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The metaphysician's free lunch

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THE METAPHYSICIAN'S FREE LUNCH

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To Bryson Brown — a fabulous supervisor.

And to my parents, Jackie and Sandy Morris, for everything.

Abstract

In this paper, I begin to develop a theory called Paradise on the Cheap — in so doing, I intend to provide a rival to David Lewis' modal realism. Paradise on the Cheap grounds possibilia in the features of the *actual* world; and so, it does not require realist commitments to the existence of non-actual worlds and individuals. I explain modality, counterfactuals, content, and properties in terms of recombinations of actual-world features, second-order mathematical schemata, and the similarity relations which hold between these things and parts of the actual world. Because the ontology of Paradise on the Cheap promotes unity and economy of theory to a greater extent than does modal realism's ontology, I argue that we should accept the former theory instead of the latter. Moreover, I address the question of whether inference to the best explanation is an argumentative strategy that is even available to modal realists.

As the realm of sets is for mathematicians, so logical space is a paradise for philosophers. We have only to believe in the vast realm of *possibilia*, and there we find what we need to advance our endeavours (Lewis 4).

Paradise on the cheap, like the famous free lunch, is not to be had (Lewis 141).

Every thing possible to be believ'd is an image of truth (Blake 37).

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Chapter 1: Paradise on the Cheap — or, an economical alternative to modal realism

In *On the Plurality of Worlds* (henceforth *OPW*), David Lewis purports to unify our analyses of, among other things, modality, counterfactuals, properties, and doxastic-state content by means of a well-articulated and well-defended realist theory of possible worlds: his *modal realism*. But, ironically, Lewis' own account suggests an *alternative* to modal realism, a means by which to gain all the theoretical benefits he attributes to the latter without commitment to the existence of possible worlds. This alternative theory (henceforth 'Paradise on the Cheap') arises from variants on some things to which Lewis himself is committed.

Key to Paradise on the Cheap is Lewis' *principle of recombination*, "according to which patching together [duplicate] 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" (Lewis 87-88).[1] Lewis claims that the principle of recombination

> requires a proviso: 'size and shape permitting'. The only limit on the extent to which a world can be filled with duplicates of possible individuals is that the parts of a world must be able to fit together with

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[1]Lewis rejects world-overlap and, so, he can't say that the parts, simplicter, of different possible worlds make up another possible world. In speaking of recombination, he employs the notion of duplicates, instead of counterparts, because he doesn't accept the idea that a counterpart of anything can coexist with a counterpart of anything else. He says that counterparts are united by similarity, where the relevant similarity is mostly extrinsic, "[b]ut extrinsic similarity is irrelevant here, so I should not speak of coexisting *counterparts*. Instead, I should say that a *duplicate* of the dragon and a *duplicate* of the unicorn coexist at some world, and that the attached talking head has at some world a separated duplicate" (89).

> some possible size and possible shape of spacetime.[2] Apart from that, anything can coexist with anything, and anything can fail to coexist with anything (89-90).

According to the principle of recombination, then, various possible worlds and various parts of possible worlds (i.e., possible individuals) are made of duplicate-parts of ρ (the actual world[3]).[4] (Likewise, various *other* possible worlds and possible individuals are composed of duplicates of duplicate-parts of ρ, duplicates of duplicate-duplicate-parts of ρ, and so on.) Thus, Kurt Vonnegut's character Billy Pilgrim,[5] who is an other-worldly

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[2]"This leaves a residual problem of plenitude: what are the possible sizes and shapes of spacetime? Spacetimes have mathematical representations, and an appropriate way to state plenitude would be to say that for every representation in some salient class, there is a world whose spacetime is thus represented. It is up to mathematics to offer us candidates for the 'salient class'" (Lewis 90). I shall ignore the question of what the possible shapes and sizes of spacetime are — following Lewis, I leave it to be answered by mathematics.

[3]I'm using Lewis' terminology, according to which 'actual' is an *indexical* term — it refers at any world *w* to the world *w*. Lewis claims that "actuality [is] a relative matter: every world is *actual at* itself, and thereby all worlds are on par" (93). He takes 'actual' to be synonymous with 'this-worldly.' Therefore, I use 'actual' to refer to this world and to this-worldly individuals.

[4]According to Lewis, "two things are duplicates iff (1) they have exactly the same perfectly natural properties, and (2) their parts can be put into correspondence in such a way that corresponding parts have exactly the same perfectly natural properties, and stand in the same perfectly natural relations" (61). A clear understanding of what natural properties are requires a clear understanding of a number of other concepts which I don't want to get into here. So, I'll leave it to the reader to consult *OPW*, pp. 59-61, for Lewis' account of natural properties.

[5]Throughout my thesis, I shall occasionally use parts of Kurt Vonnegut's novel *Slaughterhouse-Five* as examples. Perhaps, then, I should say something by way of context. *Slaughterhouse-Five* is, among other things, an account of Vonnegut's experiences as a prisoner of war during the fire-bombing of Dresden, Germany in World War II. His story is fictionalized at least to the extent that it focuses on a character named Billy Pilgrim who, in the novel, is a fellow P.O.W. during the Dresden raid. Billy Pilgrim, an abductee of Aliens from Tralfamadore, has come unstuck in time.

possible individual, consists of a combination of duplicate-features[6] of actual people. Lewis stresses that the imaginability of some state of affairs *a* is a poor criterion for the possibility of *a*. He says,

> We can imagine the impossible, provided we do not imagine it in perfect detail and all at once. We cannot imagine the possible in perfect detail and all at once, not if it is at all complicated. It is impossible to construct a regular polygon of nineteen sides with a ruler and compass; it is possible but very complicated to construct one of seventeen sides. In whatever sense I can imagine the possible construction, I can imagine the impossible construction just as well. In both cases, I imagine a texture of arcs and lines with the polygon in the middle. I do not imagine it arc by arc and line by line, just as I don't imagine the speckled hen speckle by speckle — which is how I fail to notice the impossibility (90).

