately* rigid, i.e. no longer designate the invoked object at *every* possible world (time). On my proposal, they are merely *persistently* rigid: they designate the invoked object at every world (time) *at which it exists*. (See the discussion of obstinacy and persistency in §1.4.3).

I don’t think much hangs on this departure from Kripke. I suspect the intuition that names, say, are obstinate simply arises from the thought that they *invoke* a particular object regardless of the counterfactual circumstances we are talking about. But my proposal preserves this idea; for, ‘[the *x*: $x = a$]’ still invokes *a*. So, the object invoked by a name still figures in the (counterfactual) truth-conditions of statements in which the name appears. But, as we noted earlier, invoking is not the same as designating —that was the import of (I≠D). We can acknowledge the invoking nature of a term without fully endorsing Kripke’s views about its designation and how it designates. Furthermore, the proposal still allows for meaningful distinctions between:

(a) *de facto* rigid designators (e.g. 'the only dog which *could have been* Rover's biological mother');

(b) what we might call *semantically (guaranteed) rigid* designators (e.g. 'the *actual* inventor of bifocals', 'Rover's *actual* mother', 'the individual identical with *that dog*'); and

(c) simple *invoking terms* (e.g. 'Hitler, 'Rover', '*that* dog').

The principal bone of contention is simply the *mechanism*, as it were, by which invoking terms designate their referents. The Kripkean edifice still stands.

Accepting my proposal affords a richer picture of designation by invoking terms. Suppose I point to a child in an old photo and say, "That kid is now a millionaire." We can now maintain that I have referred to a present-day individual by way of invoking the kid-in-the-photo. The statement is true because there now exists someone who is identical with the invoked kid. The demonstrative 'that kid', even though it is a simple invoking term, *functions* as a semantically rigid tethered designator: [the *x*: *x* = that kid] on this view.

Here is another application. I might point to a clay vase and say, "That vase and that lump of clay are identical". But this is problematic in so far as that vase and that lump of clay appear to have different *persistence conditions*: that lump of clay could survive squashing, for instance, while that vase could not; on the other hand, that vase could survive the removal of a tiny bit of the clay, whereas that lump of clay could not (it would not be *that* lump of clay with a tiny bit removed). My proposal allows the following take on the problem: the demonstratives 'that vase' and 'that lump of clay' *invoke* possibly non-identical objects, objects with different persistence conditions, but happen to designate the same *matter*. To put it another way: the tethered designators [the *x*: *x* = that vase] and [the *x*: *x* = that lump of clay] *invoke* different things but they are at present satisfied by, and, so, *designate*, the same bit of *matter*, *M*.

Furthermore, we may maintain that these tethered designators differ in the following respect: [the *x*: *x* = that lump of clay] invariantly and exhaustively, i.e. rigidly, designates *M*, whereas [the *x*: *x* = that vase] only contingently designates *M*: it would not designate *M* once the tiny bit of clay is removed. Thus, it seems we can coherently maintain that 'that vase' *invokes* one object, while presently *non-rigidly* designating a possibly distinct object. This is just what (MDV) admits. But perhaps it is safer to just tweak it a bit to make it more precise:

(MDV*) A term may *invoke* one object *x*, while *non*-rigidly designating another, possibly-distinct object, *y*.

This squares nicely with Chandler's suggestion (see footnote 32 on p. 53) that a name may *directly* designate one ship while (at the same time) *indirectly* designating another ship it happens to be contingently identical with.

Of course, our take on the clay vase raises the awkward question: what does 'that vase' *rigidly designate* if not the matter *M* or the lump of clay? This is a thorny question for anyone who maintains that the vase and the lump of clay are distinct things. I propose an unorthodox position on this issue in Chapter 5. We need not settle the matter here; the purpose of the example was just to illustrate the coherence of (MDV*).

3.4 Welcome to counterpart theory

Understanding (MDV*) in terms of tethered designation presents a revealing way of thinking of counterpart theory. Let us go back to our example of occasional identity (Figure 3.3 on p. 51) and remind ourselves of Chandler's picture. <u>TC</u>, the name 'the Chandler', invokes TC: it desigates TC whenever it designates anything and whenever TC exists. This is true of the tethered term [the *x*: *x* = <u>TC</u>] too. Further, given the identification of TC with TOSH (the Original Ship of Theseus) at time T_1, and the identification of TST (the museum's Ship of Theseus) with TOSH at T_1, we are led to conclude that <u>TC</u> designates TST at T_1. However, <u>TC</u> most definitely does not designate TST at time T_2, when TC and TST are distinct.

But why make the said identifications? Well, there is the thought that any ship, including TOSH, can survive (gradual) renovation, which supports the identification with TC; and the thought that any ship can survive disassembly and reassembly, which supports the identification with TST. But there is also the following consideration: intuitively, certain historical claims about TC and/or TST are *true (false) in virtue of* facts about TOSH, e.g. "Theseus piloted this very ship" asserted on TC at time T_2 or at the museum by the museum owner, pointing to TST at T_2.

It is this thought, that historical or modal claims about one object are *true because of* non-historical, non-modal facts about what is strictly a *different* object, which brings *counterpart theory* into the narrative. For, Lewis (1968; 1986) advocates just such a view about modal statements invoking certain objects: that they are—or at any rate, can be—*made true* by virtue of how things stand with *counterparts* of these objects, not strictly these objects themselves, at other possible worlds. ‘Not strictly these objects themselves’ because, on his extreme modal realism, objects exist in exactly one possible world. Thus, (MDV*) can be read as *grounding* the counterpart-theoretical view that a modal statement about one object, *b*, (the invoked object in (MDV*)) is *made true* (or false)— is true (or false) *in virtue of*—facts about *counterparts* of *b* (the *non-rigidly* designated objects in (MDV*)).

The intuitive correctness of the view that names and other invoking terms are obstinately rigid can now be put down to the fact (a) the corresponding tethered designators do indeed *invoke* one and the same object whichever counterfactual circumstances we are talking about, including worlds where the object does not exist; and (b) whatever they happen to *designate* is some sense identical to the invoked object. It is not strict identity. But it is natural to think of it as a kind of identity, since the designated objects will be *truth-makers* of modal statements involving the invoking expressions. So, there is no obstacle to accepting my proposal that invoking terms (names, demonstratives, indexicals) *designate* objects *by way of satisfaction of the tethered term*.

Let us, then, turn now to counterpart theory itself to investigate the issue of contingent identity further, more formally, with a bit more precision.

CHAPTER 4
COUNTERPART THEORY:
THREE APPROACHES EXPLORED

Preamble

Counterpart theory makes its appearance in Lewis (1968). It is motivated by his *modal realism,* which he vigorously and ingeniously defends in (Lewis 1986). Very briefly, he takes possible worlds to be real entitities, causally isolated from each other and populated with concrete objects (individuals) just like the actual world is. Concrete objecs therefore exist in precisely one world. Part of his case for such extreme realism about possible worlds is that he thinks it best *explains* the truth of *de re* modal statements, such as e.g. expressed by "Hillary Clinton might have been US President". According to Lewis, this is true *because* there is a possible world in which someone similar enough to Clinton—obviously, not Clinton herself, since she just exists in the actual world—*is* US President.

Thus, modal truths about an object, *x*, are ultimately explained (*made true by*) non-modal truths; these could be non-modal truths about *x* itself, but they could instead be non-modal truths about a *counterpart* of *x* at another world. **An object *y* in a world *w* is a *counterpart* of *x* if, roughly, *y* is sufficiently similar to *x*, and no object in *w* is more similar to *x*.**[34] On this understanding of counterparthood, many objects at one world may have a common counterpart at another, and one object may have many counterparts in some world.

Counterpart *theory* basically aims to provide a precise and fuller account of the semantics for quantified modal logic (QML). Contingent identity emerges as something proponents of counterpart theory are compelled to accept from their preferred semantics.

This chapter provides a survey of three different counterpart-theoretic (CT-) approaches, exemplified, respectively, by Lewis's (1968) original theory (LCT), Forbes's (1982) canonical counterpart theory (FCT), and Ramachandran's (1989) 'narrow scope' counterpart theory (RCT). The survey rehearses points made in Ramachandran (1989; 1990a; 1990b) and Forbes (1990), but there are significant revisions and additions. We

[34] The conversational context supposedly determines determines *weightings* for similarities, so e.g. similarity with respect to *career* may carry more weight with respect to what counts as a counterpart of me than similarity with respect to *the toothpaste I use*.

will pay particular attention to the picture of contingent identity each yields, and their (potential) treatment of *actuality*, which, as we will see, raises special difficulties.

4.1 Lewis's Counterpart Theory (LCT)

4.1.1 LCT-with-names

Does ordinary modal discourse—ordinary claims as to, or discussion of, what might or might not have been the case—call for a *nonextensional* logic, as modal logics tend to be?[35] David Lewis thinks not:

> Instead of formalizing our modal discourse by means of modal operators, we could follow our usual practice. We could stick to our standard logic (quantification theory with identity and without ineliminable singular terms) and provide it with predicates and a domain of quantification suited to the topic of modality. That done, certain expressions are available which take the place of modal operators. The new predicates required, together with postulates on them, constitute the system I call *Counterpart Theory*.
> (Lewis 1968, p. 26).

In short, Lewis aims to provide a procedure for translating any sentence of quantified mod al logic (QML), ψ, into a sentence of LCT, which is basically QML with special predicates '*Cxy*' (*x* is a counterpart of *y*), '*Wx*' (*x* is a world), '*Ixy*' (*x* is in *y*), '*Ax*' (*x* is actual), and special postulates guaranteeing:

(a) that every object (that is not a world) exists in exactly one world; and
(b) that every object is its own counterpart.

A QML-argument is then deemed valid if and only if its LCT-translation is valid in standard predicate logic (PL).[36]

Here are the individual postulates:

P1: $\forall x \forall y(Ixy \rightarrow Wy)$
(Nothing is in anything except a world)
P2: $\forall x \forall y \forall z((Ixy \wedge Ixz) \rightarrow y = z)$
(Nothing is in two worlds)

---

[35] See e.g. Kripke (1959, 1963).
[36] This is on the understanding that the domain of quantification contains every possible world and every object in every world.

P3: $\forall x \forall y(Cxy \rightarrow \exists zIxz)$

(Whatever is a counterpart is in a world)

P4: $\forall x \forall y(Cxy \rightarrow \exists zIyz)$

(Whatever has a counterpart is in a world)

P5: $\forall x \forall y \forall z((Ixy \wedge Izy \wedge Cxz) \rightarrow x = z)$

(Nothing is a counterpart of anything else in its world)

P6: $\forall x \forall y(Ixy \rightarrow Cxx)$

(Anything in a world is a counterpart of itself)

P7: $\exists x(Wx \wedge \forall y(Iyx \leftrightarrow Ay))$

(Some world, call it w*, contains all and only actual things)

P8: $\exists xAx$

(Something is actual)

These postulates allow that the counterpart relation is many-many: an object may have many counterparts in some world, and it may be the counterpart of many objects.

Lewis’s procedure for translating a QML-sentence into LCT begins with a direct definition of the translation of an arbitrary QML-sentence, α—call it ‘Tr(α)’:[37]

LT1: $Tr(\alpha) = \alpha^{w^*}$ (α holds in the actual world)

followed by a recursive definition of β^u (β holds in world u):

LT2a: β^u is β, if β is atomic

LT2b: $(\neg\beta)^u$ is $\neg\beta^u$

LT2c: $(\beta \vee \gamma)^u$ is $\beta^u \vee \gamma^u$

LT2d: $(\forall t\beta)^u$ is $\forall t(Itu \rightarrow \beta^u)$

LT2e: $(\Box\beta t_1 \ldots t_n)^u$ is

$\forall v \forall t'_1 \ldots \forall t'_n((Wv \wedge It'_1v \wedge Ct'_1t_1 \ldots \wedge It'_nv \wedge Ct'_nt_n) \rightarrow (\beta t'_1 \ldots t'_n)^v)$

---

[37] NOTATION: Following Lewis (for the main part), I will use Greek letters to stand for QML-sentences (‘α’, ‘β’, ‘γ’) and lower case English letters for variables: generally ‘t’ and ‘t′‘ (with and without subscripts) for variables that are assigned objects as values and ‘u’, ‘v’ and ‘w’ for variables that are assigned worlds (so it trivially follows that ‘Wu’, say, holds.
If α is an n-place sentence and $t_1, \ldots, t_n$ are n different variables, then $\alpha t_1 \ldots t_n$ is the sentence obtained by substituting t_k uniformly for the alphabetically k’th free variable in α. Variables introduced in translation are the alphabetically first variables that do not appear at all in the sentence to be translated.
Note: I do not list all of Lewis’s recursive definitions (1968, pp. 30-31)—the connectives and operators I leave out are to be defined in terms of the others in the standard way.

Lewis intends his semantics for closed QML-sentences only; but, for the time being we will take the liberty of interpreting constants as the LCT-rules would treat free variables.

In a nutshell, Lewis's approach takes a QML-sentence with constants or free variables a_1-a_n, [$\varphi(a_1, ..., a_n)$], to be *possibly* true if and only if [$\varphi(b_1, ..., b_n)$] is true at some world w, where (C) and (E) below hold:

(C) Ref(b_k) is a *counterpart* of Ref(a_k) for each k.

(E) Ref(b_k) *exists* in w for each k.

Thus, the LCT-translation of (1) below is given by (L_1):

(1) $\Diamond\neg Fa$

$(1)_{LCT}$ $\exists w\exists x(Ixw \wedge Cxa \wedge \neg F\mathrm{x})$

Here are some other translations for illustration:

(2) $\exists xFx$ (Something is F)

$(2)_{LCT}$ $\exists x(Ixw^* \wedge Fx)$

(3) $\forall x(Fx \rightarrow \Box Gx)$ (Every F is necessarily G)

$(3)_{LCT}$ $\forall x(Ixw^* \rightarrow (Fx \rightarrow \forall y\forall z((Wy \wedge Izy \wedge Czx) \rightarrow Gz)))$

(4) $\Diamond\exists x\Box Fx$ (Possibly, something is necessarily F)

$(4)_{LCT}$ $\exists u\exists x(Ixu \wedge \forall v\forall y((Iyv \wedge Cyx) \rightarrow Fy))$

(5) $\Diamond\Diamond Fb$ (Possibly, possibly F)

$(5)_{LCT}$ $\exists u\exists x(Ixu \wedge Cxb \wedge \exists v\exists y(Iyv \wedge Cyx \wedge Fy))$

The translation of (5) should be noted for future reference: [$\Diamond\Diamond Fa$] holds in LCT if a counterpart *of a counterpart of b* is F. The pertinence of this will emerge in Chapter 5, when Chisholm's (1967) modal paradox is presented as motivation for counterpart theory.

Another feature of LCT which should be flagged at the outset is that LCT yields a ‘weak’ interpretation of the necessity operator, ‘$\Box$’.[38] For example, on LCT-with-names, every possible object necessarily (or better: *essentially*) exists—(E) comes out valid:

($\Box$E) $\Box\exists y(b = y)$

($\Box$E)$_{LCT}$ $\forall u \forall x((Ixu \wedge Cxb) \rightarrow \exists y(Iyv \wedge x = y))$

Every counterpart of *b* in any world is identical with something in that world.

($\Box$E)$_{LCT}$ is trivially true.

Let us turn now to the issue of contingent identity.

4.1.2 Contingent Identity in LCT-with-names

Three types of contingent identity

Presumably, a logic accommodates contingent identity if it renders a QML-sentence of the same form as (C=) satisfiable:

(C=) $\Diamond t = t' \wedge \Diamond t \neq t'$

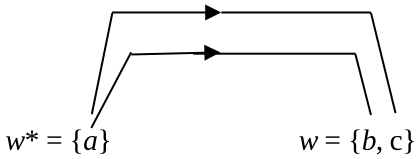
(C=)$_{LCT}$ $\exists u \exists x \exists y(Ixu \wedge Cxt \wedge Iyu \wedge Cyt' \wedge x = y) \wedge$

$\exists u \exists x \exists y(Ixu \wedge Cxt \wedge Iyu \wedge Cyt' \wedge x \neq y)$

Type 1

Figure 4.1 below depicts *one type* of verfying LCT-model (Ref(*t*) is the objects assigned to the term ‘*t*’ on that model):

‘*w**’ stands for the actual world and the directed arrow traces the counterpart relation; thus, on this model, *Cba* and *Cca* (i.e. *b* and *c* are counterparts of *a*); and, of course, *Caa*, *Cbb* and *Ccc* also hold (see postulate P6 in §4.1.1).



Ref(*t*) = Ref(*t′*) = *a*

Figure 4.1

[38] ‘Weak’ in Kripke’s sense: “Let us interpret necessity here weakly. We can count statements as necessary if whenever the objects mentioned therein exist, the statement would be true.” (Kripke 1971, p.3).

The first conjunct of (C=) comes out true because, roughly, Ref(t) and Ref(t') have a common counterpart in some world (e.g. *a* in *w**); and the second conjunct comes out true because Ref(t) and Ref(t') have distinct countepraits in some world (namely, *b* and *c* in *w*).

It is tempting to classify this as a case of contingent *self-identity*, since Ref(t) and Ref(t') are one and the same object in this model—notice the similarity to Figure 2.1 (on p. 25).[39] But, since we are dealing with mere similarity relations here, CT-theorists may prefer to minimize conflicts with ordinary modal intuitions. LCT in fact renders self-identity necessary, by rendering (S=) valid:

(S=) $\Box a = a$

$(S{=})_{LCT}$ $\forall w \forall x((Ixw \wedge Cxa) \rightarrow x = x)$

As can be seen from the translation what secures this result is simply the fact that each term-*type* introduces a counterpart quantifier in translation rather than each term-*token*. So, we should expect related conflicts are not avoided; e.g. we get the following, surely incoherent, QML-sentence coming out LCT-satisfiable:

(6) $\exists x(\Box(x = x) \wedge \forall y((x = y) \rightarrow \neg\Box(x = y)))$

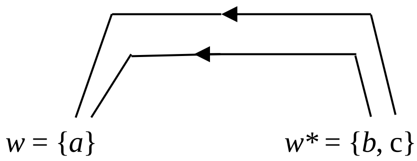
There is an object which is necessarily identical with itself and (yet) *no* object identical with it is necessarily identical with it!