But, despite the shortcomings of our imaginations, Lewis admits that

> [w]e get enough of a link between imagination and possibility, but not too much, if we regard imaginative experiments as a way of reasoning informally from the principle of recombination. To imagine a unicorn and infer its possibility is to reason that a unicorn is possible because a horse and a horn, which are possible because actual, might be juxtaposed in the imagined way (90).

We have cognitive access to some parts of our world via, e.g., observation, established theory, and authoritative testimony. (I say 'cognitive' access here because I wish to remain neutral as to whether such means of belief-formation give us epistemic, or mere doxastic, access to parts of ρ.) Because, in some instances, we can imagine parts of our world being recombined and, thereby, correctly infer the possibility of such recombinations, it follows that we have some cognitive access to the character of other

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[6] *Features*, as I use the concept, are simply elements of the factual character of worlds — they can be individuals (i.e., parts of worlds), kinds, properties, or relations. (I shall ignore any ontological concerns surrounding properties and relations, as they are beyond the scope of my discussion.)

worlds. Furthermore, through imagination, we can recombine *previous recombinations* and, thereby, correctly infer further possibilities. We gain access to the possibility of a talking donkey with Billy Pilgrim's personality by combining, in our imaginations, Billy Pilgrim — himself a product of Vonnegut's own recombinations — with an actual donkey, or by combining the former with a talking donkey — the latter also being a product of prior recombination. Cognitive access to these possibilities is gained simply by reasoning about the features of ρ.

Of course, we can also gain access to the features of other worlds without appealing to the principle of recombination. The bare fact that the parts of ρ to which we have access are actual entails that they're possible! Similarly, the features of ρ give us access to at least some necessities — which are part of the character of every world — and impossibilities — which the character of every world lacks. We know, for example, that 2=2 is necessary and that 3=4 is impossible despite the fact that we're unable to examine the features of any non-actual world.[7] (Furthermore, if Kripke is right in claiming that proper names and general terms designate rigidly, then we can *discover* necessary truths, such as the identity between heat and molecular motion.[8])

Hence, the features of ρ, in conjunction with imaginative recombination, give us cognitive access to a number of different non-actual possibilities. Thus, we have cognitive access to a variety of possible individuals — parts of possible worlds — and,

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[7]Ignoring ontological concerns, I shall assume that mathematical truths and falsehoods, like 2=2 and 3=4 (respectively), are part of the factual character of this world.

[8]See *Naming and Necessity*, especially lectures II and III.

indeed, to a variety of possible worlds less-inclusive than ρ. For example, we have access to possible worlds in which only a duplicate of our solar system exists — no other duplicate stars, planets, asteroids, &c. — as well as to possible individuals which are perfect duplicates of our known universe except that humans live on Venus instead of Earth.

Our cognitive access extends to relations of similarity between the worlds and individuals (possible and actual) we have cognitive access to. Lewis claims that a relation of *closeness* holds between ρ and other worlds. Closeness figures prominently into his account of verisimilitude, which he outlines as follows:

> Closeness to worlds can also help us to say what it means for a false theory of nature to be close to the truth. False is false — and it takes only a trace of error to make a theory false — but false theories are not all on par. We may reasonably think that present-day scientific theories, if not entirely free of error, are at any rate closer to the truth than previous theories were. We may hope that future theories will be closer still. How can we explain this?
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> ... [W]e might explain closeness to the truth (or 'truthlikeness' or 'verisimilitude') in terms of closeness of possible worlds. ... A theory is close to the truth to the extent that our world resembles some world where that theory is exactly true.[9] A true theory is closest to the truth, because our world *is* a world where the theory is true. As for false theories, the ones that can come true in ways that involve little dissimilarity to the world as it really is are theories closer to the truth than those that cannot (Lewis 24).

Thus, theories which are close to the truth at ρ *just are* theories which are true (simpliciter) at possible worlds 'close' to ρ. Because it is the factual character of this

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[9]It seems unlikely that Lewis is speaking of a resemblance-relation which our world *as a whole* bears to other worlds *as wholes*. Rather, a local sort of resemblance is probably what's being suggested here, such that certain aspects of ρ resemble certain aspects of the non-actual world(s) in question.

world that makes theories closer to, or further from, the truth at ρ, it is also the features of this world which make it the case that some worlds are closer to ρ while others are farther from it.

Lewis acknowledges that his analysis of truthlikeness in *OPW* is merely skeletal, that "[t]o put flesh on the bones, we need to say something about what an appropriate similarity ordering of worlds might be — what sort of respects of comparison are the ones that count" (24). And he's skeptical that something cleaner than the "messy business of comparative similarity" (24) can be found. It's evident that Lewis considers closeness to be a *similarity* relation, according to which, given the relevant respects of comparison, a possible world *w* is close to ρ to the extent that it is *similar* to ρ. Lewis deems it unlikely that the same similarity relation can be used for his analyses of both truthlikeness and counterfactuals. Indeed, he points out that

> [w]e have many and varied relations of comparative similarity. Some differ from others because they put different weights or priorities on different respects of (intrinsic or extrinsic) qualitative similarity; and even if they are alike in the respects of comparison they stress, they can still differ because one is more stringent than another (254).

This passage is directed at counterparts — according to Lewis, then, relations of similarity hold between *individuals* as well as worlds. Based on a variety of similarity-criteria,[10] we can, at least in principle, establish various different orderings of how similar other worlds and individuals are to ρ and ρ-individuals (call these *ρ-relative* similarity

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[10]Evidently for Lewis, as well as for myself, similarity is a relation in which individuals (including worlds) stand just in case they have certain specified characteristics in common. A similarity ordering is determined with respect to a particular individual (or individuals) — other individuals are 'ordered,' or ranked, according to the extent to which they share particular characteristics with the latter.

orderings).

But we needn't restrict ourselves to ρ-relative similarity orderings — we can establish similarity orderings *in general*. Determinations of similarity are based on comparisons of features of the actual and non-actual worlds and individuals to which we have cognitive access. The degree of similarity which a cognitively-accessible world *w* (or a *w*-individual) bears to ρ (or a ρ-individual) is judged by comparing their relevant features in a given context. If the criterion of similarity is *number of humans*, then if ρ has 6,000,000,000 humans, worlds most similar to ρ also have 6,000,000,000 humans, worlds which are second-most similar to ρ have either 5,999,999,999 humans or 6,000,000,001 humans, and so on. Likewise, the degree of similarity which *w* (or a *w*-individual) bears to another non-actual yet cognitively-accessible world *w'* (or a *w'*-individual) is judged by comparing *their* relevant features in a given context. If *w* has seven humans, then worlds most-similar to *w* also have seven humans, worlds second-most similar to *w* have either six or eight humans, worlds third-most similar have either five or nine humans, and so on. We have cognitive access to parts of ρ, to parts of other worlds, and to the totality of some worlds that are less inclusive than ρ — and we can compare any features of these worlds and individuals to any others. Therefore, similarity orderings *can* be determined even if they are *not* relative to ρ.[11]

Still, whatever the similarity conditions are in a given situation, the factual character of *this world* determines which cognitively-accessible worlds and individuals

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[11]As will become evident in Chapter 2, the notion of similarity figures prominently into the explanatory capabilities of Paradise on the Cheap.

we judge to be more and less similar to each other. Worlds are isolated from one another[12] — we cannot so interact with other worlds as to form beliefs about, or gain knowledge of, their features.[13] Hence, our cognitive access to non-actual worlds and individuals can *only* be a product of phenomena at this world. Given these limitations, it follows that the only non-actual worlds and individuals we have access to are those which consist of duplicates of ρ-features and recombinations thereof — we haven't the mental capacity to conceive of anything beyond such duplicates and recombinations.[14] So, all we have to 'go on' in assigning similarities between worlds and individuals are the features of ρ, duplicates thereof, and recombinations of these duplicates. And since our cognitive access to these duplicates and recombinations is given exclusively by the features of ρ, the only basis we have for assigning similarities is given exclusively by the features of ρ. Consequently, the characteristics of worlds and individuals we emphasize in any similarity-judgement must be possessed by entities to which we have cognitive access, from which it follows that the characteristics we emphasize must also be grounded in the

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[12]As Lewis says, "there are no spatiotemporal relations at all between things that belong to different worlds. Nor does anything that happens at one world cause anything to happen at another. Nor do they overlap; they have no parts in common, with the exception, perhaps, of immanent universals exercising their characteristic privilege of repeated occurrence" (2). Lewis argues against trans-world causation in §1.6, and against overlap in §4.2, of *OPW*.

[13]See the next chapter, in which I present a more-detailed argument in favour of such doxastic and epistemic limitations.

[14]We may, however, acknowledge the existence of non-actual phenomena which *don't* consist entirely of duplicates of ρ-features and recombinations thereof as well as grasp the schematic structure of such phenomena via a second-order mathematical apparatus. At various points below, I discuss how, with respect to Paradise on the Cheap, a second-order mathematics yields cognitive access to the structure of possibilities.

features of ρ. Therefore, our judgements regarding which cognitively-accessible worlds and individuals are more and less similar to one another depend very much on the factual character of ρ. Moreover, because our judgements on which more worlds and individuals are more and less similar to one another are what establish the similarity orderings, it is the factual character of this world that determines the similarity orderings which we assign. In sum, then, our cognitive access to the features of non-actual worlds and individuals is grounded in the features of ρ; and since it is the features of these accessible worlds which determine similarity orderings, it follows that the features of ρ (i.e., the ones to which we have cognitive access) are what ultimately determine the similarity orderings we assign. Ergo, not only our cognitive access to the features of other worlds and other individuals, but also our access to various similarity relations between such worlds and individuals, and between the latter and ρ and ρ-individuals, are solely products of this world.

So, we can appeal to real possible worlds as representations of various ways in which ρ and its parts might have been, and we can appeal to a variety of similarities and differences between these ways, despite the fact that our access to such representations is restricted to what we can extrapolate from *this* world. However, because our access to non-actual worlds and individuals is so limited — i.e., because it depends solely on the features of this world — I believe that we don't have to use other worlds or non-actual individuals to make these representations. Rather, I shall argue, all we need is the factual character of ρ — such representations can be made without asserting the existence of non-actual worlds and individuals (and, indeed, without asserting the existence of any

parts of ρ to which we lack cognitive access). Hence the principal proposal of Paradise on the Cheap: possibilia can be based exclusively on the features of this world — a plurality of real worlds needn't be brought into the picture. The latter claim is quite a bold one, suggesting that we need only features of ρ, suitably recombined, to bear the explanatory load which Lewis purports to be born by modal realism (a point which will be argued for in due course). In other words, I intend to argue that the theoretical benefits which Lewis claims for modal realism can be successfully achieved (at least in principle) without commitment to any supposedly real possible worlds. As I shall argue in Chapter 2, to realize these benefits, we need only the features of ρ and recombinations of them (plus a second-order mathematical apparatus which can schematically represent those possibilities we can't gain access to via imaginative recombination).

One thing is clear about Paradise on the Cheap from the outset: it cannot represent every possibility that Lewis claims his plurality of worlds can represent. As Lewis argues,

> Among all the possible individuals there are, some are parts of this world; some are not, but are duplicates of this world; some, taken whole, are not duplicates of any part of this world, but are divisible into parts each of which is a duplicate of some part of this world. Still other possible individuals are not thus divisible: they have parts, no part of which is a duplicate of any part of this world. These I call *alien* individuals. (That is, they are alien *to* this world; similarly, individuals could be alien to another world. For instance, many individuals in this world are alien to more impoverished worlds.) A world that contains alien individuals — equivalently, that is itself an alien individual — I call an alien world.
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> ... I defined an alien natural property as one that is not instantiated by any part of this world, and that is not definable as a conjunctive or structural property built up from constituents that are instantiated by parts of this world. Anything that instantiates an alien property is an alien individual;

> any world within which an alien property is instantiated is an alien world (91).