The Figure 4.1 model (Model 4.1) is a verifying model.

Type 2

But Figure 4.1 depicts just one kind of verifiying model for (C=). A second type depicts a case of contingent *distinctness* and the attendant variety of contingent identity—something like the Meena–Aruna case in §2.1.2:

Here, we have distinct objects *b* and *c* in the actual world *w** with a unique and common counterpart in another world, *w*. Again, (C=) comes out true because there is a world where Ref(t) and Ref(t') have a common counterpart, and also world where they have



Ref(t) = b; Ref(t') = c

Figure 4.2

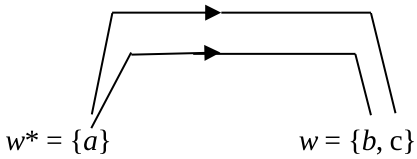
[39] The label ‘contingent *unity*’, coined by Forbes (1990, p. 170, footnote 3), also seems apt.

distinct counterparts.

Type 3

The third type of (C=)-verifying model appears to have escaped attention in the literature, but it reflects a very odd kind of contingent identity:

We have precisely the same metaphysical situation as in Model 4.1; the only difference is that here Ref(*t*′) = *b*. (C=) again comes out true because there is a world where Ref(*t*) and Ref(*t*′) have a common counterpart (namely, *b* in *w*), and also a world where they have distinct counterparts (namely, *b* and *c*, respectively, in *w*).



Ref(*t*) = *a*; Ref(*t*′) = *b*

Figure 4.3

What is downright peculiar is that these worlds are one and the same world! This is *intra-world* contingent identity, if you will, but which is not a case of *occasional* identity (discussed in §2.2). So the contingent identity of objects in LCT does not require that these objects be identical at one world but distinct at *another*!

It strikes me that Type 2 contingent identity is the least problematic conceptually. Type 1 calls for us to make sense of an object being distinct from itself at some world, whereas Type 3 requires us to make sense of object being identical and distinct at the same world.

A counterexample to LCT-with-names

So far, we have proceeded on the tacit assumption that adding names to LCT, treating them as unbound variables, is unproblematic. But there is an insupportable result; (7) below is LCT-satisfiable:

(7) $\underline{a} \neq \underline{b} \wedge \Box \underline{a} = \underline{b}$

a is distinct from, but necessarily identical to, *b*.

'$\underline{a}$' should be read as name of object *a*. Any model on which *a* and *b* inhabit different worlds and have no counterparts in common will verify (7). [$\underline{a} \neq \underline{b}$] will be true because Ref($\underline{a}$) ≠ Ref($\underline{b}$); and [$\Box \underline{a} = \underline{b}$] will be trivially true because there is no world in which Ref($\underline{a}$) and Ref($\underline{b}$) both have counterparts, and, so, it is trivially true that every world in which they both have counterparts, they have a unique and common counterpart.

(7)'s satisfiability means that the necessity axiom, [$\Box\alpha \rightarrow \alpha$] comes out LCT-invalid. So, (7) is totally unacceptable.

In light of this, the remainder of this section considers only results concerning closed QML-sentence, results I find unsatisfactory. (And I'll use 'Exists (t)' as shorthand for '$\exists t' t = t'$').

Other pertinent results

Result 1. (8) below is LCT-valid:

(8) $\Box\forall x\Box\forall y\Box(x = y \rightarrow \Box(\text{Exists}(x) \leftrightarrow \text{Exists}(y)))$[40]

(8) entails that necessarily, any identical objects necessarily co-exist. This applies to contingently identical objects too. But, I ask you, why should what are *merely contingently* identical objects be *necessarily co-existent*?

Result 2. Next, Leibniz's law:

(LL*) $\Box\forall x\Box\forall y\Box(x = y \rightarrow (\Diamond\alpha \leftrightarrow \Diamond\alpha[y/x]))$

where 'y' does not occur in α and 'α[y/x]' is the result of replacing every free occurrence of 'x' in α with 'y'. (LL*) is LCT-valid.[41] It entails that identical, including *contingently* identical, objects must have the same modal properties. Adherence to Leibniz's law may seem a virtue of LCT, but I question the plausibility of this principle, taken unrestrictedly, once contingent identities are granted. Indeed, one could argue that *contingently* identical objects *should* differ with respect to *some* modal property or other—at any rate, with respect to their *essential* properties; otherwise, why are 'they' not *necessarily* identical, i.e. a (necessarily) single object?

---

[40] Here, very roughly, is why (8) comes out valid. The embedded sentence [$\Box(x = y \rightarrow \Box(\text{Exists}(x) \leftrightarrow \text{Exists}(y))$] istrue on an LCT-model if and only if the following QML sentence is verified:

$$\forall u\forall x_1\forall y_1((Ix_1u \wedge Iy_1u \wedge Cx_1x \wedge Cy_1y) \rightarrow (x_1 = y_1 \rightarrow \forall v\forall x_2\forall y_2((Ix_2v \wedge Iy_2v \wedge Cx_2x_1 \wedge Cy_2y_1) \rightarrow (\text{Exists}(x_2) \leftrightarrow \text{Exists}(y_2))))$$

Now, '$t_1 = t_2$' is true at a world w iff $\text{Ref}(t_1) = \text{Ref}(t_2)$. So any candidates for x_1 and y_1 in the above sentence *must* have precisely the same counterparts, since x_1 and y_1 are perforce one and the same possible object.

[41] Explanation: the embedded sentence [$\Box((x = y) \rightarrow (\Diamond\alpha \leftrightarrow \Diamond\alpha[y/x]))$] is true iff

$$\forall u\forall x_1\forall y_1((Ix_1u \wedge Iy_1u \wedge Cx_1x \wedge Cy_1y) \rightarrow (x_1 = y_1 \rightarrow (\exists v\exists x_2(Ix_2v \wedge Cx_2x_1 \wedge \alpha[x_2/x]) \leftrightarrow \exists v\exists y_2(Iy_2v \wedge Cy_2y_1 \wedge \alpha[y_2/x]))))$$

Whatever is a counterpart of x_1 is a counterpart of y_1, since x_1 and y_1 are one and the same possible object. Thus, whatever property x_1 might have had, y_1 might have had as well.

Result 3. Moreover, the LCT-validity of (LL*) squares ill with the LCT-satisfiability of:

(9) $\Diamond\exists x\Diamond\exists y(\Box x = y \wedge \Box Fx \wedge \Box\neg Fy)$
There might have been necessarily identical possible objects where one is necessarily *F* but the other is necessarily *not F*)

Here is a verifying-model for the embedded sentence $[(\Box x = y \wedge \Box Fx \wedge \Box\neg Fy)]$:

w* = {*a*} w = {*b*}

Ref(x) = *a*; Ref(y) = *b*
Ext(F) = {<*a*>}

Figure 4.4

The absence of counterpart arrows signifies that neither *a* nor *b* is a counterpart of the other. By translation rule LT2e, the first conjunct, '$\Box(x = y)$', holds in a world if and only if $[\forall x_1\forall y_1(Ix_1u \wedge Cx_1x \wedge Iy_1u \wedge Cy_1y) \rightarrow x_1 = y_1)]$ holds in every world u. But, since there is *no* world in which *both* Ref(x) and Ref(y) have a counterpart, the antecedent of the embedded conditional above is never satisfied and '$\Box(x = y)$' comes out trivially true. The second conjunct, '$\Box Fx$' comes out true because every counterpart of Ref(*x*) is *F* (for, it has only one counterpart: itself); and the third conjunct, '$\Box\neg Fy$' comes out true because Ref(*y*) has no counterparts that are *F*. Thus, the embedded sentence and (9) come out true on this model.

However, (9) is surely unacceptable—in its own right but all the more so in light of the LCT-validity of (LL*), which, as noted, entails that identical possible objects have precisely the same modal properties.

All things considered, I contend that LCT yields a most unconvincing account of contingent identity.[42]

4.1.3 Actuality in LCT

The introduction of an *actuality* operator, *ACT*, into LCT also raises problems. We need such an operator to express the likes of

(10) There might have been tigers other than the ones which actually exist.

which we might express formally as follows:

(10*) $\Diamond\exists x(Tx \wedge \neg ACT\ \exists y(Ty \wedge x = y))$

[42] Lewis (1971) embellishes LCT so that it now incorporates a multiplicity of 'sortal-relative' counterpart relations. We'll consider sortal-relative counterpart theory in Chapter 5.

There are two obvious ways LCT could evaluate '*ACT'* into LCT:

T2f$_1$: $(ACT\ \beta t_1 ... t_n)^u$ is

$\forall t'_1 ... \forall t'_n((It'_1 w^* \wedge Ct'_1 t_1 ... \wedge It'_n w^* \wedge Ct'_n t_n) \rightarrow (\beta t'_1 ... t'_n)^{w^*})$

T2f$_2$: $(ACT\ \beta t_1 ... t_n)^u$ is

$\exists t'_1 ... \exists t'_n((It'_1 w^* \wedge Ct'_1 t_1 ... \wedge It'_n w^* \wedge Ct'_n t_n) \wedge (\beta t'_1 ... t'_n)^{w^*})$

But, as Allen Hazen (1979) anticipates, both give rise to counterintuitive results. On the first, (@$_1$) comes out satisfiable:

(@$_1$) $\Diamond\exists x(ACT\ \text{Exists}(x) \wedge \neg(ACT\ Fx \vee ACT\ \neg Fx))$

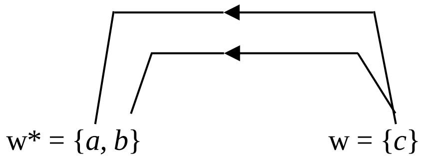
There might have been an object which actually exists but which is neither actually *F* nor actually not-*F*.

On the second, (@$_2$) does:

(@$_2$) $\Diamond\exists x(ACT\ \text{Exists}(x) \wedge (ACT\ Fx \wedge ACT\ \neg Fx))$

There might have been an object which actually exists, is actually *F* and is actually not-*F*.

Model 4.5 on the right serves as a verifying model for both.



Ref(x) = *c*
Ext(F) = {<*a*>}

Figure 4.5

It is difficult to see how actuality can be satisfactorily handled by the LCT-approach—so long as one allows that an object can have multiple counterparts at a world.

4.1.4 A neglected problem for LCT

There is, finally, this little discussed shortcoming of LCT, highlighted by Wollaston (1994) and Schwarz (2012). It is the LCT-*invalidity* of the following QML-theorem:

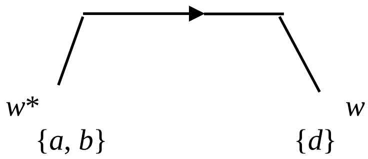
(K) $\Diamond\varphi \rightarrow \Diamond(\varphi \vee \gamma)$

Model 4.6 below is a counterexample-model for the following instance:

(K*) $\Diamond F\underline{a} \rightarrow \Diamond(F\underline{a} \vee F\underline{b})$

$$(K^*)_{LCT}\ \exists w \exists x(Ixw \,\&\, Cxw \,\&\, Fx) \rightarrow$$
$$\exists w \exists y \exists z((Iyw \,\&\, Cy\underline{a} \,\&\, Izw \,\&\, Cz\underline{b}) \,\&\, (Fy \vee Fz))$$

The antecedent is true because *a* has a counterpart in a world (namely, world *w*) which is *F*; but the consequent is false because there is no world on this model which contains counterparts of *both a* and *b* and where one of them is *F*.



Ref($\underline{a}$) = *a*; Ref($\underline{b}$) = *b*

Ext(*F*) = {<*d*>}

Figure 4.6

The invalidity of (K) is surely an undesirable, if not intolerable, result.

4.2 Forbes's Canonical Counterpart Theory (FCT)

4.2.1 FCT

In FCT, all *n*-place QML-predicates except '=' are translated as *n*+1-place predicates, the last place being taken by world-terms; e.g. [*Fx*] becomes [*Fxw*] (*x* is *F* at world *w*); and the extension of predicates may now vary between possible worlds. Likewise, the counterpart-relation becomes a *three-place* relation, *Cxyz* (*x* is a counterpart of *y* at world z). Forbes further postulates:

(F_A) For any world *w*, and any object *x* in *w*—i.e. in the *domain* of *w* (*dom(w)*) in Forbes's terminology—*x* is its own, and only, counterpart at *w*:

$$\forall u \forall x((Wu \wedge Ixu) \rightarrow (Cxxu \wedge \forall y(Cyxu \rightarrow (x = y)))$$

(So, every object has a counterpart *at* every world, albeit not *in* every world.)

(F_B) For any world w, and any object x, if x is not in dom(w), then *either* x is its own, and only, counterpart at w *or* every counterpart of x at w is *in* dom(w).[43]

(F_C) For any *n*-place predicate *F* in QML, and any world *w*, Ext(*F*, *w*)—the extension of predicate *F* with respect to world *w*—is a set of *n*-tuples of

[43] (F_B) captures the *intended* reading of Forbes's stipulation (1985, p. 61, condition (iv)) that *if x is not in dom(w), then x is its own, and only, counterpart at w iff no counterpart of x at w is in dom(w)*. That (F_B) is the intended reading is suggested by Milne (1993, p. 88) and acknowledged by Forbes (1994, p. 38).

possible objects, *not necessarily objects in dom(w)*. [The italicized phrase allows 'Fa' to be true at a world where *a* does not exist.][44]

In LCT, a world may fail to *contain* a counterpart of an object *a*. This is as it should be, according to Forbes, because:

> [...] it is plausible that in some worlds all of the things which exist are *so* dissimilar from *a* as it actually is that it is difficult to allow even the most similar of these to count as 'representatives' of *a* at that world, i.e. as *a*'s counterparts there (Forbes 1985, p. 58).

Given this fact, it seems incumbent on us to maintain that *a* is a *contingent* existent; yet, as we saw, LCT renders (□E) valid:

(□E) □Exists(*b*)

In FCT, a contingent existent is one that has a counterpart at a world—*itself*—which does not exist in that world.

The clauses for evaluating sentences of quantified modal logic with constants and the actuality operator *ACT* (QML*) in FCT are as follows (Forbes 1985, pp. 62-63; pp. 240-42):

(V_1) For any QML*-sentence α, the FCT-translation of α is true on an FCT-model iff α is true at the actual world, w*, on that model.

(V_2) For any *n*-adic predicate *F* of QML*, except '=', and any free variables or constants (*terms*) t_1–t_n, [$Ft_1...t_n$] is true at world *w* iff <Ref(t_1), ..., Ref(t_n)> ∈ Ext(F, w).

(V_3) For any QML*-sentence α with a free occurrence of a variable *u*, ∀*u*α is true at *w* iff for every *a* in dom(w), α[<u>*a*</u>/u] is true.[45]

(V_4) For any QML*-sentence α in which the term-tokens t_1, ..., t_n occur free and do not lie within the scope of a modal operator, □α is true at world *w* iff for every world *w*′, and any objects u_1, ..., u_n where each u_k is a counterpart of Ref(t_k) at w′, α[$\underline{u}_k$/t_k] is true at *w*′.

[44] So, each *n*-place predicate in QML gets translated as an (*n*+1)-place predicate in FCT; an atomic FCT-sentence,.[$Ft_1...t_nu$], is true just in case <Ref(t_1), ..., Ref(t_n)> ∈ Ext(*F*, *u*).
[45] 'α[<u>*a*</u>/u]' is the result of replacing every free occurrence of u in α with a name of *a*, i.e. a constant c where Ref(c) = *a*. Forbes stipulates that every possible object has a name on every FCT-model.

Three points: (i) the actuality operator *ACT* is to be counted as a modal operator; (ii) '$\alpha[\underline{u}_k/t_k]$' is the result of replacing each term-token t_k with a name for the corresponding counterpart at w′, u_k; and (iii) term-tokens of the same type may be correlated with different counterparts. We will see that this focus on tokens rather than types has significant ramifications.

(V_5) For any QML*-sentence α where every term-token therein lies within the scope of a modal operator, □α is true at world w iff α is true at every world w′.

(V_6) For any QML*-sentence α in which the term-tokens $t_1, ..., t_n$ occur free and do not lie within the scope of a modal operator, *ACT* α is true at w iff there are possible objects $u_1, ..., u_n$ such that (for each k) u_k is a counterpart of Ref(t_k) at w* (the actual world) and $\alpha[\underline{u}_k/t_k]$ is true at w*.

(V_7) For any QML*-sentence α where every term-token therein lies within the scope of a modal operator, *ACT* α is true at world w iff α is true at w*.

(The obvious clauses for sentential connectives have been omitted.) Forbes takes these clauses as securing a 'strong' interpretation of '□', so that e.g. (□E) comes out invalid. Nevertheless, as we shall shortly see, there are other grounds for disputing the claim that FCT interprets '□' as strong necessity.