With only some of the features of ρ to work with, we can't have access to the complete character of every world Lewis purports there to be. From the features of ρ to which we have access, we can't generate all possible states of affairs — not even close! "We can't get the alien possibilities just by arranging the non-alien ones. Thus our principle of recombination falls short of capturing all the plenitude of possibilities" (Lewis 92).[15] Alien properties, and even some non-alien ones, simply can't be accounted for.

Lewis points out that "[a] world to which no individuals, worlds, or properties are alien would be an especially rich world" (92); and he is right to claim also that we have no reason to believe that such a world is *our* world. He says, immediately afterwards, that an acceptable account of possibility must make provision for alien possibilities. In a sense, Paradise on the Cheap *does* provide for alien possibilities. We have a second-order mathematics by means of which we can give schematic representations of the *structure* of alien individuals and the relations in which they stand. Via the mathematical specification of relations — monadic, dyadic, triadic, &c. — we may grasp the possibility of alien properties, alien individuals, and alien relations.[16] However, we cannot say

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[15]Lewis considers revising the principle of recombination, saying that "[a] principle which allowed not only recombination of spatiotemporal parts of the world but also recombination of non-spatiotemporal parts — universals or tropes — would do a bit more. It would generate those alien individuals that do not instantiate alien properties. But I say (1) that such a principle, unlike mine, would sacrifice neutrality about whether exist universals or tropes, and (2) that it still wouldn't go far enough, since we also need the possibility of alien properties" (92).

[16]For example, a property is described schematically by the mathematical expression of a monadic relation: "Φa." Moreover, two-place and three-place relations are schematically

anything further about these individuals, properties, and relations — our understanding of them has to remain solely schematic. Because the means we have for generating possibilities are ρ-bound, any *precise* talk we engage in regarding the way the world, or its parts, might have been must be ρ-bound.

Modal realism's capacity to make provision for alien possibilities is just as limited as Paradise on the Cheap's. Indeed, as stressed above, any possible world or possible individual (in its entirety) that we, at ρ, think precisely about must, in Lewis' terms, consist completely of duplicate-features of ρ or recombinations thereof. To consider (in precise terms) worlds made of anything else is beyond our limitations! It follows, then, that any possible worlds or individuals precisely appealed to must be made of ρ-duplicates or their recombinations. Moreover, any precise (as opposed to schematic) similarity orderings that Lewis refers to in his explanations — including those pertaining to counterparts — must be based on ρ-duplicates and recombinations thereof. Therefore, Lewis' analyses of counterfactuals, content, verisimilitude, modality, &c., inasmuch as they involve precise specifications of properties, individuals, and worlds, must ultimately

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described by "Φ*ab*" and "Φ*abc*," respectively. And we may even imagine, schematically, ties between these properties and relations like those expressed by laws of nature. These 'laws' would be specified by axioms defining a set of properties, but only up to isomorphism. Nothing more specific can be said about such laws, save that for any two interpretations that could in principle be given for the axioms, there is a one-to-one correspondence by which the objects, properties, functions, &c. asserted by one interpretation are mapped exactly onto those asserted by the other. (A more detailed account of how the second-order framework handles alien possibilities is given in Chapter 2.) In contrast, non-alien properties and relations are described in what I shall call *precise* terms — e.g., "*a* is a talking donkey," "*a* is jumping over *b*," and "*a* and *b* are the parents of *c*," where *a*, *b*, and *c* are interpreted as actual individuals or as recombinations of actual individuals and properties.

be ρ-bound. Of course, Lewis can *say* that there are alien worlds with alien properties and alien individuals — i.e., he can assert their existence (just as proponents of Paradise on the Cheap recognize that there are ways this world and its individuals might have been which our imaginative limitations prohibit us from grasping). He can even use a second-order mathematics to gain a schematic understanding of the structure of alien worlds and alien individuals.[17] (Such a mathematics is presumably what Lewis refers to in saying that it's up to mathematics to determine the possible shapes and sizes of spacetime and spacetime analogues.) But he certainly can't say anything *precise* about these alien phenomena.[18]

As the resources for any theory of possibility are limited to those supplied by our

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[17]Even an actually-false theory of physics provides a means by which one can grasp the structure of some alien worlds and individuals. Modal realism implies that there must be various alien worlds (and parts of alien worlds) in which classical Newtonian mechanics, for example, is true. With respect to such worlds, the false physics provides us with an understanding of their structures. Such a theory of physics may likewise be of service to proponents of Paradise on the Cheap, as it specifies the structure of various alien possibilities for ρ and its parts.

[18]Though Lewis can't say anything precise about alien phenomena, the latter still play an explanatory role in his theory. Modal realism would be significantly *less coherent* if Lewis failed to acknowledge the existence of properties, individuals, and worlds completely unlike the properties and individuals of ρ. This being the case, Lewis would be forced to account for the absence of alien worlds even though we have no reason to believe that there aren't any alien possibilities. Similarly, proponents of Paradise on the Cheap (which may include just myself!) must, for the sake of coherence, acknowledge that there are possibilities which we could not have gained access to via any recombination of any ρ-feature.

But, coherence is not the only motivation for proponents of modal realism and Paradise on the Cheap to recognize alien possibilities — the latter play explanatory roles in each theory. Some of Lewis' analyses, e.g., of modality, make reference to the entire plurality of possible worlds, including the alien ones. Likewise, as we shall see in the next chapter, in performing analyses of modality, counterfactuals, content, properties, &c. with Paradise on the Cheap, one might make reference to alien structures.

world, it's too much to ask of any such theory that it account, in precise terms, for alien phenomena. Paradise on the Cheap provides for alien phenomena to the same extent as modal realism does — namely, schematically. So, given that the ability to furnish alien possibilities is one necessary condition of an acceptable theory of possibilia, if modal realism satisfies this condition, then so must Paradise on the Cheap. Therefore, assuming with Lewis that modal realism satisfies the condition, we have it that Paradise on the Cheap satisfies it as well.

Paradise on the Cheap is *not* a form of ersatzism[19] — at least it is not of a kind with any of the forms of ersatzism Lewis considers in *OPW*. It doesn't provide representations of the ways this world might have been via linguistic, pictorial, or 'magical' worlds. Furthermore, it does not provide *abstract* representations of the way ρ might have been. If successful, Paradise on the Cheap explains the phenomena Lewis seeks to explain exclusively in terms of the factual character of this world. Of course, there's a common-sense reading of 'abstract' such that, when a person generates a possibility — e.g., that there might have been barking cats — she, in a sense, 'abstracts' features from the world and recombines them in her imagination. Were a person so inclined, she could even write down the products of these 'abstractions' (just as I did in giving the 'barking cat' example), or otherwise record them. However, it is *not* these 'abstractions' which represent possibilia — the latter are represented by *the world itself*.

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[19]Broadly speaking, ersatzism is the view that "instead of having an incredible plurality of concrete worlds, we can have one world only, and countless abstract ways of representing ways that this world might have been" (Lewis 136).

That there might have been barking cats is represented[20] by the fact that the recombination of a certain part[21] of ρ (cats) with a certain other part of ρ (the ability to bark) is *acceptable* to us, as human agents.[22] When someone says "There might have been barking cats," she refers to the fact — itself a feature of ρ — that the recombination of cats with the ability to bark is acceptable. According to Paradise on the Cheap, then, the phenomena Lewis seeks to explain can be explained in terms of recombinations (of varying complexity) of ρ-features and, thus, satisfactory analyses of the former can be grounded in the factual character of this world.[23]

(It is important to note that the notion of *recombination* which I use in regard to Paradise on the Cheap is quite different from Lewis' use of recombination. Basically, my

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[20]It is important to note that although I borrow the term 'representation' and its variants from Lewis, I use it in a different sense when discussing Paradise on the Cheap. In regard to the latter theory, I don't mean to suggest that the features of ρ, or their recombinations, somehow provide us with *images* of possibilia in the way that Lewis' possible worlds and individuals, or the ersatzer's abstract structures, allegedly do. Rather, throughout this paper, whenever I speak of ρ-features and/or recombinations as representing possibilities, I mean that the latter are *grounded* in the former.

[21]The notion of a *part* is extremely vague, but I think Lewis intends it to be that way. He claims that a possible individual is any part of a world, whether it be a collection of dogs or cats, or an individual human, or a collection of various dogs and cats and humans and telephone poles and scrap pieces of aluminum siding, or even an entire duplicate of ρ which belongs to a more inclusive world. So, I shall take a *part* of ρ to be anything that can be imagined as separate from whatever it's actually conjoined with — such as my basketball (which is conjoined with my closet floor), the ability to bark, and the left half of my right eyeball — or combinations thereof.

[22]A recombination is acceptable if and only if there is some actual state of affairs *suitably similar* to it, where the relevant criteria of similarity varies with context. The notions of acceptability and suitable similarity will be explicated much further in the next chapter.

[23]Paradise on the Cheap's explanatory power will be demonstrated in Chapter 2.

position is that a relation of similarity holds between a recombination — which represents some individual or state of affairs — and an actual truth. Furthermore, I hold that when an recombination is suitably similar to some actual truth, it represents a possibility — i.e., the individual and state of affairs reported by a sentence describing the recombination is possible. In contrast, Lewis uses 'recombination' to denote a kind of metaphysical rearrangement of individuals, properties, relations, &c. which, given a possible size and shape of space-time, *must* represent a possibility. In short, all recombinations represent possibilities for Lewis, while some of Paradise on the Cheap's recombinations represent states of affairs and individuals which are *impossible* for ρ and/or its parts.)

Practically speaking, Paradise on the Cheap cannot provide us with every way in which the cognitively-accessible parts of ρ might have been recombined in reality. The principle of recombination could, in principle, be applied to the features of ρ and to previous recombinations indefinitely, thereby correctly deriving myriad possibilities (perhaps even an infinitude of them) — a task which exceeds our human limitations. Furthermore, this-worldly analyses of, e.g., certain counterfactuals or certain modalised expressions may turn out to be too difficult for any human to perform. But, in spite of these intractabilities, the fact that a theory such as Paradise on the Cheap can in principle be constructed implies that there's something which can perhaps carry the explanatory load just as well (if not better) than modal realism *without* requiring realist commitments to possible worlds.

Lewis says we should accept modal realism because it provides the *best explanation* of various things. Let's assume for now that (a) Lewis is justified in using

inference to the best explanation (a question to be taken up in Chapter 4), (b) modal realism succeeds in providing coherent explanations for all the phenomena Lewis seeks to explain in *OPW*, and (c) the fact that a theory qualifies as the best explanation of certain phenomena constitutes sufficient justification for believing in its truth. Therefore, we're justified in believing in the existence of other worlds and non-actual individuals only if modal realism does, in fact, constitute the best explanation of those things. But if Paradise on the Cheap gives us the best explanation — or if modal realism and Paradise on the Cheap are explanatorily equivalent and there are other theoretical considerations, such as increased unity and economy, that make the latter preferable — then we have better reason to subscribe to *its* ontology, and less reason to accept the existence of anything non-actual. The success of Paradise on the Cheap over modal realism warrants us in believing, at most, in the existence of *this* world and its constituents.[24]

If the theoretical virtues of Paradise on the Cheap are superior to those of modal realism then, provided we're justified in applying Occam's razor in the present case,[25] the view that there's a world (among various others) in which Billy Pilgrim exists, has come unstuck in time, is abducted by Tralfamadorians, survives the Dresden raid, and so on can only play the role of a *heuristic device*. In other words, modal realism could at best serve as a convenient way of talking and thinking about recombinations of the parts of ρ. But,

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[24]It's important to note that I am speaking in *local* terms here, ignoring other potential reasons why one could perhaps be justified in accepting Lewis' ontology (e.g., the success of other theories which employ the latter). I've been assuming that there are no philosophical reasons, other than those touched upon by Lewis, why one might assert the existence of a plurality of worlds.