Forbes's evaluation clauses yield the following translation scheme for translating sentences of QML* into FCT. Adopting the format of Lewis's translation scheme, we begin with a direct definition of the translation of an arbitrary QML*-sentence α:

FT1: $Tr(\alpha) = \alpha^{w^*}$ (α holds in the actual world) followed by a recursive definition of β^u (β holds in world u):

FT2a: β^u, where β is an atomic QML*-sentence, $Ft_1...t_n$, is $Ft_1...t_nu$

FT2b: $(\neg\beta)^u$ is $\neg\beta^u$

FT2c: $(\beta \vee \gamma)^u$ is $\beta^u \vee \gamma^u$

FT2d: $(\forall t\beta)^u$ is $\forall t(Itu \rightarrow \beta^u)$

FT2e: $(\Box\beta t_1...t_n)^u$, where the term-tokens t_k do not lie within the scope of a modal operator in β, is $\forall v\forall t'_1...\forall t'_n((Ct'_1t_1v \wedge ... \wedge Ct'_nt_nv) \rightarrow (\beta t'_1...t'_n)^v)$

FT2f: $(\Box\beta)^u$, where every term-token in β lies within the scope of a modal operator, is $\forall v(Wv \rightarrow \beta^v)$

FT2g: ($ACT\ \beta t_1 \ldots t_n)^u$, where the term-tokens t_k do not lie within the scope of a modal operator in β, is

$\exists t'_1 \ldots \exists t'_n((Ct'_1 t_1 w^* \wedge \ldots \wedge Ct'_n t_n w^*) \wedge (\beta t'_1 \ldots t'_n)^{w^*})$

FT2h: $(ACT\ \beta)^u$, where every term-token in β lies within the scope of a modal operator, is β^{w^*}

To illustrate this scheme, and to give some idea of the departure from LCT, I give the FCT-translations of the following QML*-sentences:

(□E) □Exists(b)

$(E)_{LCT}$ $\forall w \forall x(Cxbw \rightarrow \text{Exists}(x))$

(1) $\Diamond\neg Fa$

$(1)_{FCT}$ $\exists w \exists x(Cxaw \,\&\, \neg Fxw)$

(2) $\exists xFx$

$(2)_{FCT}$ $\exists x(Ixw^* \wedge Fxw^*)$

(3) $\forall x(Fx \rightarrow \Box Gx)$

$(3)_{FCT}$ $\forall x(Ixw^* \rightarrow (Fxw^* \rightarrow \forall u \forall y(Cyxu \rightarrow Gyu)$

(5) $\Diamond\Diamond Fb$

$(5)_{FCT}$ $\exists u \exists x(Cxbu \wedge Fxu))$

(11) $\Box(Fb \rightarrow ACT\ Gb)$

$(11)_{FCT}$ $\forall u \forall y((Cybu \wedge Fyu) \rightarrow \exists z(Czbw^* \wedge Gzw^*))$

I flag two pertinent points. First, the truth of $(1)_{FCT}$ evidently does not require that the candidate counterpart exists in the candidiate world w. And second, (5) comes out true if a counterpart of b at some world is F; LCT, on the other hand, required that *a counterpart of a counterpart* be F. In FCT, iterations of modal operators are redundant: e.g. [$\Diamond\Diamond Fb$] and [$\Box\Diamond Fb$] are simply equivalent to [$\Diamond Fb$].

4.2.2 Contingent Identity

The FCT-translation of (C=) is given by $(C=)_{FCT}$ below:

(C=) $\Diamond t = t' \wedge \Diamond t \neq t'$

(C=)$_{FCT}$ $\exists u \exists x \exists y(Cxtu \wedge Cytu' \wedge x = y) \wedge \exists v \exists x \exists y(Cxtv \wedge Cyt'v \wedge x \neq y)$

Thus, (C=) is satisfied if Ref(t) and Ref(t') have a common counterpart at—not necessarily *in*—some world, and distinct counterparts at—not necessarily *in*—some world. So, FCT, like LCT-with-names, harbours the three types of contingent identity mentioned in §4.1.2, which I have characterized as, respectively: contingent self-identity (Figure 4.1 on p. 64); the contingent identity required by contingent distinctness (Figure 4.2 on p. 65); and intra-world contingent identity (Figure 4.3 on p. 66). All those models verify (C=)$_{FCT}$.

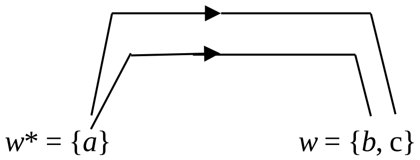
FCT's trademark result

Unlike LCT, however, FCT introduces counterpart quantifiers (CQs) for each token of a term. This gives rise to a trademark result of FCT—the satisfiability of:

(T) $\Diamond(t = t \wedge t \neq t)$

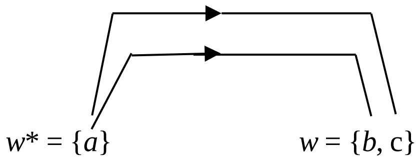
(T)$_{FCT}$ $\exists w \exists x_1 \exists x_2 \exists x_3 \exists x_4(Cx_1tw \wedge Cx_2tw \wedge Cx_3tw \wedge Cx_4tw \wedge x_1 = x_2 \wedge x_3 \neq x_4)$

FCT comes out true on both Model 4.1 and Model 4.3; here they are again (Ref(t') is obviously irrelevant for present purposes):



Ref(t) = Ref(t') = a

Figure 4.2



Ref(t) = a; Ref(t') = b

Figure 4.3

(T)'s satisfiability flouts the law of non-contradiction, (EQW)—the equivalence of identity within worlds (see §2.1)—and the necessity of self-identity all in one fell swoop. Forbes disputes the charge that the satisfiability of [$\Diamond t \neq t'$] commits him to denying the necessity of self-identity; witness the following passage (I have replaced 'α' with 'a'):

> ... [the FCT-satisfiability of [$\Diamond a \neq a$]] does not mean that the counterpart theorist is committed to the idea that an object a could have been non-self-identical (written '$\Diamond\lambda x(x \neq x)[a]$'). The possibility that $a \neq a$, written '$\Diamond(a \neq a)$' or '$\Diamond\lambda x\lambda y(x \neq y)[a, a]$', is rather the possibility for a of being two or more things. (Forbes 1990, p. 170)

But, even if we grant Forbes this interpretation, (T) still flouts the law of non-contradiction and (EQW). Forbes apparently considers this the price one has to pay if one endorses contingent identity. Here’s what he says to those who object to (T)’s satisfiability:

> It is hard to square this [the unsatisfiability of (T)] with a willingness to allow the logical possibility of contingent identity. (Forbes 1990, p. 170).

However, I question whether all advocates of counterpart theory advocate it *because* they want to accommodate contingent identity. It is not clear in Lewis (1968) and Forbes (1985), for example, that contingent identity is anything but an unsought ramification of endorsing modal realism. In any case, it would be reasonable for CT-theorists to attempt to minimize violations of generally accepted principles where possible. As we shall see, while CT-theorists may have to grant (tolerate) the satisfiability of (C=), they are not obliged to endorse (T).

4.2.3 Some Pertinent Results

(8’) and (LL*)

The following cousins of (8) and (LL*) come out FCT-valid:

(8′) $(\underline{a} = \underline{b}) \rightarrow \Box(\text{Exists}(\underline{a}) \leftrightarrow \text{Exists}(\underline{b}))$

If *a* is identical with b, they necessarily co-exist.

(LL′) $(\underline{a} = \underline{b}) \rightarrow (\Diamond\alpha \leftrightarrow \Diamond\alpha[\underline{b}/\underline{a}])$

If *a* is identical with *b*, they have the same modal properties.

These come out valid because ‘$\underline{a} = \underline{b}$’ is true on an FCT-model if and only if *a* and *b* are one and the same possible object; so, trivially, whatever is true of *a* must be also true of *b*, and vice versa. As I said earlier, though, it seems implausible to require even *merely contingently* identical objects to necessarily co-exist and to have exactly the same modal properties.

But what is especially peculiar about the FCT-validity of (8′) and (LL′) is that their necessitations come out FCT-*invalid:*

($\Box$8′) $\Box((\underline{a} = \underline{b}) \rightarrow \Box(\text{Exists}(\underline{a}) \leftrightarrow \text{Exists}(\underline{b})))$

Necessarily, if *a* is identical with b, they necessarily co-exist.

($\Box$LL′) $\Box((\underline{a} = \underline{b}) \rightarrow (\Diamond\alpha \leftrightarrow \Diamond\alpha[\underline{b}/\underline{a}]))$

Necessarily, if *a* is identical with *b*, they have the same modal properties.

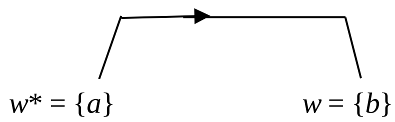
In FCT, every world is accessible (possible relative) to every other world, just as in Kripkean S5. This has the consequence any statement of the form [$\Box$(A $\rightarrow$ $\Box$B)] is logically equivalent to [$\Diamond$A $\rightarrow$ $\Box$B].[46] Thus, ($\Box$8′) and ($\Box$LL′) are equivalent, respectively, to (8′$\Diamond$) and (LL′$\Diamond$) below:

(8′$\Diamond$) $\Diamond\underline{a} = \underline{b} \rightarrow \Box(\text{Exists}(\underline{a}) \leftrightarrow \text{Exists}(\underline{b}))$

(LL′$\Diamond$) $\Diamond\underline{a} = \underline{b} \rightarrow (\Diamond\alpha \leftrightarrow \Diamond\alpha[\underline{b}/\underline{a}])$

It is now easily checked that Model 4.7 depiceted below serves as a counterexample to both.

The antecedent in each case is true because *a* and *b* have a common counterpart *at* some world (namely, *b* in *w*). (8′$\Diamond$)'s consequent is false, because, informally, *a* exists in *w** but *b* doesn't. And the consequent of (LL′$\Diamond$) is false because *a* is possibly (indeed, actually) *F*, but *b* is not *F* at any world.



Ext(*F*, *w**) = {<*a*>}

Ext(*F*, *w*) = ∅ (the empty set)

Figure 4.7

Now, don't get me wrong: I have nothing against these results—the approach I favour also invalidates (8′) and (LL′). What I am questioning is the coherence of maintaining their *validity*, as FCT does, along with the in*validity of their necessitations*.

Actuality

Forbes's rules for interpreting the actuality operator, (V_6) and (V_7) (p. 72), render (@$_2$) satisfiable:

(@$_2$) $\Diamond\exists x(ACT\ \text{Exists}(x) \wedge (ACT\ Fx \wedge ACT\ \neg Fx))$

(There might have been an object which actually exists, is actually *F* and is actually not *F*)

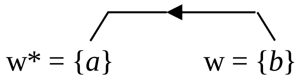
Forbes claims that (@$_2$)'s satisfiability is a plausible consequence of employing a counterpart relation rather than an identity relation across possible worlds (1982, p. 37).

[46] As we'll see in Chapter 5 Forbes (1984) himself appeals to the S5-equivalence of [$\Box$(A $\rightarrow$ $\Diamond$B)] and [$\Diamond$A $\rightarrow$ $\Diamond$B] in his discussion of Chisholm's paradox.

But there is a more basic anomaly which remains unsatisfying even if we allow Forbes's mitigation of ($@_2$); it is the FCT-invalidity of:

($@_3$) $\alpha \leftrightarrow ACT\ \alpha$
(α holds if and only if it *actually* holds)

Model 4.8 on the right falsifies the following instance:



Ext(F, w*) = {< *a* >}
Ext(F, w) = ∅ (the empty set)

Figure 4.8

($@_3$*) $F\underline{b} \leftrightarrow ACT\ F\underline{b}$

($@_3$*)$_{FCT}$ $F\underline{b}w^* \leftrightarrow \exists x(Cx\underline{b}w^* \wedge Fxw^*)$

Note: terms that do not lie within the scope of a modal operator do not, on FCT's translation scheme, invoke any CQs in translation, whereas those that fall within the scope of an actuality operator *do* (see FT2a and FT2g in §4.2.1, p. 72).

To be sure, the falisifiability of ($@_3$) does not seem so unpalatable if we grant the satisfiability of (T); nonetheless, I think these results are things Forbes is prepared to live with rather than intrinsically desirable.

(K)

FCT does render (K) valid:

(K) $\Diamond\varphi \rightarrow \Diamond(\varphi \vee \gamma)$

The FCT-translation of (K*), for example, is triviallyvalid:

(K*) $\Diamond F\underline{a} \rightarrow \Diamond(F\underline{a} \vee F\underline{b})$

(K*)$_{FCT}$ $\exists w\exists x(Cx\underline{a}w \ \&\ Fx) \rightarrow \exists w\exists y\exists z((Cy\underline{a}w \ \&\ Cz\underline{b}w) \ \&\ (Fyw \vee Fzw))$

Forbes's postuates (F_A) and (F_b) guarantee that any possible object has a counterpart *at* every world. This is what secures (K).

The Falsehood Principle

A key complaint Forbes (1985) levels against LCT is that it enforces what he calls the *Falsehood Principle*, whereby no atomic sentence can be true at a world unless the individuals mentioned therein exist at that world:

(FP) $\Box(Ft_1...t_n \rightarrow (\text{Exists}(t_1) \wedge ... \wedge \text{Exists}(t_n))$

Forbes objects that the Falsehood Principle is a *metaphysical* principle which must be supported by *philosophical* argument and, so, should not be enforced as a matter of *logical* necessity. (FP) is invalid in FCT: objects may satisfy atomic predicates at wrolds where they do not exist.

4.2.4 Not So Strong Necessity

Forbes (1982, p. 34) claims that '$\Box$' expresses strong necessity in FCT. As we noted earlier, it does render (E), the tell-tale sign of weak necessity, invalid:

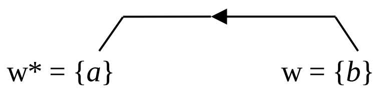
($\Box$E) $\Box$Exists(b)

$(\Box E)_{FCT}$ $\forall w \forall x(Cxbw \rightarrow \text{Exists}(x))$

However, surprisingly, as Ramachandran (1989, p. 33) reveals, the fundamental necessity axiom [$\Box\alpha \rightarrow \alpha$] comes out *invalid*! Model 4.9 below falsifies the following instance:

(N) $\Box F\underline{b} \rightarrow F\underline{b}$

$(N)_{FCT}$ $\forall w \forall x(Cx\underline{b}w \rightarrow Fxw) \rightarrow F\underline{b}w^*$



Ext(F, w*) = {<a>}; Ext(F, w) = {<b>}

Figure 4.9

(N)'s antecedent is true because *b*'s counterparts at every world are *F*; but the consequent is false because *b* is not *F* at the actual world, *w**.

Names of non-actual objects

Forbes (1990) floats two ways of rectifying this. I'll leave consideration of one of these ways to §4.3, after RCT, Ramachandran's (1989) 'narrow scope' counterpart theory, has been outlined. The other method involves excluding names of non-actual objects from our logic. Without going into the technical alterations that accompany this strategy, I should like to say why I think it is a mistake to bar such names.

Forbes argues that any attempt to anchor a name to a non-actual object with a reference-fixing description presupposes that objects have individual essences. But:

> [i]f there are no individual essences, this stipulation will not work even in Kripke semantics. And it will not work in counterpart-theoretic semantics even if there are individual essences, since individuals are worldbound: *which* of the world- bound individuals which in different

> worlds represent the thing … would be denoted…? (Forbes 1990, p. 172)

I am not sure whether the alleged difficulty for CT-theorists is decisive. Lewis (1973) appeals to *similarity orderings* of worlds in his analysis of counterfactuals; on such an ordering, one world may be deemed *closer* (*more similar*) to actuality (the actual world) than another. So, perhaps in some cases there will be a *closest* world where a rigid description *D* is satisfied uniquely. In that case, stipulating that a name refers to the closest object fitting a certain rigid description (if there is one) will not always fail.

In any case, it is not clear to me why the names in our logic cannot be taken as names of *arbitrary* possible objects. Consider e.g. the following argument:

Premises

1. There might have been an individual, *a*, arising from the combination of this sperm, *s*, and this egg, *e*.
2. There might have been an individual, *b*, arising from the combination of that sperm, *s*′, and this egg *e*.
3. Sperm *s* is distinct from sperm *s*′.
4. Egg *e* is such that it could not have combined with more than one sperm.

Conclusion

5. So, necessarily, *a* and *b* do not co-exist.

This argument seems logically coherent; and it involves names of arbitrary, perhaps non-existent, possible objects (‘*a*’ and ‘*b*’). So, ordinary language does lend itself quite naturally to the use of arbitrary names. Why shouldn’t our logic? After all, the central purpose of any logic is to determine the validity or otherwise of arguments; and whether an argument is valid or not is surely *independent* of *which* specific actual or possible objects are under discussion. Rather than thinking of names in a logical language as representing names in ordinary language, as Forbes appears to, we could think of them as representing possible objects themselves.

As I have said, Forbes’s alternative strategy for securing the validity of [$\Box\alpha \rightarrow \alpha$], which permits names of non-actual objects, will be considered in the following section.

4.3 Narrow-Scope Counterpart Theory (RCT)

4.3.1 RCT

Ramachandran (1989) presents a counterpart theory (RCT) with the following features:

(a) Unlike LCT, it interprets '$\Box$' as strong necessity; and unlike FCT, it secures the necessity axiom [$\Box\alpha \rightarrow \alpha$]

(b) It avoids the Actuality Problem, as we might call it, in that incorporating an *actuality* operator presents no special problems; ($@_1$) and ($@_2$), for example, are not RCT-satisfiable:

($@_1$) $\Diamond\exists x(\mathit{ACT}\,\exists y(x = y) \wedge \neg(\mathit{ACT}\,Fx \vee \mathit{ACT}\,\neg Fx))$

($@_2$) $\Diamond\exists x(\mathit{ACT}\,\exists y(x = y) \wedge (\mathit{ACT}\,Fx \wedge \mathit{ACT}\,\neg Fx))$

and (c) It accommodates contingent identity but not contingent self-identity.

What is more, RCT provides all this without altering Lewis's core theory one iota—the counterpart relation remains a binary relation, and *n*-place predicates remain *n*-place on translation. The only divergence from Lewis is in the scheme for translating QML-sentences into LCT. Two distinctive features of the RCT-scheme are:

(a) *Every* token of a term (i.e. a constant or free individual variable) in a QML-sentence introduces *both* existential and universal counterpart quantifiers (**CQ**s) in translation.

and (b) The CQs introduced in translation govern *only atomic sentences*; thus, in general, they will have *narrower scope* than the CQs introduced by LCT and FCT's schemes.

QML*–RCT TRANSLATION SCHEME

Defn. 1: A term in a QML*-sentence, ψ, is *modally free* if it is either a constant, or a variable-token that is governed by a modal operator which has narrower scope than the quantifier which binds it.

Defn. 2: For any QML*-sentence, ψ, $[\psi]_P$ is a *preliminary translation*, the result of replacing every atomic constituent, ϕ, of ψ that has modally free term-tokens t_1, ..., and t_n with:

$$\exists t'_1 \ldots \exists t'_n(Ct'_1t_1 \wedge \ldots \wedge Ct'_nt_n) \wedge \forall t'_1 \ldots \forall t'_n(Ct'_1t_1 \wedge \ldots \wedge Ct'_nt_n) \rightarrow \phi[t'_k/t_k])$$

where '$\phi[t'_k/t_k]$' is the result of replacing each token of 't_k' in ϕ with 't'_k'.