[25]In Chapter 3, I will argue that we are justified in applying Occam's razor here.

as I shall argue in Chapter 3, the heuristic convenience of modal realism is *not* adequate ground for committing oneself to the existence of other worlds.

Chapter 2: Theoretical benefits — modal realism versus Paradise on the Cheap

A. In Chapter 1, I expressed my belief that Paradise on the Cheap is at least equal to modal realism in explanatory power. In the present chapter, I'm going to argue that this belief is *true*. When first planning my approach to the latter task, I was under the illusion that possible-worlds talk can be reduced somehow to Paradise-on-the-Cheap talk. In particular, I sought to construct an argument like the following:

> (1) Our cognitive access to non-actual worlds and non-actual individuals is gained, without exception, by means of our access to the features of ρ and our imaginative recombinations of such features.
>
> (2) Therefore, in describing possible worlds and possible individuals, we're just describing certain collections of ρ-features and recombinations of ρ-features.
>
> (3) Ergo, Lewis' modal-realistic analyses of modality, counterfactuals, content, properties, &c. are just analyses of such phenomena in terms of particular combinations of ρ-features and recombinations of ρ-features.

Obviously, 2 does not follow from 1. The fact that our cognitive access is restricted to the features of ρ and recombinations thereof does *not* imply that our possible-worlds talk refers simply to ρ-features and ρ-recombinations — in using the language of modal realism, regardless of our doxastic and epistemic limitations, we may still be speaking about possible worlds and possible individuals (although there *are* views on semantics which would rule out this sort of reference). Therefore, 3 is not established since if our possible-worlds talk is not just Paradise-on-the-Cheap talk, we cannot conclude that modal realistic analyses are just analyses made in terms of ρ-features and -recombinations. The language of modal realism is not synonymous with the language of

Paradise on the Cheap — they're *not* semantically equivalent. Lewis specifies truth conditions for the former in terms of a plurality of non-actual worlds and individuals, while I hold that the truth of statements made in terms of the latter depend on features of ρ and certain activities of human agents (in particular, imaginative recombinations and similarity-assignments).[26] Hence, the former cannot be paraphrased into the latter. For the same reason, the former cannot be reduced to the latter — e.g., possible worlds and individuals cannot be reduced to constructions of actual features and recombinations of these features.[27]

As mentioned in the last chapter, our doxastic and epistemic limitations are such that our cognitive access to possibilia is restricted to what we derive from the individuals and properties belonging to ρ and recombinations of the individuals and properties belonging to ρ.[28] This assertion is key to my argument that Paradise on the Cheap is at

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[26]Of course, Paradise on the Cheap also makes use of second-order mathematical language. (The latter will be discussed in greater detail in Section B of this chapter.) But the latter needn't require us to add other entities to the Paradise-on-the-Cheap ontology, such as some kind of 'mathematical objects.' In Chapter 3, I discuss a *naturalist* view of semantics and, in so doing, suggest that we might characterize an ontology for mathematics in terms of the natural features of this world (though I don't go so far as to suggest a form which such an ontology might take).

[27]This same point is suggested by Ian Hinckfuss in the following passage: "I have stressed that the fictionalist need not, indeed must not regard propositions which entail the existence of prodigal entities as being semantically equivalent to any economical counterpart. Hence it is absurd to demand that economicalists either provide an analytic reduction of prodigal discourse in economicalist terms or give up their economicalism" (613).

[28]And, of course, our second-order mathematics yields a schematic understanding of alien possibilia. Henceforth, unless specified otherwise, I shall take it as tacit that such a mathematics provides us with cognitive access to the structure of alien properties and relations. Thus, when I speak of our access being limited the features of ρ and

least *equal* to modal realism in explanatory power; so, though its truth might seem obvious to some, I will spend some time establishing it. I pointed out in Chapter 1 that Lewis claims that possible worlds are completely isolated from one another — in particular, there are *no* spatiotemporal relations whatsoever between worlds or between the parts of different worlds,[29] there is *no* causal interaction between worlds or the parts of different worlds, and different worlds do *not* have any common parts. (Indeed, trans-world causation is precluded by Lewis' analyses of causation and counterfactuals. See *OPW* pp. 78-81.) Therefore, any cognitive access we have to other worlds and otherworldly individuals is *not* provided to us by causal interaction with these worlds or individuals. Moreover, I take it that under the concept of *causal interaction* is included '*a priori*' interactions like those Kurt Gödel posits between us human agents and real mathematical objects. Consider what Gödel says in the following passage, quoted in Paul Benacerraf's "Mathematical Truth":

> ... the objects of transfinite set theory ... clearly do not belong to the physical world and even their indirect connection with experience is very loose ...

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recombinations thereof, it's to be understood that our access is limited to the latter features and recombinations *as well as* the schematic understanding given to us by second-order mathematics.

[29]Lewis doesn't say that the parts of every world are united by spatiotemporal relations properly so-called. Rather, he claims that "each world is interrelated (and is maximal with respect to such interrelation) by a system of relations which, if they are not spatiotemporal relations rightly so-called, are at any rate analogous to them. ... When a system of relations is analogous to the spatiotemporal relations, strictly so called, let me call them analogically spatiotemporal" (75-76). We speak more accurately, then, by saying that neither spatiotemporal relations *nor their analogues* exist between worlds or the parts of different worlds. See *OPW* 74-78 for further details.

> But, despite their remoteness from sense experience, we do have a perception also of the objects of set theory, as is seen from the fact that the axioms force themselves upon us as being true. I don't see why we should have less confidence in this kind of perception, i.e., in mathematical intuition, than in sense perception, which induces us to build up physical theories and to expect that future sense perceptions will agree with them and, moreover, to believe that a question not decidable now has meaning and may be decided in the future (415).

Provided, then, that we at ρ can't have these sorts of *a priori* perceptions of other worlds, or their parts, it follows that we cannot so interact with any non-actual worlds or individuals as to gain cognitive access to them. (Against the possibility of such *a priori* interaction with other worlds, we can insist that possible worlds are *concrete* — not abstract — and, so, that we have access to possible worlds, if at all, causally.[30])

The only things we causally interact with are the things which exist at our world. So, if modal realism is true, our cognitive access to the character of other worlds, as well as to the similarity orderings between possible worlds and possible individuals, is provided exclusively by the features of ρ (along with our second-order mathematics, which gives us a language wherein we can quantify over properties and/or speak of *properties* of properties). Hence, as discussed in Chapter 1, any of the non-actual worlds and non-actual individuals that we're able to describe precisely must, in Lewis' terms, consist exclusively of duplicates of ρ-individuals and ρ-recombinations. (Indeed, we're only able to describe alien properties, alien individuals, or alien worlds schematically.) Because we have no interaction with non-actual worlds or parts, and because we cannot

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[30]Lewis himself seems to concede that possible worlds are concrete, despite the difficulties he raises for the notions of abstractness and concreteness in §1.7 of *OPW*. See the final paragraph of §1.7, on page 86.

have access to anything alien (precisely speaking), it's evident that any talk of possible worlds and individuals in which Lewis, or anyone else, engages is based *without exception* on ρ-individuals, recombinations of ρ-individuals, and our grasp of mathematics. There are no other ways in which we *can* have access to other worlds and other-worldly individuals! Therefore, as conjectured in the last chapter, any precise non-actual worlds and individuals (and precise similarities orderings between them) which Lewis appeals to in his explanations must consist of ρ-duplicates or their recombinations (and similarity orderings between *them*), it's evident that Lewis' analyses of, e.g., counterfactual conditionals, modality, content, and properties are, to the extent that they involve a *precise* understanding of possibilities, based ultimately on ρ-individuals and their recombinations.

B. We now have it that any application of modal realism is limited to the extent that our cognitive access to the various possibilia is limited. Hence, in analysing for example modality, counterfactuals, verisimilitude, content, and properties in terms of modal realism, our non-schematic — or precise — resources are limited in all cases to the possible worlds and individuals to which we are provided access by the features of this world and recombinations thereof. Lewis says that modal realism provides satisfactory analyses of, for example, modality, counterfactual conditionals, verisimilitude, the content of doxastic and epistemic states, and properties. Because our modal-realistic analyses are bound, in all instances, to the features of this world and their recombinations, I believe that we can analyse modality, counterfactuals, content, &c. at least as well as modal realism without appealing to possible worlds — we need only make reference to

the features of this world, recombinations thereof, and our schematic understanding of alien phenomena. Now let's take a look at how some of the phenomena which Lewis purports to be explained by modal realism are explained with Paradise on the Cheap.

Put briefly, Lewis analyses modality as *quantification over possible worlds*. Accordingly, a proposition is possible just in case it's true in at least one world, impossible just in case it's *not* true in any worlds, necessary just in case it's true in all worlds, and contingent just in case it's true in some, but not all, worlds. In contrast, the alternative analysis of modality proceeds as follows. Consider the proposition "Possibly, there are barking cats." This proposition is true because certain actual states of affairs, such as barking dogs, meowing cats, and mooing cows, are *suitably similar* to the recombination specified in the proposition. (Here, a similarity ordering is invoked — for which the relevant criterion is, say, being an animal which regularly emits a particular noise from the mouth.) Thus, we say that the sentence "Possibly, there are barking cats" expresses a truth if and only if the sentence obtained by removing the possibility operator — i.e., "There are barking cats" — is an *acceptable substitute* of some actually-true sentence — e.g., "There are mooing cows." "There are mooing cows" is suitably similar to "There are barking cats" and, so, the latter is what we may call a *true image* of the former. A sentence s is a true image of another sentence s^* if and only if s is actually true and expresses a state of affairs suitably similar to that expressed by s^*. Similarly, s^* is an acceptable substitute of s just in case the state of affairs expressed by s is suitably similar to that expressed by s^*. Therefore, whether an unactualised state of affairs (access to which is gained by recombination) is possible ultimately depends on whether there are

actual states of affairs that are suitably similar to the former; and whether a statement of possibility, $\Diamond s^*$, is true depends on whether there is an actually-true statement, s, which expresses a state of affairs suitably similar to that expressed by the unmodalised s^*. Of course, because what we regard as suitably similar can vary from context to context, what we count as possible can also vary between contexts. This variance parallels the flexibility of the similarity orderings which Lewis' asserts between possible worlds and individuals. For example, on certain construals of the accessibility relation — which holds between worlds (as opposed to the counterpart relation, which holds between individuals) — the statement "Possibly, Jim is a grapefruit" is true.

Based on the alternative analysis of possibility — i.e., the analysis of possibility made in terms of Paradise on the Cheap — it's obvious that a state of affairs (access to which is gained by recombination) is *im*possible if and only if there are *no* actual states of affairs which are suitably similar to the former. Thus, we say that it's impossible for an object's surface to be both completely red and completely green at the same time, since there are no actual objects whose surfaces are both completely one colour and completely another colour at the same time. Moreover, a statement of impossibility, $\sim\Diamond s^*$ (or $\Box\sim s^*$), is true just in case there is *no* actually-true statement, s, expressing a state of affairs suitably similar to that expressed by unmodalised s^*. Accordingly, "It is impossible that an object's surface be both completely red and completely green at the same time" is true because there are no actually-true sentences which are suitably similar to "An object's surface is both completely red and completely green" (where a suitably similar sentence would be of the form "Object o's surface is both completely *colour*$_1$ and completely

colour$_2$ at the same time"). The fact that there are no actual objects whose surfaces are both completely one colour and completely another at the same time is not known empirically; rather, it is known *structurally*. The bare structure of colour talk is such that there *couldn't* be such states of affairs; and thus, we know that any suitably similar state of affairs (where the relevant criterion is being an object whose surface is both completely *colour*$_1$ and completely *colour*$_2$ at the same time) *must* be false.