This preliminary translation ensures, for example, that [$F\underline{a}$] is true at a world *w* if and only if *a* has counterparts in *w*, and each counterpart is *F*.

For any QML*-sentence, ψ, the RCT-translation is the result of applying familiar recursive rules to the formula $[\psi]_P^{w*}$(read: $[\psi]_P$ holds at the actual world, *w**):

(A)	φ^w, where φ is an atomic QML*-sentence, is simply φ
($\neg$)	$(\neg\varphi)^w$ is $\neg\varphi^w$
($\wedge$)	$(\varphi \wedge \gamma)^w$ is $\varphi^w \wedge \gamma^w$
($\vee$)	$(\varphi \vee \gamma)^w$ is $\varphi^w \vee \gamma^w$
($\forall$)	$(\forall x\varphi)^w$ is $\forall x(Ixw \rightarrow \varphi^w)$
($\exists$)	$(\exists x\varphi)^w$ is $\exists x(Ixw \wedge \varphi^w)$
($\Box$)	$(\Box\varphi)^w$ is $\forall u\phi^u$ [47]
($\Diamond$)	$(\Diamond\varphi)^w$ is $\exists u\varphi^u$
(*ACT*)	$(ACT\ \varphi)^u$ is φ^{w*}

We can think of RCT as a *narrow-scope counterpart theory* since the CQs in RCT-translations have narrower scope than in their LCT and FCT cousins. This can be seen from the various translations of (1):

(1)	$\Diamond\neg Fa$
$(1)_{LCT}$	$\exists w\exists x(Ixw \wedge Cxa \wedge \neg F\mathrm{x})$
$(1)_{FCT}$	$\exists w\exists x(Cxaw\ \&\ \neg Fxw)$
$(1)_{RCT}$	$\exists w\neg\exists x(Ixw \wedge Cxa \wedge Fx)$

Note, the CQ '$\exists x$' has narrower scope than the negation in $(1)_{RCT}$.

Here are some other simple translations to illustrate the scheme.

(2)	$\exists xFx$
$(2)_{RCT}$	$\exists x(Ixw^* \wedge Fx)$

(3)	$\forall x(Fx \rightarrow \Box Gx)$

[47] In LCT and FCT CQs are only introduced in the translation (evaluation) of sentences governed by modal operators. In RCT, they are introduced before, in the preliminary translation.

$(3)_{RCT}$ $\forall x(Ixw^* \rightarrow (Fx \rightarrow \forall w(\exists y(Iyw \wedge Cyx) \wedge \forall y((Iyw \wedge Cyx) \rightarrow Gy)))$

(5) $\Diamond\Diamond Fb$

$(5)_{RCT}$ $\exists u(\exists x(Ixu \wedge Cxb) \wedge \forall x((Ixu \wedge Cxb) \rightarrow Fx))$

(11) $ACT\, \neg Gb$

$(11)_{RCT}$ $\neg\exists x((Ixw^* \wedge Cxb) \wedge \forall x((Ixw^* \wedge Cxb) \rightarrow Gx)$

Of course, the translations get unwieldy with more complex sentences involving multiple-place predicates; but the basic idea is clear I trust.

A word of warning about (□E)

It would be a mistake to translate it as (□E)*:

(□E) □Exists(b)

(□E)* $\forall w(\exists x(Ixw \wedge Cxb) \wedge \forall x((Ixw \wedge Cxw) \rightarrow \text{Exists}(x))$

The reason is that ‘Exists(b)’ is merely shorthand for ‘$\exists y\, y = b$’; so, the CQs introduced in translation must take narrower scope than the quantifier ‘$\exists y$’. The correct translation, then, is this:

$(\Box E)_{RCT}$ $\forall w\exists y(\exists x(Ixw \wedge Cxb) \wedge \forall x((Ixw \wedge Cxw) \rightarrow x = y))$

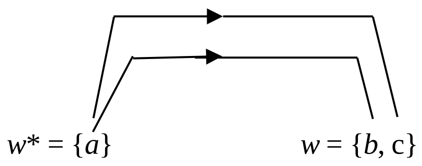
$(\Box E)_{RCT}$ comes out false if there are worlds where b has no counterpart, but also if there are worlds where b has more than one counterpart.

We may wish to count something as existing at a world if it has multiple counterparts there. To this end, we could add a primitive atomic existence-predicate, ‘Exists*’ to QML* and stipulate that atomic constituents of the form [Exists*(t)], whether or not‘t’ is modally free, with simply [$\exists t' Ct't$]. *However*, it is important to realize that whereas the sentence ‘Exists(t) merely abbreviates a QML*-sentence, ‘Exists*(t)’ does not; it cannot be reduced to any QML*-sentence, for it is defined in terms of LCT’s counterpart relation. This point is relevant to an actuality-result considered in §4.3.3.

4.3.2 Contingent Identity

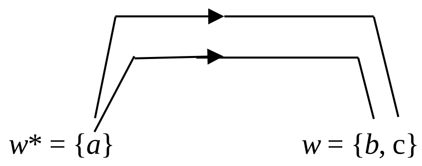
In RCT, Models 4.1 and 4.3 below do not verify (C=)—as they do in LCT and FCT:

(C=) $\Diamond t = t' \wedge \Diamond t \neq t'$



Ref(t) = Ref(t') = a

Figure 4.3



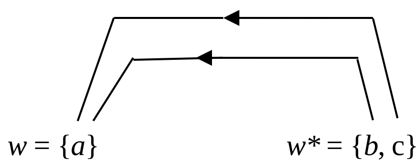
Ref(t) = a; Ref(t') = b

Figure 4.3

We need not consider the cumbersome RCT-translation of (C=). Informally, in RCT [$t = t'$] is true at a world w *only if* every w-counterpart of Ref(t) is identical with every w-counterpart of Ref(t'). So, if either has multiple w-counterparts, [$t = t'$], and thereby (C=), comes out false.

However, (C=) *is* true on Model 4.2.

Here, Ref(t) and Ref(t') each have a counterpart in world w, and every w-counterpart of Ref(t)—namely a—is identical with every w-counterpart of Ref(t')—namely, a.



Ref(t) = b; Ref(t') = c

Figure 4.2

So, RCT accommodates contingent identity, but only contingent identity that piggybacks on contingent distinctness.

Weak necessity of self-identity

[$\Box t = t$] is not RCT-valid, because [$t = t$] is false in worlds where Ref(t) does not exist or has multiple counterparts. But the following, *weak necessity of self-identity* princuple: [$\Box$(Exists(t) $\rightarrow t = t$)] does come out valid. Note, we are using the original 'Exists(x)' predicate here, not 'Exists*(x)'. 'Exists(<u>b</u>)' holds at a world only if b has exactly one counterpart there. So, by RCT an object could never exist and be distinct from itself.

4.3.3 Other Pertinent Results

Strong necessity

It follows from what we have just noted that RCT renders [$\Box$Exists*(b)] invalid; and the necessity axiom [$\Box\alpha \rightarrow \alpha$] also comes out valid—this is secured because even non-modal sentences introduce CQs in RCT-translations. So, we can conclude that '□' does capture stong necessity in RCT.

A note on weak necessity and essentialist claims

Consider the intuitively true statement:

(12) Socrates is *essentially* a man.

If (12) were interpreted as simply affirming:

(12′) Necessarily, Socrates is a man (□*Ms*).

it would be *false* by RCT, since Socrates is a contingent existent. The necessity alluded to in (S_1) is obviously weak necessity—to remind you: "We can count statements as [weakly] necessary if whenever the objects mentioned therein exist, the statement would be true." (Kripke 1977, p. 68). Thus, the correct reading of (S) is captured in RCT by:

$(12)_{RCT}$ □(Exists*(*s*) → *Ms*)
(Necessarily, *if* Socrates exists then he is a man)

This comes out true as long as every counterpart of Socrates is a man.

But it would be a mistake to draw the conclusion that modal statements in natural language are just ambiguous between strong and weak readings of necessity (possibility). Consider e.g.

(13) Necessarily, Elizabeth (the Queen of England) is Charles's mother.

On the strong interpretation of necessity, it is false, since the Queen and her son are contingent existents. On the weak interpretation, what (13) affirms is that in every world in which *they both* exist, she is his mother. But what the utterer of (6) is more likely to be conveying is the proposition expressed by

(13*) Necessarily, *if* Charles exists, then his mother is Elizabeth.

On *this* reading, Charles cannot exist without Elizabeth also existing and being his mother. The former weak reading entails rather that they cannot both exist without her being his mother.

So, for any necessity-statement that mentions more than one individual, a number of weaker-than-strong readings are possible. It does not seem right to conclude *necessity* is many-ways ambiguous; there is only the strong notion in play in all these cases. The right conclusion to draw is that natural-language necessity-statements are often *elliptical* for necessity-conditionals, as we might call them, whose antecedents invoke the existence of certain of the individuals mentioned in the original statement. Thus, on this suggestion, the utterance of (13) is regarded as elliptical for (13*), not as being semantically ambiguous as between strong and weak interpretations of the necessity operator.

(8) and (LL*)

The following RCT-cousins of the LCT-valid sentences (8) and (LL*) (on p. 67) come out RCT-*in*valid:

(8″) $(\underline{a} = \underline{b}) \rightarrow \Box(\text{Exists}^*(\underline{a}) \leftrightarrow \text{Exists}^*(\underline{b}))$

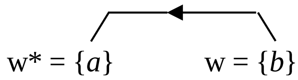
Necessarily, if *a* is identical with b, they necessarily co-exist.

(LL′) $(\underline{a} = \underline{b}) \rightarrow (\Diamond\alpha \leftrightarrow \Diamond\alpha[\underline{b}/\underline{a}])$

Necessarily, if *a* is identical with *b*, they have the same modal properties.

Model 4.8. below serves as a falsifying model for both:

[$\underline{a} = \underline{b}$] is true because *a* and *b* both have a counterpart in *w**, namely, *a*, and every *w**-counterpart of *a* is identical with every *w**-counterpart of *b*. But, only *b* has a *w*-counterpart—so (8″)'s consequent is false; and only *a* is possibly *F*—so (LL′)'s consequent is false.



Ext(F) = {< *a* >}

Figure 4.8

Actuality

I contend RCT avoids the Actuality Problem in so far as there is no *special* problem arising from the incorporation of the actuality operator *ACT* into QML. Firstly, neither ($@_1$) nor the FCT-satisfiable ($@_2$) are RCT-satisfiable:

($@_1$) $\Diamond\exists x(ACT\ \text{Exists}(x) \wedge \neg(ACT\ \text{F}x \vee ACT\ \neg\text{F}x))$

($@_2$) $\Diamond\exists x(ACT\ \text{Exists}(x) \wedge (ACT\ \text{F}x \wedge ACT\ \neg\text{F}x))$

And, secondly, the FCT-(implausibly)-invalid ($@_3$) comes out RCT-valid:

($@_3$) $\alpha \leftrightarrow ACT\ \alpha$

But, Fara and Williamson (2005, p. 21) (henceforth, F&W) point to the satisfiability of ($@_4$) below (which they label '(36)') as an unacceptable actuality-result:

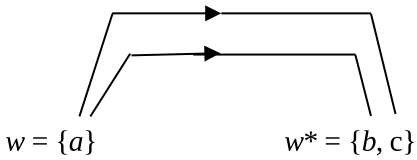
($@_4$) $\Diamond\exists x ACT\,(\text{Exists*}(x) \wedge \neg(Fx \vee Gx) \wedge \forall y(Fy \vee \text{G}y))$ [48]

However, as I emphasized when I introduced the predicate 'Exists*' (p. 82) sentences employing this predicate are *not* strictly speaking QML-sentences. So, we should not regard *this* result as speaking to the Actuality Problem.

What F&W could have pointed to instead, though, is the RCT-satisfiability of the simpler—and, I agree, counterintutive:

($@_5$) $ACT(\neg(F\underline{a} \vee G\underline{a}) \wedge \forall y(Fy \vee Gy))$
Actually *a* is neither *F* nor *G* even though everything is either *F* or *G*.

Model 4.10 on the right is a verifying model. Briefly, because *a* has two actual counterparts, one not-F and the other not-G, it is neither F nor G in the actual world, w*, even though every object in *w** is either *F* or *G*.



Ext(F, w^*) = {<b>}
Ext(G, w^*) = {<c>}

Figure 4.10

But this result does not reflect a problem about *actuality* (or *ACT*) *specifically*—the problem is quite general in RCT. For example, Model 4.10 verifies the following sentence in RCT too:

(14) $\Diamond(\neg(F\underline{a} \vee G\underline{a}) \wedge \forall x(Fx \vee Gx))$
It might have been that *a* was neither *F* nor *G* even though everything was either *F* or *G*.

I do not deny that this is an unwelcome (and unsought) result; my point is simply that it is not the accommodation of an actuality operator that generates the problem.

(K)

(K) is RCT-valid, though it is secured by very different means than in FCT (see 77). Consider e.g. the translation of (K*):

[48] They use '*Ex*' where I have used 'Exists*(x)'; but the intent is the same—see F&W, p. 21, footnote 25.

(K*) $\Diamond F\underline{a} \rightarrow \Diamond(F\underline{a} \vee F\underline{b})$

(K*)$_{RCT}$ $\exists w \exists x(Ixw \ \& \ Cx\underline{a} \ \& \ Fx) \rightarrow$

$\exists w(\exists y(Iyw \ \& \ Cy\underline{a} \ \& \ Fy) \vee \exists z(Izw \ \& \ Cz\underline{b} \ \& \ Fz))$

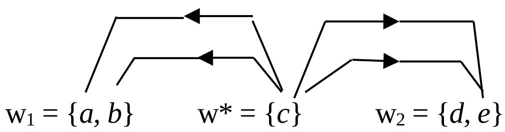
Clearly, any world satisfying the antecedent trivially satisfies the consequent. In RCT, it is the narrow-scope nature of the CQs introduced in translation which secures the validity of (K).

4.3.4 Objections to RCT

I now briefly consider some objections to RCT. I have just acknowledged a few paragraphs back that the RCT-satisfiability of ($@_5$) and (14) is an undesirable outcome.

Objection 1

Forbes (1994, p. 38) contends another implausible ramification is that [$\Diamond Ft$] can be false even when Ref(t) has a counterpart at every non-actual world that is F. This will be so when Ref(t) has an additional counterpart at every such world, as in Model 4.11 on the right.



Ref(t) = c

Ext(F) = {<b>, <d>}

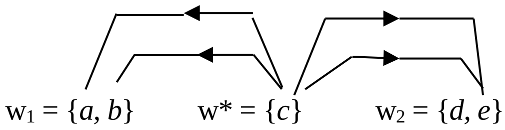
Figure 4.4

This kind of objection is different from previous ones in that it does not cite an intuitively valid (invalid) QML-sentence α which is deemed otherwise by counterpart theory—in this case, RCT. Avocates of counterpart theory who are not motivated by modal realism (e.g. me) and see CT-semantics merely as a means of establishing the validity or invalidy of arguments, not at as literal truth-conditions of modal statements, are not going to be impressed by this objection alone. Forbes needs to establish that violence is done to our intuitive verdicts on QML-arguments.

In any case, it is not clear that modal realists should be perturbed either. Their goal, in providing a CT-semantics for QML, presumably, is to provide truth-conditions that do least damage to our pre-theoretical intuitions. It may be that this result is the cost of avoiding grosser damage—for example, admitting contingent self-identity.

Finally, FCT does not really fare any better with '$\Diamond Ft$': for, it allows that this sentence can be false even though Ref(t) itself is F at every non-actual world! Consider the following variation on Model 4.11:

FCT allows that an object may satisfy a predicate '*Fx*' at worlds other than the one it inhabits. On FCT-model 4.12, Ref(*t*) (= *c*) is *F* at worlds w_1 and w_2, but not in *w** where it exists. Yet '◊Ft' comes out *false,* for there is no world where a counterpart *c* at that world is *F* at that world. So, Forbes's objection does not in any case tell in favour of FCT over RCT.



Ref(t) = *c*

Ext(F, w*) = ∅, the empty set

Ext(F, w_1) = Ext(F, w_2) = {< *c*>}

Figure 4.12

Objection 2: Twins

The second objection was raised by David Lewis in correspondence. Suppose there are worlds where two, and only two, individuals are so alike that if either of them is my counterpart, then both are. Let us call any such pair of individuals 'Twins'. Twins need not be born at exactly the same time; let us call the younger member of a pair of Twins a 'Junior'. Now, it seems permissible for one to affirm:

(15) ◊(I am a Junior).
(I might have been a Junior)

Yet, (15) will come out unsatisfiable—and hence false—by RCT, since it is true iff something like the following is true:

$(15)_{RCT}$ For some world w, there are exactly two counterparts of me in w, x and y, such that x is younger than y and for every counterpart of me in w, z, z is the younger of my Twins in w (i.e. z = x).

This may not be the most perspicuous way of expressing the RCT-reading, but it will do for present purposes. What is clear is that $(15)_{RCT}$ cannot be satisfied: crudely, speaking, any world where I have a Junior-counterpart, I will have a 'Senior'-counterpart who, *ipso facto*, will not be a Junior. Neither Lewis's nor Forbes's systems, LCT and FCT, have this difficulty. In both, (15) is true as long as $(15)_{LCT}$ is:

$(15)_{LCT}$ For some world w, there are exactly two counterparts of me in w, one of whom is younger than the other.

So, how telling is RCT's inability to accommodate (15)?

Not very, I say. The predicate 'x is a Junior' is defined in terms of counterparts, it cannot be defined in the modal language itself. I see no reason why predicates that are indefinable in our modal language should figure in it at all; it is only to be expected that accommodating them will yield peculiar results.

Consider (16) for example:

(16) There are Juniors.

(16) cannot come out true because this would require that an individual in the actual world have two counterparts in the actual world—something ruled out by all three of our counterpart theories. In LCT and FCT this result then gives rise to the satisfiability of (17), which I find decidedly odd:

(17) $\exists x \Diamond Jx \wedge \Box \forall y \neg Jy$ [49]
Someone might have been a Junior even though it is necessarily true that no one is a Junior.

FCT renders the counterintuitive (18) satisfiable:

(18) $\Diamond(Jm \wedge Sm)$
I might have been a Junior while being a Senior.

LCT only avoids this sort of result because (i) it does not have names, and (ii) it translates variable-types rather than tokens. However, it does render the related sentence (18′) satisfiable:

(18′) $\forall x(\Diamond Jx \rightarrow \forall y(x = y \rightarrow \Diamond(Jx \wedge Sy)$
Anything which might have been a Junior, is such that anything it was identical to might have been a Senior while it was a Junior.

So, as I say, counterintuitive verdicts are probably unavoidable if we incorporate predicates definable only in terms of counterparts into QML, and then evaluate them according to our CT-semantics.

[49] (17)'s satisfiability invalidates the Converse Barcan Formula [$\Box \forall x \varphi(x) \rightarrow \forall x \Box \varphi(x)$] (CBF). While there may be some examples that support the denial of (CBF), it does not strike me that (17) is one.

Objection 3: the Falsehood Principle

We noted earlier (§4.2.3, p. 77) Forbe's complaint against LCT's enforcement of the Falsehood Principle. He repeats the complaint against RCT (Forbes 1990, p. 169), since (FP)* is trivially valid in RCT given the preliminary translation of sentences:

$$\text{(FP)*} \quad \Box(Ft_1...t_n \rightarrow (\text{Exists*}(t_1) \wedge ... \wedge \text{Exists*}(t_n))$$

In retrospect, I think I was wrong in trying to defend the Falsehood Principle in Ramachandran (1990b). I concede that

> [...] whether or not the Falsehood Principle is correct is a metaphysical question which logic should not foreclose (Forbes 1990, p. 169).

Of the RCT-results considered so far, I regard this and the satisfiability of ($@_5$) and (14) (§4.3.3, p. 86) as the significant failings. We'll see how they can be avoided withing reverting to the earlier approaches in Chapter 5.

4.3.5 Forbes's Modified FCT

Let us turn now to an issue we postponed from §4.2.4: Forbes (1990) attempt to fix FCT so as to secure the validity of the axiom of necessity [$\Box\alpha \rightarrow \alpha$]. I made some brief remarks against his proposal to exclude names of non-actual objects from our logic (p. 78 ff.). I should like to consider his alternative proposal now:

> Suppose that in the last stage of translation, when atomic formulae are being relativized to a world-term w, for each term-occurrence t_i in '$Ft_{1...}t_n$' we write '$\exists v_i C v_i t_i w \wedge$' and substitute v_i for t_i in '$Ft_1, ... t_n$'. For the formula '$\Box Fb \rightarrow Fb$' [= (N)], using the clause for $\Box$ [i.e. (V_4) on p. 71], we would then obtain:
>
> $$(\text{N})_{\text{FCT*}} \; \forall w \forall x(Cxbw \rightarrow \exists y(Cyxw \wedge Fyw)) \rightarrow \exists x(Cxbw^* \wedge Fxw^*)$$
>
> Since FCT guarantees at least one counterpart of b at any world w, and also guarantees that that counterpart is its own sole counterpart at w, this conditional is a theorem of FCT (Forbes 1990, p. 168, with minor typographical adjustments).

This amounts, in effect, to making the substitutions recommended by (a) and (b) to FCT's evaluation rules FT2a and FT2g (on p. 72):

(a) replace FT2a with:

FT2a′: β^u, where β is an atomic QML*-sentence, $Ft_1...t_n$, is

$$\exists t'_1...\exists t'_n((Ct'_1t_1u \wedge ... \wedge Ct'_nt_nu) \;\&\; Ft'_1...t'_nu)$$

(b) replace FT2g and FT2h with the single rule:

FT2g′: $(\mathit{ACT}\ \beta)^{u}$ is β^{w*} (i.e. β holds at the actual world)

Call the resulting system *Modified*-FCT (or FCT*).

Modified-FCT does achieve its goal of salvaging the axiom of necessity. And the unsatisfactory ($@_2$) is now duly rendered unsatisfiable because ($@_6$) is:

($@_2$) $\Diamond\exists x(\text{ACT Exists}(x) \wedge (\text{ACT F}x \wedge \text{ACT} \neg \text{F}x))$

($@_6$) $\text{ACT Fb} \wedge \text{ACT} \neg\text{Fb}$

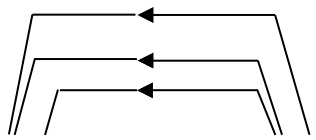
$(@_6)_{FCT*}$ $\exists y(\text{Cybw*} \wedge \text{Fyw*}) \wedge \neg\exists y(\text{Cybw*} \wedge \text{Fyw*})$

$(@_6)_{FCT*}$ is clearly contradictory.

However, Modified-FCT has some unintended consequences too. Ramachandran (1990b, p. 176 ff.) notes that identity is no longer transitive. The FCT-unsatisfiable sentence (19), for example, becomes satisfiable in FCT*:

(19) $(\underline{b} = \underline{c})\ \&\ (\underline{c} = \underline{d})\ \&\ (\underline{b} \neq \underline{d})$

Model 4.13 is a verifying model. We need only rule FT2a′ to evaluate (19). ‘$\underline{b} = \underline{c}$’ is *true* because *b* and *c* both have *b* as a counterpart in w*; ‘$\underline{c} = \underline{d}$’ is *true* because *c* and *d* both have *a* as a counterpart in w*; but ‘$\underline{b} = \underline{d}$’ is *false* because *b* and *d* have no common counterpart in w*.



w* = {*a*, *b*} w = {*c*, *d*}

Ref(x) = *b*

Ref(y) = *c*

Ref(z) = *d*

Fig. 4.13

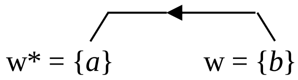
Now, given the FCT-satisfiability of [$\Diamond t \neq t'$] which we have noted, Forbes may argue that this result is to be welcomed. But this is of little comfort to those (like me) who find both unpalatable!

Another unintended ramification of FCT* is that it reverses FCT’s verdicts on (8′) and (LL′)—these now come out invalid:

(8′) $(\underline{a} = \underline{b}) \rightarrow \Box(\text{Exists}(\underline{a}) \leftrightarrow \text{Exists}(\underline{b}))$

(LL′) $(\underline{a} = \underline{b}) \rightarrow (\Diamond\alpha \leftrightarrow \Diamond\alpha[\underline{b}/\underline{a}])$

Model 4.8 serves to make the point. $[\underline{a} = \underline{b}]$ is true because *a* and *b* both have *a* as their only *w**-counterpart. But, only *b* has a *w*-counterpart—so (8′)'s consequent is false; and only *a* is possibly *F*—so (LL′)'s consequent is false.



Ext(F, w*) = {< *a* >}
Ext(F, w) = ∅ (the empty set)

Figure 4.8

Of course, I have argued that these are the proper verdicts, and they are the verdicts RCT delivers—I just wanted to register the change.

A Marriage Proposal

The real purpose of leaving discussion of Modified-FCT till now though is to point out Forbes (1990) is basically adopting Ramachandran's (1989) narrow-scope strategy here—as is clear from the following translations:

(20) $\neg Fa$

$(20)_{FCT}$ $\neg Fa$

$(20)_{FCT*}$ $\neg\exists x(Cxaw^* \wedge Fxw^*)$

$(20)_{RCT}$ $\neg\exists x(Cxaw^* \wedge Fxw^*)$

This discreet marriage of the two approaches heralds a more robust counterpart theory which will be developed in Chapter 5.

CHAPTER 5
MANY-ONE COUNTERPART THEORY

Preamble

In the previous chapter we saw how early approaches to counterpart theory are bedevilled by problems arising from allowing multiple counterparts of an object at a world. Contingent identity, especially contingent self-identity in the case of LCT and FCT, was, I hazard, an unsought consequence defended *post hoc*. The modal realism behind counterpart theory seems dubious motivation for contingent identity.

Here is a central concern I have. Lewis claims his extreme realism *explains* modal facts: modal facts are *reducible* to non-modal facts about spatio-temporally unrelated but equally real worlds, of which the actual world, the world we inhabit, is but one. But what non-actual worlds *are there*? Why should there be any worlds which *make it true* that *Hitler might have been a barber*, say? Indeed, what grounds are there for thinking there are any non-actual worlds at all? Why should there be the ‘plentitude’ of worlds required to make what we take to be non-trivial modal facts true? What ensures “that there are possibilities enough, and no gaps in logical space?” (Lewis 1986, p. 87).

Lewis looks to “the Humean denial of necessary connections between distinct existence” (1986, p. 87) and a *principle of recombination* according to which:

> […] patching together parts of different possible worlds yields another possible world. Roughly speaking, the principle is that anything can coexist with anything else, at least provided they occupy distinct spatiotemporal positions. Likewise, anything can fail to coexist with anything else. (1986, p. 87-88)

As Divers (2002) elaborates:

> So, for example, since there exists a horse and there exists a horn, there exists a world which contains a horse with a horn. (Divers 2002, p. 107)

But I find the principle of unrestricted recombination highly implausible. I want to deny, for example—what the principle delivers—that humans might have had hoofs, horns and wings.

And the ‘can’ in Lewis’s claim that ‘anything can coexist with anything else’ strikes me as meaning ‘*could’*. In which case, *these basic modal facts* (about possible coexistence) must be regarded as primitive, not as reducible to non-modal facts about worlds; for, it is they which explain what worlds there are. Indeed, possible worlds effectively drop out of the picture: these basic modal facts putatively explain all others (I am setting aside logical and mathematical truths here). Divers (2002, ch. 7) discusses ways of disarming this kind of worry, but I remain unpersuaded.

Hence, I do not buy the supposed explanatory virtues of modal realism. I therefore also doubt that a credible case for contingent identity *from* modal realism and any attendant counterpart theory can be made. And Gallois’ (1986; 1990) case for contingent identity, which we considered in Chapter 2, must be set aside in my opinion since it advocates contingent self-identity: of Mary and Alice in his ship example (§2.1), and, implicitly if not explicitly, of AMOEBA and AMOEBA in his example of amoebic division (§2.2). As for the Titanic–QE2 variation I floated on behalf of Chandler’s (§3.1.1), it was presented simply as a variation of his own putative counterexample; my goal was only to illustrate the mixed-designation phenomenon, not to trumpet a genuine case of contingent identity.

So, we are, as yet, short of a tenable case for contingent identity across worlds, or for modal counterpart theory, for that matter. In this chapter I will make a case for both by way of considering Chisholm’s (1967) modal paradox, which appeared just a year before Lewis’s (1968) counterpart theory. Stalnaker (1986) takes this paradox, and others, to motivate counterpart theory, albeit not one underpinned by extreme modal realism; and, more recently, Sider (2001) appeals to a temporal version of the paradox in motivating four-dimensionalism and an accompanying temporal counterpart theory. But they do not address Salmon’s (1981; 1986; 1989; 1993) dogged defence of an alternative solution floated earlier by Chandler (1976); namely, ditching the S4-axiom [$\Diamond\Diamond\psi \rightarrow \Diamond\psi$], and endorsing the view that what is possible may be only *contingently* possible.

§5.1 presses two lines of objection against the Chandler–Salmon (CS-) solution; these give rise to two variations on Chisholm’s paradox, what I shall the *strengthened* version and the *identity* version. I will argue that only a counterpart-theoretic approach can resolve all three versions because, as the identity version reveals, accommodating the intuitions underlying the parodexes commit one to contingent identity. §5.2 points to shortcomings of some CT-approaches, including Forbes' (1984) 'fuzzy' CT-solution, and proposes a mish-mash of the FCT and RCT approaches following on from Forbes's Modified-FCT. A key departure from the earlier theories is the invocation of *many-one counterpart assignments*. These enable CT-theorist to avoid many of the counterintuitive results unearthed in Chapter 4.

The remaining sections sketch ways of developing many-one counterpart theory to handle (§5.3) *occasional identity* and (§5.4) *sortal-relative contingent identity*. I will provide only cursory motivations for these—certainly not as rigorous as the case I make for modal counterpart theory in §5.1; my goal is simply to signal possible extensions and modifications.

5.1 Chisholm's Modal Paradox: A Case for Modal Contingent Identity and Counterpart Theory

This section is largely extracted, much of it verbatim, from a paper that was under consideration for publication at the time of writing, 'Chisholm's Modal Paradox(es) and Counterpart Theory 50 Years On'. The paper has since been accepted (Ramachandran forthcoming).

5.1.1 The paradox and the Chandler–Salmon solution

Chisholm's (1967) modal paradox, as presented here,[50] arises from a compelling principle concerning composite artefacts:

[50] Salmon (1981) and Williamson (1990) present more refined versions which avoid certain complications; but this crude version will serve our purposes.

The Moderate Toleration Principle (MTP)

Necessarily, any (large) composite object (such as e.g. a ship) might have originally been composed of a *slightly different* set of parts (i.e. the same-but-for-one-or-two parts) but could not have been composed of a *very different* set of parts.

Suppose a ship α is composed of a set of n planks, P_0, in the actual world w_0. Let 'P_kx' mean 'x is a ship that is qualitatively identical in design and composition to α as it is in w_0, and comprises all but k of the planks α is made of in w_0.

Since α is P_0 in w_0, by MTP α is P_1 in some other world w_1; but, then, by MTP again, *that ship*, the one in w_1, supposedly α, is P_2 in yet another world w_2; and by MTP again, *that ship*, the one in w_2, supposedly α, is P_3 in a world w_3. And so on. Eventually, we reach the conclusion that α is P_n in some world w_n, i.e. that α is composed of an entirely different collection of planks in world w_n, which would appear to directly contradict the latter part of MTP.

Thus, the paradox is standardly taken to be this: MTP requires that the following set of sentences be consistent, whereas our reasoning above, given succour by Kripkean S5-semantics for quantified modal logic (QML) (KS5 for short), renders it inconsistent:

$$\Gamma = \{P_0\alpha, \neg\Diamond P_n\alpha, \Box(P_k\alpha \rightarrow \Diamond P_{k+1}\alpha) \text{ for each } k, 0 \leq k < n\}$$ [51]

We can think of the $[\Box(P_k\alpha \rightarrow \Diamond P_{k+1}\alpha)]$ as *toleration premises*. However, I prefer to represent the paradox with the more general toleration premises $[\Box(x)(P_kx \rightarrow \Diamond P_{k+1}x)]$ which MTP explicitly avows. Thus, our focus will be on the (in)consistency of

$$\Gamma_1 = \{P_0\alpha, \neg\Diamond P_n\alpha, \Box(x)(P_kx \rightarrow \Diamond P_{k+1}x) \text{ for each } k, 0 \leq k < n\}$$

MTP apparently demands that it is consistent, whereas a natural line of reasoning and KS5 decree otherwise.

Of course, one might take the KS5-inconsistency as grounds for maintaining that the very composition of a (composite) object, such as a ship, when it comes into being is *essential*

---

[51] See e.g. Salmon (1981; 1989) and Forbes (1983; 1984).

to it: so that e.g. α's original composition could not have been even slightly different.[52] But I find the moderate toleration principle more compelling than such absolute essentialism; so, I seek a solution to the paradox which accommodates MTP.

Chandler (1976) and Salmon (1981; 1986) render Γ_1 consistent by proposing a non-transitive accessibility relation between worlds, which, on Kripke-semantics, is tantamount to rejecting the S4-axiom $[\Diamond\Diamond\psi \rightarrow \Diamond\psi]$. So, e.g. what is possible relative to world w_1 need not be possible relative to the actual world w_0; thus, even though α's being P_2 at world w_2 entails the truth of $[\Diamond\Diamond P_2\alpha]$ at w_0, it does not entail that $[\Diamond P_2\alpha]$ is true at w_0. We'll call this the Chandler-Salmon (CS-) solution.[53]

That rejecting S4 renders Γ_1 consistent is indisputable; but I think two lines of objection demonstrate that this strategy is inadequate.

5.1.2 The Strengthened variation

The first objection centres on the fact that the S4-solution still allows that $[\Diamond^n P_n\alpha]$ holds, where '$\Diamond^n$' stands for *n* iterations of '◊'. Indeed, Salmon (1993, pp. 156-157) takes it to be an interesting consequence of his strategy that $[\Diamond^n P_n\alpha]$ follows, even though $[\Diamond P_n\alpha]$ does not, from $[P_0\alpha]$ if one allows, as he does, 'infinite necessitations' of the toleration principles $\Box(x)(P_k x \rightarrow \Diamond P_{k+1}x)$ —that is, $[\Box^m(P_k\alpha \rightarrow \Diamond P_{k+1}\alpha)]$ for every *m*. But, allowing $[\Diamond^n P_n\alpha]$ is surely to concede that α is P_n in a world, e.g. w_n, that is *possible in some sense*, albeit, a world which, according to the S4-strategy, is *inaccessible from* (*impossible relative to*) the actual world. Lewis puts the point as follows:

> [...] by what right do we ignore worlds that are deemed inaccessible? Accessible or not, they're still worlds. We still believe in them. Why don't they count? (Lewis 1986, p. 246)

---

[52] This would be a variety of *mereological essentialism*, but not the variety Chisholm (1973) argues for, which applies to more fundamental composite objects; he does not regard things like *tables* and *ships* as *primary* objects.

[53] Salmon (1986, p. 82) also allows vagueness in the accessibility relation, so that e.g. it can be indeterminate whether one world is accessible (possible) relative to another. But the points we will be making here are unaffected by this.

Salmon (1989) addresses this objection, but I argue he fails to refute it. As I too deny modal realism, I have no quarrel with Salmon's conception of possible worlds as:

> [...] certain sorts of (in some sense) maximal abstract entities *according to which* certain things (facts, states of affairs) obtain and certain other such things which do not obtain (Salmon 1989, p. 5)

This conception allows for (metaphysically, logically, nomologically) *impossible* worlds; so, I agree with his point against Lewis that the mere fact there is a world, *w*, *according to which* [α is P_n] holds does not thereby render it metaphysically possible.

However, Salmon glosses over a distinction one might wish to make, between, as we might put it, *relative* impossibility and impossibility *tout court*, which we can explicate in terms of a non-relative notion of *realizability*. There are worlds, in Salmon's sense, according to which [2 + 2 = 6] holds, but these, one may hold, are not *realizable*—not *actualizable* even from a God's-eye perspective—given the nature of the arithmetical terms therein. Likewise, there are worlds according to which humans are also elephants; but these, one may hold, are not *realizable* either, given the natures (essences?) of humans and elephants. Such worlds, i.e. unrealizable ones, are impossible *tout court*, not merely contingently impossible.

Now, it strikes us that some advocates of MTP advocate it on *essentialist* grounds; the thought that α *could not have been* P_n, for them, reflects the view that [α is P_n] is not just relatively impossible, but impossible tout court, in the same way that [humans are elephants] is. Such essentialists will deny [$\Diamond^n P_n\alpha$] as well as [$\Diamond P_n\alpha$]. So, these MTP-supporters at any rate will not be appeased by the CS-strategy, since this, as Salmon owns, dictates that [$\Diamond^n P_n\alpha$] holds given infinite necessitations of the toleration principles.

So, I contend that the CS-strategy, by Salmon's own lights, is inadequate insofar as it does not speak to motivations for MTP that also motivate [$\neg\Diamond^n P_n\alpha$]—the strategy falls short in failing to render the following set of QML-sentences consistent:

$$\Gamma_2 = \{P_0\alpha, \neg\Diamond^n P_n\alpha, \Box^n(x)(P_k x \rightarrow \Diamond P_{k+1}x), \text{ and each } k, 0 \leq k < n\}$$

If it is not yet obvious that counterpart theory is the way to go, our second objection to the CS-strategy, based on another variation on Chisholm's paradox, should make this clear.

5.1.3 The Identity variation

This objection emerges from Williamson (1990), who rejects the CS-solution on the grounds that there are similar paradoxes:

> [...] in which the series of worlds [in our initial example: worlds w_0, w_1, ..., and w_n , where [$P_i\alpha$] holds at world *i*] is viewed not from one end [e.g. from the perspective of w_0] but from the standpoint of a world outside the series, from which all its member are equally possible. (Williamson 1990, p. 126, our insertions)

Here is a simplistic variation in keeping with our ship example to illustrate his point. Suppose a person, X, in charge of building a ship with a unique design as decides, on the advice of his deranged astrologer, on the following procedure to select the collection planks that will be used. Each plank in the warehouse is labelled; X then gets a computer to make a list of *n*+1 collections of planks, Q_0-Q_n, which could be used to build the ship, where collection Q_k has *k* planks that are not in Q_0; X then gets a programme running on the computer which randomly selects a number between 0 and *n*, inclusive. All X has to do is press the return key to display the current selection. Unfortunately, just as X is about to press the key, there is a power cut and the computer switches off. So, no ship of this unique design is actually made.

Let us name each merely possible ship that would have been constructed had there been no power cut, and number *k* had been selected by the computer, β_k. Now, by the moderate toleration principle MTP, ships β_0 and β_n, being originally constructed from entirely different planks are distinct ships: $\beta_0 \neq \beta_n$. But, seeing as any ship β_{k+1} differs from β_k only in being originally constructed with a collection of planks one plank different from the collection that β_k was built from, MTP would appear to license the conclusion [$\beta_k = \beta_{k+1}$]. So, we get all the following identity statements coming out true: [$\beta_0 = \beta_1$]; [$\beta_1 = \beta_2$]; ...; and [$\beta_{n-1} = \beta_n$]. But, by transitivity, we get [$\beta_0 = \beta_n$], contradicting our hypothesis about those ships. So, we have a very similar paradox to Chisholm's, but neither S4 nor any non-modal analogue of it seems pertinent here.

One significant dis-analogy, noted by Salmon (1993, p. 159), is that Williamson's version involves *cross-world identities*. Since none of these ships exist in the actual world, one may well question whether *any* of the above identity statements are true in the actual world. However, Williamson's objection can be recast in terms of *possible* identities: [$\Diamond\beta_0 = \beta_1$]; ....; and [$\Diamond\beta_{n-1} = \beta_n$]. On Kripkean QML-semantics these possibilities are not compatible with the hypothesis [$\neg\Diamond\beta_0 = \beta_n$]. For, the Kripkean treatment of *identity* ensures the validity of the following weak-necessity of identity principle, even if S4 is denied:

(WN) $\Diamond a = b \rightarrow \Box(\exists x(x = a) \rightarrow a = b)$ [54]
(if it is possible that $a = b$, then necessarily, if a exists, $a = b$)

I reject Williamson's (1990) own resolution of this paradox because it effectively amounts to a rejection of moderate toleration: *no* member of the sequence of identities of the form [$\beta_m = \beta_{m+1}$] (or [$\Diamond\beta_m = \beta_{m+1}$]) is determinately true or determinately false on his view (see e.g. Williamson 1990, p. 133). Salmon would agree; he says, "[Williamson's] solution to Chisholm's paradox thus involves embracing a fairly intolerant form of mereological essentialism" (Salmon 1993, p. 158).

Salmon tackles this paradox (1993, p. 161 ff.) by way of the following strategy (which I adapt for our example). Suppose that one of these merely possible ships is such that the worlds where that ship is built (on the basis of this selection process) are closer to actuality than any world where one of the other ships is built. For the sake of argument (given the limitations of our example), let us suppose it is ship β_0. The intuitions underlying our toleration principle MTP will support the first few members in Williamson's series: [$\Diamond\beta_0 = \beta_1$], [$\Diamond\beta_1 = \beta_2$], ..., and also the *falsity* of the final members, including [$\Diamond\beta_{n-2} = \beta_{n1}$], and [$\Diamond\beta_{n-1} = \beta_n$]; but, Salmon reckons, for some members in between, it will be indeterminate whether they are true or false. So, Salmon contends, the conjunction of the *determinately true* members of Williamson's series do *not* entail the conclusion [$\Diamond\beta_0 = \beta_n$] as Williamson claims.

An obvious problem with Salmon's response is that it ignores Williamson's hypothesis that all the possibilities are *equally possible*: the worlds where the various ships are built are *equally close* to the actual world. If so, it would seem reasonable to allow that if one

[54] On Kripkean QML-semantics, treating constants as unbound variables, [$a = b$] is true at some world on a model, M, iff Ref(a) = Ref(b) in M; but, then, [($\exists x(x = a \rightarrow a = b$] will come out true at every world on M.

member of the series is true, all are. The trouble is, Salmon has given no convincing reason for questioning Williamson's 'equally possible' hypothesis.

But the more telling problem is this. Even if one grants that Salmon has succeeded in casting doubt on the claim that all the members of the series are true, his strategy still dictates that [$\Diamond^k\beta_{k-1} = \beta_k$] *is* determinately true for each k, $0 < k < n$. But, in that case, [$\Diamond^n\beta_k$-1 = β_k] also comes out true for all such k. Our initial objection now resurfaces: even if S4 is denied, the Kripkean treatment of identity ensures the validity of a stronger weak-necessity of identity principle:

(WN^n) $\Diamond^n a = b \rightarrow \Box(\exists x(x = a \vee x = b) \rightarrow a = b))$.
(if it is possible^n that $a = b$, then necessarily, if either exists, $a = b$)

So, Salmon's strategy against Williamson still commits him to the consistency of the following set of QML-sentences, *contra* Kripkean QML-semantics:

Γ_3 = {[$\neg\Diamond\beta_0 = \beta_n$], and [$\Diamond^n\beta_k = \beta_{k+1}$] for each k, $0 \leq k < n$}

Salmon (1986) has argued that Chisholm's paradox is *not* a paradox about *identity*—his main grounds being that the premises generating the paradox do not explicitly invoke identity. He makes the same point in his response to Williamson (Salmon 1993, p. 159). But, if our rejoinders to Salmon are correct, it is precisely the treatment of identity in Kripke-QML-semantics—and *not* S4, as Salmon maintains—which is behind Williamson's paradox. In light of this, we should be open at least to an over-arching solution to our paradoxes that plays on the interpretation of identity.

Moreover, we should be prepared for a solution that countenances *contingent identity*, in some sense at least. For, presumably the members of Γ_3 can only be jointly true if there are worlds w and w' and possible ships β_j, and β_k such that (i) and (ii) below hold:

at w: $\beta_j = \beta_{j+1}$
at w': $\beta_{j+1} = \beta_k \wedge \beta_j \neq \beta_k$

But (ii) entails:

at w': $\beta_j \neq \beta_{j+1}$

So,

β_j and β_{j+1} are only contingently identical at world *w*.

Cue counterpart theory—the obvious way of accommodating contingent identity. Our goal in the remainder of the paper is to identify a CT-framework that allows for a solution to our paradoxes at minimum cost to our modal intuitions.

5.1.4 LCT and solution #1 (denies counterpart-transitivity and S4)

LCT affords a consistent interpretation of MTP. Consider the way the paradox was initially set up in §5.1.1 (p. 96):

> […] by MTP α is P_1 in some other world w_1; but, then, by MTP again, *that ship*, the one in w_1, which is α by hypothesis, is P_2 in yet another world w_2 […]

The CT-interpretation is that the first token of the demonstrative '*that ship*' in the above passage picks out a *counterpart*, x_1, of α in w_1; and it is *that ship*, x_1, which has a counterpart, x_2, in w_2 which is P_2; and it is *that ship*, x_2 which has a counterpart, x_3, in w_3 which is P_3; and so on. Crucially, x_2 need not be a counterpart of α if the counterpart relation is not transitive: thus, what is (im)possible for one ship need not be (im)possible for a counterpart of that ship. So, although this line of reasoning commits us to a world w_n in which a counterpart of a counterpart …of a counterpart of α is P_n, we are not thereby committed to [$\Diamond P_n\alpha$], i.e. to α having a counterpart that is P_n.

We can capture the above accommodation of MTP more precisely as follows. Let us use 'C^nxy' or 'x is an *nth-counterpart* of y' as shorthand for 'x' followed by n-iterations of 'is a counterpart of' followed by 'y'. Thus, denying counterpart-transitivity is tantamount to denying that [C^nxy] entails [Cxy]. In LCT, [$\Diamond^n\phi(t)$] holds if and only if [$\exists x(C^nxa \wedge \phi(x))$] holds. So, denying counterpart-transitivity has the effect of rendering [$\Diamond\Diamond Ft \rightarrow \Diamond Ft$], an instance of the S4-axiom [$\Diamond\Diamond\psi \rightarrow \Diamond\psi$], invalid. Consequently, even though [$P_0\alpha$] and the toleration principles [$\Box(x)(P_kx \rightarrow \Diamond P_{k+1}x)$] commit LCT-theorists to [$\Diamond^nP_n\alpha$], they are not thereby committed to [$\Diamond P_n\alpha$], which we want to deny. In short,

$$\Gamma_1 = \{P_0\alpha, \neg\Diamond P_n\alpha, \ \Box(x)(P_kx \rightarrow \Diamond P_{k+1}x) \text{ for each } k, 0 \leq k < n\}$$

is LCT-consistent. So, we have a putative solution to Chisholm's original paradox. Two points to flag—anticipating our discussion of Forbes in §5.1.5—are, first, that Γ, {$P_0\alpha$, $\neg\Diamond P_n\alpha$, $\Box(P_k\alpha \rightarrow \Diamond P_{k+1}\alpha)$ for each k, $0 \leq k < n$}, also comes out LCT-consistent, and, second, that we are not here denying that every world is possible relative to (accessible from) every other world. In standard QML-semantics, the S4 and S5 axioms are valid if the accessibility relation is an equivalence relation. This is not so in LCT: it is the nature of counterpart-relation (whether it is reflexive, symmetric or transitive) which determines what kind of system we have—we get S4 if it is transitive, S5 if it as equivalence relation, etc. (This is assuming, as Lewis stipulates, that LCT is a semantics for QML-with-closed-sentences. As we have seen, (K) is LCT-invalid if open sentences are allowed.)

Denying counterpart-transitivity also straightforwardly resolves what we are calling the identity variation of Chisolm's paradox, because it renders:

$$\Gamma_3 = \{[\neg\Diamond\beta_0 = \beta_n], \text{ and } [\Diamond^n\beta_k = \beta_{k+1}] \text{ for each } k, 0 \leq k < n\}$$

(where, recall, the β_k are all unactual but possible ships) LCT-consistent. Briefly: for some j, β_{j+1} may now have a counterpart that is not a counterpart of β_j.

But, as we have noted, LCT-theorists *are* commited to $[\Diamond^n P_n\alpha]$, by virtue of being committed to there being an nth-counterpart of α which is P_n. So, they cannot accommodate

$$\Gamma_2 = \{P_0\alpha, \neg\Diamond^n P_n\alpha, \Box^n(x)(P_k x \rightarrow \Diamond P_{k+1}x), \text{ and each } k, 0 \leq k < n\}$$

—it is LCT-inconsistent. Hence, LCT does not yield a resolution of the strengthened Chisholm's paradox.

5.1.5 Fuzzy FCT and solution #2 (preserves counterpart-transitivity and S5)

Forbes (1983; 1984) represents Chisholm's paradox as posing the problem of accommodating Γ (rather than our Γ_1):

$$\Gamma = \{P_0\alpha, \neg\Diamond P_n\alpha, \Box(P_k\alpha \rightarrow \Diamond P_{k+1}\alpha) \text{ for each } k, 0 \leq k < n\}$$

But, he condemns solutions which rest on denying S5, or the transitivity of the accessibility relation between worlds. He points to a close parallel between Chisholm's paradox and the Sorites: in S5, $[\Box(A \rightarrow \Diamond B)]$ is equivalent to $[(\Diamond A \rightarrow \Diamond B)]$; so Γ can be recast as Γ^*:

$$\Gamma^* = \{P_0\alpha, \neg\Diamond P_n\alpha, \Diamond P_k\alpha \rightarrow \Diamond P_{k+1}\alpha \text{ for } k, 0 \leq k < n\}.$$

This recasting highlights the parallel between the two paradoxes and, thereby, makes it:

> ... much less clear that the problem arises because of some fallacious modal inference since there is no modal logic in the standard Sorites; so a solution of Chisholm's paradox which focusses on the accessibility relation between worlds runs the risk of not directly addressing the heart of the matter (Forbes, 1984, pp. 172-73).

As we noted in §5.1.4, LCT accommodates Γ by denying counterpart-transitivity and, thereby, S5, but *not* the equivalence of the world-accessibility. It is the denial of S5 Forbes is ultimately challenging—since the standard Sorites does not invoke modal logic—so he is also challenging the denial of counterpart-transitivity as a solution too.

Forbes reckons that the two paradoxes should have similar solutions, and, given our remarks above, these solutions should not rest on denying the equivalence of the counterpart or world-accessibility relations. To this end, he proposes the following fuzzy FCT-semantics, that is, one which invokes *degrees of truth*—any departures are irrelevant to the objections we'll be making. For any FCT-sentences α and β:

- $Deg(\alpha) \in [0, 1]$ -- the degree to which α is true takes a real value between 0 and 1; crudely, in the case α is an atomic sentence, this reflects the extent to which the individuals referred to in α satisfy the predicate: 0 for complete non-satisfaction, and 1 for complete satisfaction.
- $Deg(\neg\alpha) = 1 - Deg(\alpha)$
- $Deg(\alpha \,\&\, \beta) = \min\{Deg(\alpha), Deg(\beta)\}$
- $Deg(\alpha \vee \beta) = \max\{Deg(\alpha), Deg(\beta)\}$
- $Deg(\alpha \rightarrow \beta) = 1 - (Deg(\alpha) - Deg(\beta))$ if $Deg(\alpha) > Deg(\beta)$; 1 otherwise.
- $Deg(\exists x\alpha(x)) = \max\{Deg(\alpha(c)$: c is a constant$\}$ – (it is assumed that every possible object x has a name: i.e. that for any possible x, $\text{Ref}(c) = x$ for some constant c).
- $Deg(\forall x\alpha(x)) = \min\{Deg(\alpha(c)$: c is a constant$\}$

A rule (or inference) is *valid* if

> … its conclusion in any application never takes a degree of truth lower than the greatest lower bound of the premises to which it is applied (Forbes 1984, p. 175).

Chisholm's paradox is supposedly resolved as follows. The degree of truth of a toleration conditional [$\Diamond P_k\alpha \rightarrow \Diamond P_{k+1}\alpha$] is the degree of truth of its FCT-translation:

(F1) $\exists u\exists x(Cx\alpha u \,\&\, P_k xu) \rightarrow \exists v\exists y(Cy\alpha v \,\&\, P_{k+1}yv)$

Since counterpart-hood is grounded on *similarity*, which obviously admits of degrees, and any counterpart x of ship α which is P_k is going to be *more similar* to α than any counterpart y of ship α which is P_{k+1}, the antecedent of (F1) will always be *truer*—have a higher degree of truth—than its consequent. Hence, the conditional itself will never be less true than its consequent. Therefore, given the definition of validity, *every* application of *modus ponens* in the paradoxical reasoning for $k > 1$, to get [$\Diamond P_{k+1}\alpha$] from [$\Diamond P_k\alpha$], is invalid—or, as Forbes says, "commits the 'fallacy of detachment'" (Forbes 1984, p. 175). On the face of it, then, the reasoning would seem to be blocked *at the very first step*: even the inference from [$\Diamond P_0\alpha$] to [$\Diamond P_1\alpha$] is, on this view, invalid (i.e. illegitimate). And the same strategy would seem to block the inference to [$\Diamond\Diamond P_2\alpha$] too, and, thus the line of reasoning which eventually leads to [$\Diamond^n P_n\alpha$].

Not so. The fact is, Forbes's solution pivots on his special evaluation rule for the conditional '$\rightarrow$': [$\alpha \rightarrow \beta$] is not evaluated as equivalent to the *material conditional* [$\alpha \supset \beta$], i.e. [$\neg\alpha \vee \beta$]. But, he offers no reasons for thinking that upholders of Γ mean anything other than '$\supset$' when they use '$\rightarrow$'. The lacuna in Forbes's solution, then, is precisely that it does not deliver the consistency of Γ, or, what is more pertinent for our purposes, of Γ_1, when the '$\rightarrow$' is read as '$\supset$'. Here, briefly, is why it does not accommodate Γ_1 (with '$\supset$' replacing '$\rightarrow$'):

$$\Gamma_1 = \{P_0\alpha, \neg\Diamond P_n, \Box\forall x(P_k x \supset \Diamond P_{k+1}x) \text{ for each } k, 0 \leq k < n\}$$

- For any ship x which is P_k at a world u, $Deg(P_k xu) = 1$. (Forbes's strategy for resolving Chisholm's paradox only assumes that counterpart-hood admits of degrees.)
- For any ship x which is P_k at world u, and any counterpart of x, y, which is P_{k+1} at

world v, $Deg(Cyxv)$ will be less than $Deg(P_kxu)$, but close to 1; for, y differs only minimally from x.

- Sticking with the same x and y, we get:
  $Deg(\neg P_kxu \vee P_{k+1}yv) = \max(1 - Deg(P_kxu), Deg(P_{k+1}yv))$
  $= Deg(P_{k+1}yv)$ from (1) and (2)

- So, the following argument *is valid* on Forbes's earlier reasoning:
  $P_k, P_kxu \supset \exists v\exists y(Cyxv \ \&\ P_{k+1}yv) \therefore \exists v\exists y(Cyxv \ \&\ P_{k+1}yv)$

- Hence, from our initial premise [$P_0\alpha w^*$] (α is P_0 in the actual world), we can validly infer that [$P_1b_1w_1$] holds for some counterpart of α, b_1, at some world world w_1; and, then, that [$P_2b_2w_2$] holds for some a counterpart of b_1, b_2, at some world w_2; and so on.

- Assuming counterpart-transitivity, we can thereby validly derive [$\Diamond P_n\alpha$]; in which case, Γ_1 is not consistent.

So, until Forbes provides a case for *not* understanding the toleration principles at play as material conditionals, his fuzzy strategy fails to resolve Chisholm's paradox. (Let us in any case stipulate that henceforth, '$\rightarrow$' should be understood as the material conditional.) And denying counterpart-transitivity would rather defeat his purpose, since there would, in that case, be no need to resort to fuzzy semantics.

5.2 FRCT — A Many-One Counterpart Theory

We saw that LCT fails to accommodate the paradoxical set of premises Γ_2 in the strengthened version of Chisholm's paradox. This is because in LCT the satisfiability of [$C^nt\alpha \wedge \phi(t)$] goes hand in hand with the satisfiability of [$\Diamond^n\phi(\alpha)$]. But this is not so in FCT and RCT, on which the S4 axiom [$\Diamond\Diamond\psi \rightarrow \Diamond\psi$] is trivially true—courtesy of their respective evaluation rules for '$\Diamond$' and '$\Box$' (FT2f in §4.2.1 p. 72 and ($\Diamond$) in §4.2.1 p. 81). So, for FCT- and RCT- theorists, commitment to there being an nth-counterpart of α which is P_n (at some world) does not commit them to [$\Diamond^nP_n\alpha$]. Thus, they both render Γ_2 consistent:

$$\Gamma_2 = \{P_0\alpha,\ \neg\Diamond^nP_n\alpha,\ \Box^n(x)(P_kx \rightarrow \Diamond P_{k+1}x), \text{ and each } k,\ 0 \leq k < n\}.$$

We have, then, two very different CT-approaches that can handle all out paradoxes. But each has undesirable outcomes (laid out in §§4.2 and 4.3). In FCT we have, for instance, the invalidity of [$\Box\psi \rightarrow \psi$] and satisfiability of [$\Diamond t \neq t'$]; in RCT we have, for instance, the enforcement of the Falsehood Principle.

Forbes's Modified FCT (§4.3.5) marries the two approaches, with the result that [$\Box\psi \rightarrow \psi$] comes out valid and the Falsehood Principle comes out invalid, as we desire. But it leaves the satisfiability of [$\Diamond t \neq t'$], and ushers in the satisfiability of [($\underline{b} = \underline{c}$) & ($\underline{c} = \underline{d}$) & ($\underline{b} \neq \underline{d}$)], i.e. the failure of transitivity of identity in the actual world.

I accept Forbes's marriage proposal but suggest a further modification so as to secure the necessary equivalence of identity. Here is the CT-system I recommend, FRCT.

5.2.1 Introducing FRCT

FRCT retains FCT's three-place counterpart relation, and the postulate that for any object *a*, and any world *w* that does not *contain* a counterpart of *a*, *a* is its own, and sole, counterpart at *w*. But it follows the RCT-strategy (§4.3.1) of taking CQs (counterparpart quantifiers) to govern just atomic sentences. The procedure for translating a QML sentence into FRCT differs slightly from RCT's scheme—I have marked the departures by emboldening the text (for comparison with RCT, see p. 80) :

QML–FRCT TRANSLATION SCHEME

Defn. 1: A term in a QML-sentence, ψ, is *modally free* if it is either a constant, or a variable-token that is governed by a modal operator which has narrower scope than the quantifier which binds it.

Defn. 2: For any QML-sentence, ψ, $[\psi]_P$ is a *preliminary translation,* the result of replacing every atomic constituent, ϕ, of ψ that has modally free term-tokens t_1, ..., and t_n with **[$\exists t'_1 \ldots \exists t'_n(Ct'_1t_1 \wedge \ldots \wedge Ct'_nt_n \wedge \phi[t'_k/t_k])$]**, where '$\phi[t'_k/t_k]$' is the result of replacing each token of 't_k' in ϕ with 't'_k'.

For any QML-sentence, ψ, the RCT-translation is the result of applying familiar recursive rules to the formula $[\psi]_P^{w^*}$(read: $[\psi]_P$ holds at the actual world, *w**):

(A*) φ^w, where φ is an atomic QML-sentence, $Ft_1 \ldots t_n$, except when F is '=', is simply $Ft_1 \ldots t_n w$

(¬) $(\neg\varphi)^w$ is $\neg\varphi^w$

(∧) $(\varphi \wedge \gamma)^w$ is $\varphi^w \wedge \gamma^w$

(∨) $(\varphi \vee \gamma)^w$ is $\varphi^w \vee \gamma^w$

(∀) $(\forall x\varphi)^w$ is $\forall x(\varphi^w)$

(∃a) $(\exists x\varphi)^w$ ***unless* the '∃x' was introduced in the premliminary translation** is $\exists x(Ixw \wedge \varphi^w)$

(∃b) $(\exists x\varphi)^w$ **where the '∃x' *was* introduced in the premliminary translation** is $\exists x(\varphi^w)$

(□) $(\Box\varphi)^w$ is $\forall u\phi^u$

(◊) $(\Diamond\varphi)^w$ is $\exists u\varphi^u$

(*ACT*) $(ACT\ \varphi)^w$ is φ^{w*}

The change in Defn. 2 anticpates the appeal to many-one counterpart assignments we are going to make in evaluating the FRCT-sentences. The change in the translation of atomic sentences, (A*) in place of (A) on p. 80, has the effect that the FRCT-translation delivers FCT-sentences. The new rules for '∃' allow that counterparts of an object at a world need not exist at the world.

Here are some translations to illustrate the scheme, including some comparisons (numbering here may not correspond to numbering in Chapter 4):

(1) $\Diamond\neg Fa$

$(1)_{FCT}$ $\exists w\exists x(Cxaw\ \&\ \neg Fxw)$

$(1)_{RCT}$ $\exists w\neg\exists x(Ixw \wedge Cxa \wedge Fx)$

$(1)_{FRCT}$ $\exists w\neg\exists x(Cxaw \wedge Fxw)$

(2) $\forall x(Fx \rightarrow \Box Gx)$

$(2)_{RCT}$ $\forall x(Ixw^* \rightarrow (Fx \rightarrow \forall w(\exists y(Iyw \wedge Cyx) \wedge \forall y((Iyw \wedge Cyx) \rightarrow Gy)))$

$(2)_{FRCT}$ $\forall x(Ixw^* \rightarrow (Fxw^* \rightarrow \forall w(\exists y(Cyxw \wedge Gyw)))$

(3) $\Diamond\Diamond Fb$

$(3)_{RCT}$ $\exists u(\exists x(Ixu \wedge Cxb) \wedge \forall x((Ixu \wedge Cxb) \rightarrow Fx))$

$(3)_{FRCT}$ $\exists u \exists x(Cxbu \wedge Fxw)$

(4) $ACT\ (Fa \wedge \neg Gb)$

$(4)_{FRCT}$ $\exists x(Cxaw^* \wedge Fxw^*) \wedge \neg\exists y(Cybw^* \wedge Fyw^*)$

(C=) $\lozenge(t = t') \wedge \lozenge(t \neq t')$

$(C=)_{FRCT}$ $\exists u \exists x \exists y(Cxtu \wedge Cyt'u \wedge x = y) \wedge \exists u \neg\exists x \exists y(Cxtu \wedge Cyt'u \wedge x = y)$

5.2.2 Many-One Counterpart Assignments

We come now to the key departure from Forbes's Modified-FCT (FCT*) and the Lewisian approach. These allow that the counterpart relation is many-many: many objects from one world may have a common counterpart at another, and one object may have many counterparts at a world. It is the second conjunct, the allowing multiple world-counterparts of an object, which gives rise to the FCT*-satisfiability of [$\lozenge t \neq t'$] and [($\underline{b}$ = $\underline{c}$) & ($\underline{c}$ = $\underline{d}$) & ($\underline{b} \neq \underline{d}$)]. I intend to block these yucky results by way of *many-one counterpart* (*MOC*-) *assignments*: these are just like PL-assignments but with the proviso that they comply with the following *many-one counterpart* postulate:

(MOC) $\forall w \forall x \forall y \forall z((Cyxw \wedge Czxw) \rightarrow y = z)$

Lewis argues that we should allow multiple world-counterparts of an object because there obviously could be (indeed, *are*) possible worlds containing identical twins which closely resemble, and are equally similar to, you (Lewis 1968, p. 29). But, as I have made clear, I am not a modal realist. I set out in this chapter to provide a different, more convincing, motivation for endorsing contingent identity and counterpart theory—it was to this end that we considered Chisholm's modal paradox and its variations. A comprehensive solution to these requires that possibly distinct objects have a common counterpart at some worlds, but it does not require that one object have many counterparts at a world. A many-one counterpart theory suffices. However, rather than stipulate that the counterpart relation itself is many-one, I shall deploy MOC-assignments; in part, so that modal realists can stay on board—I am not, after all, denying that objects can, as a matter of (modal-realist) fact have many counterparts at a world; but primarily because a similar stipulation in the case of temporal counterpart theory (the subject of §5.3) is implausible.

FRCT-semantics for QML*

So, here is the CT-semantics for QML* I am recommending:

(Moc1) A QML*-sentence, ψ, is *valid* if and only if its FRCT-translation is true on every MOC-assignment.

(Moc2) A QML* argument is *valid* if and only if the FRCT-translations of its premises and conclusion are such that the conclusion is true on any MOC-assignment which renders all the premises are true.

A modal realist can construe a MOC-assignment as mapping any object to just one of the object's genuine counterparts at any world. And they can, if they wish, take the truth (falsity) of natural language modal statement, *S*, to be explained by the truth (falsity) of its eventual FRCT-rendering on some interpreted MOC-assignment whose truths correspond to reality, i.e. how things stand with the actual world and all other possible worlds, save for possible divergences concerning the counterpart relation. For my part, I see the purpose of a QML*-semantics as a means of establishing the validity or invalidity of modal arguments. To that end, (Moc1) and (Moc2) suffice. The need for a CT-semantics in the first place is that it is required to resolve Chisholm's paradox and its variations.

5.2.3 FRCT check-list

So, I submit FRCT, a marriage of FCT and RCT with MOC-assignments, is a well-motivated counterpart theory which harbours contingent identity. Here is a reminder of some pertinent results:

- '$\Box$' represents strong necessity.
- Contingent self-identity is ruled out, as is 'intra-world' contingent identity (see §4.1.2 p. 66); $[\Diamond t \neq t]$ is not satsifiable.
- But contingent identity by way of contingent distinctness is permitted; (C=), $[\Diamond t = t' \wedge \Diamond t \neq t']$, is atisfiable.
- (K), $[\Diamond\varphi \rightarrow \Diamond(\varphi \vee \gamma)]$, is valid.

- The Falsehood Principle is invalid.
- $[(\underline{a} = \underline{b}) \rightarrow \Box(\text{Exists*}(\underline{a}) \leftrightarrow \text{Exists*}(\underline{b})))]$ and $[(\underline{a} = \underline{b}) \rightarrow (\Diamond\alpha \leftrightarrow \Diamond\alpha[\underline{b}/\underline{a}]))]$ are invalid.
- $(@_3)$, $[\alpha \leftrightarrow \mathit{ACT}\ \alpha]$ is valid.
- Neither $(@_5)$, $[\mathit{ACT}(\neg(F\underline{a} \vee G\underline{a}) \wedge \forall y(Fy \vee Gy))]$, nor $[\Diamond(\neg(F\underline{a} \vee G\underline{a}) \wedge \forall x(Fx \vee Gx))]$ are satisfiable.
- The premises sets in Chisholm's paradox and variatons, Γ_1, Γ_2, and Γ_3 all come out consistent.

5.2.4 Closing remarks on Chisholm's paradox

What of the Sorites paradox, which Forbes argues should have a similar resolution to Chisholm's paradox (§5.1.5)? Of course, I do not deny that the parallels between Chisholm's paradox and the Sorities, or that this should lead us to expect similar solutions. But I do not have a worked out position. Instead, I'll settle for a few brief (unsupported) remarks indicating my present thoughts. First of all, I think the objection to Forbes's fuzzy solution to Chisholm's paradox presented in §5.1.5 carries over to his solution to the Sorites, since it too pivots on his special treatment of '→'. This solution evidently leaves the material-conditional version of the Sorites, so to speak, untouched. Secondly, I am in any case dubious about the appeal to degrees of truth; *tallness*, *baldness* and other vague properties admit of degrees, but this does not commit us to degrees of *truth*, and certainly not to the view that degrees of truth must be invoked to resolve both paradoxes. Rather, I suspect that the common factor will merely be the invocation of a non-transitive similarity (or counterpart) relation. This is work in progress.

Salmon (1989, p. 148) claims that Chisholm's paradox *demonstrates* the invalidity of S4 modal reasoning. I have argued that denying S4 does not in fact resolve it—for, the strengthened and the identity variations remain. I contend that these paradoxes rather *demonstrate* the need for a CT-semantics for QML. Such a semantics should not, however, be regarded as providing the *truth-conditions* for QML-statements as Lewis (1986) maintains. Rather, the appeal to counterparts is required, I contend, to *represent* certain modal facts, such as those underlying our acceptance of MTP for instance, *for the purposes of logic alone*—to explain the correctness or otherwise of modal inferences.

The remainder of this chapter sketches motivations for, and the bare bones of, a *temporal* counterpart theory and a *sortal-invoking* counterpart theory—just to give an idea of how the many-one FRCT approach may be extended.

5.3 Occasional Identity and Temporal Counterpart Theory

Preamble

The case for modal contingent identity, contingent identity across worlds, presented in §5.1 was rather indirect, to say the least. But I think a compelling, and more direct case can be made for occasional identity, contingent identity across time. This case is underpinned by Parfit's (1971) thesis that what matters for the survival of a person is *psychological continuity* rather than (strict) *identity*, which gives succour to the view that persons can survive *teleportation*.[55] §5.3.1 briefly rehearses Parfit's thinking and L&R's (2013) development of a novel stance on occasional identity from a consideration of various sceanrios involving teleportation-mishaps . §5.3.2 sketches how FRCT mght be modified for an apt temporal counterpart theory.

5.3.1 Surviving Teleportation: A Case for Occasional Identity and Temporal Counterpart Theory

Parfitian personal survival in a nutshell

Locke's (1689) view of personal identity over time takes *memory* as forging the crucial link. Very very roughly: person X at time *t* is the same person as person Y at a later time t^+ if Y at t^+ can *recollect* an experience that was had by X at *t*. This is a sufficient condition for personal identity; add to this that personal identity is an equivalence relation, and you get a necessary and sufficient condition for personal identity over time. Parfit's (1971) view of *personal survival*, as we might put it, is a descendant of Locke's view, but— again, very very roughly, and perhaps skewed slightly to support my position—he takes *psychological continuity* to be crucial to personal survival, not personal *identity*. Y is a psychological *continuer* of X, we may say, if a wide variety of

[55] Parfit (1984) apparently rejects his earlier view that persons can survive teleportation; Brueckner (1993) and Ehering (1999) suggest further that he even came to deny that persons can survive fission, period. I stand by early Parfit!

Y's psychological characteristics, not just her (as-of-) memory experiences, are *causally continuous with* (or *dependant on*) X's psychological (or mental) state at an earlier time. These psychological characteristics may include, for example, Y's ability to speak Urdu, her love of Powell and Pressburger movies, her tendency to get embarrassed when flattered, etc. X survives past a certain date if, and only if, there is a (psychological) continuer of X past that date. Identity is not important: there may, for example, be two continuers of X at a certain time *t*, Y and Z; if we respect, as I do, the equivalence of identity *at any time* (EQT) we cannot hold both [at *t*: X = Y] and [at *t*: X = Z], since [at *t*: Y ≠ Z] holds. So, being a continuer of X is not sufficient for *being the same person as* X.

But Parfit (1971) adds to this view the following necessary and sufficient condition for personal identiy:

(P=) For any continuer of X, Y, X = Y (i.e. X is the same person asY) if and only if for any continuer of X, Z, either Y is a continuer of Z or Z is a continuer of Y. (We will say Y is a *non-branching coninuer* of X is such a case.)

L&R (2013) argue that (P=) must be rejected—that being a non-branching continuer is neither necessary nor sufficient for being the same person—by way of considering teleportation mishaps.

Introducing teleportation

Teleportation, let us suppose, works in the following way. At the departure teleport, a machine scans and stores all the information regarding the traveler's psychological (mental) state; the traveler's body is then vaporized, and a machine at the destination teleport reconfigures matter so as to produce a type-identical body with the same psychological make up, a *replicant* of the traveler if you will. Figure 5.1 below depicts the normal course of events.

Person X steps into the departure teleporter at time T_2 and and a replicant of X, Y, 'appears' at a distant teleport a bit later.

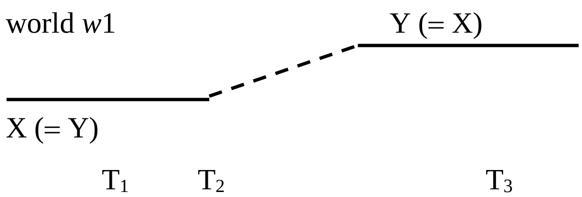


Figure 5.1 Run-of-the mill teleportation

Y is a continuer of X. According to (P=), Y is the same person as X. But there are rare mishaps.

Mishap #1: teleportation fission and occasional identity

Sometimes two replicants, both continuers of X, appear at separate teleports we'll call this a case of teleportation fission.

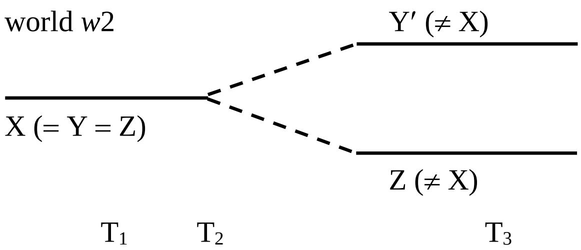


Figure 5.2 Teleportation fission

Here, neither Y′ nor Z are X by (P=). So, if one takes Y′ to be Y, then one is committed to the contingent identity of X and Y, since in world *w*1 Y = Y′ = X. And we would be flouting the Only X and Y principle (introduced in §3.1, p. 48): whether Y is identical with X or not would pivot on the causally independent process leading to the production of another replicant (Z). But if we deny that Y′ is Y, we would be flouting the Simply X principle (§3.1, p. 48): for, then, the very existence of Y would pivot on the causally independent process leading to the production of Z.

The important point I wish to highlight, signaled in Figure 5.2) is that we also have a case for *occasional* identity here: at T_1: Y′ = Z = X, but at T_2: Y′ ≠ Z. So, a temporal counterpart theory is called for.

Mishap #2: no vaporization

Parfit (1984) considers the following sort of mishap. X's psychological data is scanned and then relocated to a replicant at a distant teleport, as in the normal case, but the machine at the departure teleport malfunctions and fails to vaporize X's body:

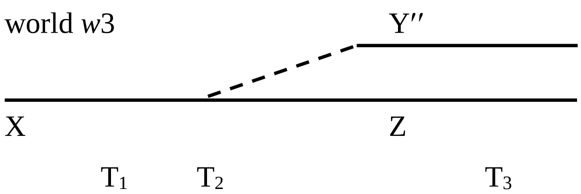


Figure 5.3 No vaporization

Here, both Y″ and Z are continuers of X. Clearly, Z is not a continuer of Y″, and it seems wrong to say that Y″ is a continuer of Z.

In that case, by (P=) neither Z nor Y″ are X. But we surely do want to say that Z *is* X; after all, X is related to Z in precisely the same way that a non-teleporting individual is related to their future self. In order to maintain that Z is X (permanently) we have to deny that non-branching continuity is *necessary* for personal identity.

And we have the same dilemma regarding the identification of Y″ with Y: either the Only X and Y principle or the Simply X principle must be violated.

L&R (2013) make a novel proposal to circumvent this persistent dilemma:

> [R]egard *all* cases of teletransportation [what I am here calling teleportation], including mishap-free cases—that is, including cases where there is no fission or fusion—as producing objects […] that are temporarily identical with the original individual before it is vaporized, but not identical with it post replication (2013, p. 113).

On this proposal, Figure 5.4 replaces Figure 5.1—the key change is that at T_3: Y ≠ X:

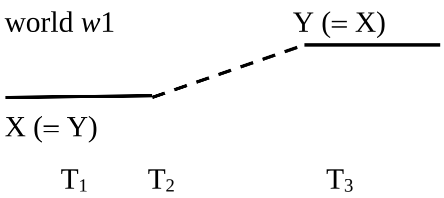


Figure 5.1

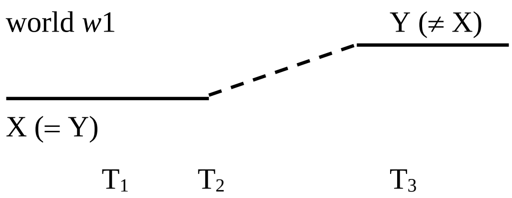


Figure 5.4 Run-of-the mill teleportation

There is no obstacle now to maintaining that Y′ in Figure 5.2 and Y″ in Figure 5.3 are one and the same possible object as Y. The Only X and Y principle is not violated because Y is a different possible individual from X, period. X and Y are temporarily identical at T_1, but could never be permanently identical. The dashed line linking travellers to their replicants is significant: it serves to mark out a causal process which is capable of yielding multiple continuers. The line from X to Z in Figure 5.3 is, by contrast, a continuous line; this signals that the causal processes underpinning normal persistence of individuals cannot yield multiple continuers.

Let us turn now to the logic.

5.3.2 Many-One Temporal Counterpart Theory

First, we need a quantified temporal logic (QTL) in place of QML. Instead of '□', we have the operator 'ALWAYS', and instead of '◊' we have 'ON OCCASION'; we also have temporal operators of the form 'AT TIME *t*'. I assume that symbolizing natural language temporal statements into QTL is straightforward. TCT is just like FRCT but for the following divergences:

- Instead of quantifying over worlds, we now quantify over *times* (including *periods of times*); we can continue to reserve '*u*', '*v*' and '*w*', possibly with numerical subscripts, for this purpose.
- The counterpart realation is basically the continuer relation. It remains a 3-place relation: 'C*xyw*' for '*x* is a counterpart (continuer) of *y* at time *w*'. It is reflexive and transitive but not symmetrical.
- One important divergence, demanded by our take on Figure 5.3, is that we now allow: (a) that objects may exist at various times—they are not 'time-bound'; and (b) that an object *b* can be its own counterpart at a time *w* even if another object which exists at *w* is also counterpart of *b* at *w*.
- Another important divergence is that we should now take seriously the view that temporal statements about an object *b are made true* by non-temporal facts concerning counterparts of *b*. I argued that the truth-making conception of counterparts was not apt in the case of modal counterpart theory; but it strikes me that it is quite apt in the temporal case. (Unless, of course, one happens to be a four-dimensionalist.) More on this shortly.
- The translation rules for 'ALWAYS' and 'ON OCCASION' are precisely the same as the rules for '□' and '◊', respectively. But we need to add the following rule: (AT TIME *u*: $\varphi)^w$ is φ^u

As with FRCT, the TCT- semantics makes use of many-one-counterpart (MOC-) assignments:

- A QTL-sentence, ψ, is *valid* if and only if its TCT-translation is true on every MOC-assignment; and

- A QML* argument is *valid* if and only if the TCT-translations of its premises and conclusion are such that the conclusion is true on any MOC-assignment which renders all the premises are true.

We get no untoward results, so far as I can see, regarding what TCT delivers about the *validity* of arguments. What about truth itself? Truth on a model is not truth *simplicter*. Let us say an interpreted MOC-assignment is *veridical* if all the non-temporal QTL-sentences it renders true are in fact true. Then it seems we can say that a temporal statement is *true simpliciter* if and only if its QTL-rendition is true on all veridical MOC-assignments.

This will yield the following sort of anomaly. If I have two continuers next week, one of a fierce Federer-supporter and the other a fierce Nadal-supporter, then the statement [I will support Federer next week] comes out as being neither true nor false simplicter. So be it. In this sort of situation, there is no verdict ordinary speakers would univocally concur with. So, I do not take this anomaly to be a shortcoming of the proposed CT-semantics itself.

Finally, let us turn, again very briefly, to sortal-relative identity.

5.4 Sortal Modal Logic and Counterpart Theory

5.4.1 Sortal Relative Identity: A Case for Sortal Counterpart Theory

We come now to a different, but perhaps the most familiar, sort of case for contingent identity, supported e.g. by Lewis (1971; 1986), Gibbard (1975) and, more recently, Sider (2001).[56] We might want say of a statue of Napoleon, N, that it is identical with the lump of clay, L, it is made from. But also that lump L could have existed without that statue

[56] Some, including Lewis (1976) himself, take the following sorts of considerations to support to support four-dimensionalist accounts of persistence (defended at length by Sider 2001). But I am not going to enter the debate between three- and four-dimensionalists here. I am hoping, however, that my proposals do not drive one to the latter!

existing—suppose e.g. that L had been formed into ashtray, A. In that case, we will want to allow (NL):

(NL) (L = N) & ◊(L ≠ N)

We might explain this by saying that the statue and the lump of clay have different *persistence conditions* (mentioned in §3.3, p. 57): e.g. L can survive squashing whereas N cannot. (NL) exemplifies what I shall call *sortal-relative contingent identity*.

However, (NL) does not sit comfortably with our present picture of rigidity and contingent identity. It was argued in Chapter 1 that a statement of (NL) affirms the contingent identity of objects only if 'L' and 'N' are rigid designators. But, it is not clear what these terms rigidly designate. They are, by hypothesis, names introduced in the actual world for actual objects; and since they name objects which are identical—after all, L = N—they are, on the face of it, names of one and the same actual object. But, then, (NL) presumably affirms a contingent *self*-identity, which in my (oft repeated) view Kripke has demonstrated to be incoherent.

There also non-modal statements that raise the same sort of awkward question. Suppose someone, indicating a photo of a child and a photo of an adult on a mantelpiece, asserts:

(S1) This child and that adult are one and the same person, but distinct collections of molecules.

(S1) seems true, or, at any rate, seems to have a true reading. One may object that *at any given time*, the child and the adult will 'be' precisely the same collection of molecules. But suppose (indulge me) time travel to the past is possible, and that someone goes back in time to pass on valuable information to their younger self. Then, someone present at the reunion and made aware of the special occasion, might well assert:

(S2) *That* individual [pointing to the adult time traveller] and *this* individual [pointing to the time travller's much younger self] are one and the same person but entirely distinct bodies.

We might express (S2) symbolically as: $[a =_P b \wedge a \neq_B b]$, where '$x =_F y$' for any sortal predicate F stands for the predicate 'x is the same F as y'. This would be a case of *relative* *identity*, famously defended by Geach (1962). Again, the awkward question of what '*a*' and '*b*' rigidly designate comes up.

I closed §3.3 with the claim that I would be proposing an unorthodox answer to this question. Here is proposal, along with some neighbouring thoughts and elaborations:

- First, I shall individuate *objects*—the things assigned to constants (names) and individual variables in logic—*spatiotemporally*. For any world *w*, and any objects *x* and *y* existing in *w*: either $x = y$ if and only if *x* and *y* occupy exactly the same spatiotemporal region. We can think of an object as *matter* spread out over space and time.
- Sortal-invoking terms, such as 'that person', *invoke* an *object b and* a sortal predicate *F*—a *sorted object* [*b*, *F*] if you will, which our logic will signify by affixing the sortal predicate as a subscript to a name of the object, thusly: '$\underline{b}_F$'. We'll call these *sorted terms*.
- What a sorted term, $\underline{b}_F$, designates at any world is just an *object d* which is *F* and which is *the same F* as *b*. Being the same *F* as *b* does not require being the same *object* as *b*. Consquently, on this proposal, sortal-invoking terms *invoke* and *designate*, but do not *rigidly designate* anything!
- Just to clarify: for any object *b*, and sortal predicates *F* and *G*, $\underline{b} = \underline{b}_F = \underline{b}_G$ (where '$\underline{b}$' is a name of *b*), because all these expressions *designate b*, even though the sorted terms *invoke* sortal predicates too.
- (NL) is accommodated if we interpret 'N' and 'L' as sorted terms invoking *different* sortal predicates, *S* = '*x* is a statue' and *M* = '*x* is a lump of matter', respectively: $[(L_M = N_S) \wedge \Diamond(L_M \neq N_S)]$. Briefly: our sortal counterpart theory (SCT) will replace Lewis's original counterpart relation with a multiplicity of *sortal-invoking* counterpart relations—as recommended by Lewis (1971) himself, one for each sortal predicate. So, crudely, $[\Diamond(L_M \neq N_S)]$ comes out affirming that some *matter*-counterpart of L at some world is distinct from some *statue*-counterpart of N at that world.
- A sortal-relative identity statement $[a =_F b]$ is true, on the SCT-semantics to be outlined, if and only if *a* and *b* have precisely the same *F*-counterparts. Returning to our time traveller, in capturing the content of (S2) formally, we must give different names to the traveller and her younger self, '*a*' and '*b*', say, because we

have two *objects* here occupying distinct, non-overlapping spatiotemporal regions.Thus, we can consistently maintain [$a =_P b$] (a is the same person as b) while at the same time denying [$a =_B b$], that a is the same body as b.

That concludes the informal briefing on sortal relativity. Let me say a bit about the formal apparatus, which parallels but diverges significantly from the approach defended in Ramachandran (1998).

5.4.2 Sortal Modal Logic and Sortal Counterpart Theory

Lewis (1971) assumes we can translate directly from natural language into what I am calling Sortal Counterpart Theory (SCT). But I think it may be useful to have a logical language along the lines of QML—I'll call it Sortal Modal Logic (SML)—suitably modified to regiment sortal-relative statements of natural language, and then translate from that into SCT.

Here's a sketch of SML indicating divergences from QML:

- A subclass of the unary QML-predicates are designated *sortal predicates*; I'll use 'P' and 'Q' as variables for quantifying over them.
- All the sentences of QML are SML-sentences, but SML further allows names (constants) and variables with sortal-predicate subscripts: e.g. 'b_F' (read: *b qua F*-hood). *b* is the *invoked object*, *F* the *invoked sortal*. I'll call such terms *sorted names* or *sorted variables*.
- Quantifiers, e.g. '$\exists x$' and '$\forall x$', cannot contain sorted variables. But if e.g we want to affirm that some people (persons) might have been tall *qua persons*, we can capture this in SML as [$\exists x(Person(x) \wedge \Diamond Tall(x_p)$)].

Here is a sketch of SCT, our sortal counterpart theory, including the significant departures from FRCT.

- SCT has 3-place sortal-invoking counterpart relations of the form: C_Pxyw (x is a P-counterpart of y at world w. It does not contain any non-sortal-invoking counterpart relation. A P-counterpart of an object a is *the same P* as a. So, every sortal-invoking counterpart relation is an equivalence relation.

- A non-sortal-invoking SML-sentence such as [Fb] is interpreted in SCT as equivalent to [$\exists PFb_p$].
- Any (sorted or unsorted) term in an SML-sentence, ψ, is *modally free* if it is a name, or a variable-token governed by a modal operator which has narrower scope than the quantifier which binds it.
- In the preliminary translation of an SML-sentence, ψ, $[\psi]_P$, every atomic constituent of ψ except sentences of the form [‘$t = t'$’], ϕ, with modally free term-tokens is bound by counterpart quantifiers as before: any *sorted* term-token, t_P, is bound by the the corresponding *P*-counterpart quantifier [$\exists xC_Pxt$]. But for each modally free *unsorted* term-token, *t*, we need to introduce a sortal-predicate too: [$\exists P\exists xC_Pxf$]. Here is a preliminary translation for illustration of what I have in mind:

  (a)$_{SML}$ $\exists x\Box\neg Fbx_P$

  [(a)]* $\exists x\forall w\neg\exists y\exists z\exists Q(C_Qybw \wedge C_Pzx \wedge Fyzw)$
- As with FRCT, the next step of the translation applies recursive rules to the formula $[\psi]_P^{w*}$(read: $[\psi]_P$ holds at the actual world, w*).
- And, *pace* FRCT, an SCT MOC-assignment assigns just one *P*-counterpart to an object at any world. If an object *a* (which is *P*) does not have a *P*-counterpart which exists in world *w*, *a* is its own, and only, *P*-counterpart at *w*.

These sketches of SML and SCT are rough and incomplete, but I think what I have said gives a fair indication of how FRCT might be developed so as to provide a suitable logic for arguments involving sortal-relative statements.

Conclusion

In this thesis I hope to have motivated, and demonstrated the coherence of, a counterpart-theoretic conception of contingent identity, despite Kripkean considerations supposedly establishing the necessity of identity (considered in Chapter 1). Chapter 2 considered an unsuccessful strategy from Gallois to accommodate contingent identity by way of a 'restricted' notion of rigidity.The 'breakthrough' ideas, I would say, are the distinction between *invoking* and *designating*, and the notion of *tethered designation*, both introduced in Chapter 3 in the course of examining Chandler's argument against Kripke's thesis that names are rigid designators. The idea of tethered designation, I argued, leads naturally to a counterpart-theoretic understanding of contingent identity, and *truth-making* (or, as I suggest in Chapter 5, *truth-representing*) of modal facts.

In Chapter 4 I examined three counterpart-theoretic approachs and found them wanting, largely because of counterintuitive results arising from allowing multiple counterparts of an object at a world. In Chapter 5 I attempted to provide a (comparatively) rigorous motivation for accepting the coherence of contingent identity across worlds and the need for modal counterpart theory by way of considering Chisholm's paradox. I argued that a counterpart-theoretic solution along the lines I provided was *the only* satisfactory way of accommodating the underlying intuitions behind the moderate toleration principle generating the paradox.

Another key factor in my proposed counterpart theory, FRCT, was the method I then proposed to avoid the setbacks facing earlier counterpart theories: this appealed to *many-one counterpart models*. The discussion of occasional identity and sortal-relative identity in the remainder of the chapter served to show the need for variations of FRCT, *temporal* counterpart theory (TCT) and *sortal-invoking* counnterpart theory (SCT). I gave a sketch in each case of how one might go about this. It turns out that the counterpart relations in the various theories have different logical features.The motivation for FRCT demands that the counterpart relation is *not transitive*; the motivation for TCT takes the counterpart relation to be the continuer-relation, and, so, demands that it is transitive but not symmetric; finally, the motivation for SCT demands that the sortal-invoking counterpart relations are all equivalence relations, and, so, symmetric and transitive.

I hope I have demonstrated that the generally scoffed-at notion of contingent identity, as well as the equally scoffed-at notion of *relative* identity, are in fact tenable, if we adopt an appropriate counterpart-theoretic semantics; I do not see the views I have defended as being antithetical to Kripke's central views on rigidity and necessity—even though these have led Kripkeans to think so. Most importantly, perhaps, I hope to have shown that counterpart theory, shorn of its initial modal-realist underpinnings, has much to offer.

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