A state of affairs is necessary just in case all states of affairs suitably similar to it are also actually-true. Furthermore, a statement of necessity, $\Box s^*$, is true if and only if *every* statement, *s*, expressing a state of affairs suitably similar to that expressed by unmodalised s^*, is true. Consider the simple arithmetical statement "7+2 = 9"; and let's say that the relevant similarity-criterion is *being a true expression of arithmetical equivalence*. All true statements expressing arithmetical equivalences are, of course, true; and therefore, "7+2 = 9" is necessary and "Necessarily, 7+2 = 9" is true. We can make the criterion more general — say, *being an expression of a mathematical truth* or *being an appropriate combination of symbols*. (It is our understanding of mathematical language that, for the most part, tells us which mathematical statements are true, which combinations of symbols are appropriate, and that all such combinations are true. The latter fact, especially, is not known empirically.)

In addition, assuming that Kripke is correct in asserting that proper names and general terms are rigid designators,[31] we can use Paradise on the Cheap to analyse the truth of statements of *a posteriori* necessity like "Necessarily, Hesperus is Phosphorus"

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[31]See *Naming and Necessity*.

and "Necessarily, water is H_2O." Unlike instances of mathematical truths, there are counterfactual situations (i.e., recombined states of the world) in which neither water nor the planet Venus exist. Still, our analyses proceed by means of quantification over states of affairs.[32] Regarding the necessary identity of Hesperus and Phosphorus, the relevant similarity-criterion is *being a state of affairs in which the planet Venus exists*.[33] Thus, for all suitably similar states of affairs — both the actual one and all the recombined ones — it is the case that the object actually referred to with the proper name 'Hesperus' and the object actually referred to with the proper name 'Phosphorus' are identical. Similarly for water and H_2O. Given that the relevant similarity-condition is *being a state of affairs in which water exists*, in all suitably similar states of affairs the stuff we refer to with the mass term 'water' is identical to the substance referred to with the mass term 'H_2O.'[34]

Finally, a situation is contingent if and only if some, but not all, states of affairs suitably similar to the former are actual. That there are barking cats is a contingent state of affairs because certain situations, like the existence of mooing cows, are this-worldly while certain others, like the existence of screeching grasshoppers, are not. Likewise, a

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[32]Unless otherwise indicated, by 'states of affairs' and 'situations,' I mean both *actual* and *unreal* states of affairs, the latter being recombinations of ρ-features as well as possibilities represented schematically by our second-order mathematics. Of course, depending on our similarity-criteria, some recombinations will *not* be possibilities for ρ or any of its parts.

[33]Such a criterion of similarity runs parallel to the strategy, discussed by Lewis, of restricting the accessibility relations of each world. Thus, a proponent of modal realism may restrict accessible possible worlds to just those in which water exists.

[34]As we shall see in Section D of this chapter, Paradise on the Cheap has an advantage over modal realism in that the former is flexible enough to allow coherent acceptance of Kripke's views on rigid designation, *a posteriori* necessity, and haecceitism.

statement of contingency, Qs^* (or, $\Diamond s^* \wedge \neg\Box s^*$), is true just in case *some but not all* statements, *s*, expressing states of affairs suitably similar to that expressed by unmodalised s^* are actually-true. In other words, s^* expresses a contingent truth if and only if some *s* are true and some *s* are *not*. Consider again the example for the alternative analysis of possibility, "There are barking cats." This sentence expresses a contingency because there are some acceptable substitutes for it which are actually true — e.g., "There are mooing cows" — and some which aren't actually-true — e.g., "There are growling ants." Likewise, the sentence "There are mooing cows," along with the situation it denotes, is contingent because there are both actual and non-actual states of affairs suitably similar to that situation, such as the existence of mooing cows itself and the existence of growling ants, respectively.

Thus, like the modal-realistic analysis of modality, the alternative analysis of the same relies upon quantification (which guarantees a lot of the formal features we want). But, unlike the modal-realistic analysis, the alternative quantifies over *situations* (both actual and recombined[35]), instead of possible worlds. To this point, my discussion of the modalities has been limited to modality *de dicto*. With respect to modality *de re*, Lewis says,

> As other worlds are alternative possibilities for an entire world, so the parts of other worlds are alternative possibilities for lesser individuals. Modality *de re*, the potentiality and essence of things, is quantification over possible individuals. As quantification over possible worlds is commonly restricted to accessibility relations, so quantification over possible individuals is commonly restricted by counterpart relations. In both cases, the restrictive relations usually involve similarity (8).

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[35]See note 32.

The alternative analysis of modality *de re* is very straightforward, given that it's very similar to the alternative analysis of modality *de dicto*. According to Paradise on the Cheap, *de re* modality is not to be analysed in terms of quantification over states of affairs *per se* but in terms of quantification over individuals (both actual individuals and those unreal individuals grasped via imaginative recombination or mathematics). Whether I, Jim Morris, am *necessarily human* depends on the individuals to which I'm to be counted as suitably similar. If we allow that I'm suitably similar to individuals which *fail* to posses the property of *being human* — such as walruses or grapefruits or talking donkeys — then it is not the case that I am necessarily human. Rather, because I am suitably similar to individuals which don't have the property of *being human*, in addition to those which *do* posses it (one such individual being myself), I am merely *contingently* human. If, however, I am *not* regarded as suitably similar to any individuals failing to posses the property of *being human*, then every individual to which I am suitably similar will be human; and therefore, this being the case, I am necessarily a human. And, if I am suitably similar to no individual lacking the property of *being human*, it follows that it is *impossible* for me to not-posses this property — in other words, it follows that I'm impossibly non-human.

Based on the alternative analysis of *de re* modality just given, we have it that the truth and falsity of assertions of *de re* modality is to be analysed in terms of quantification over individuals. "Jim is necessarily human," is true just in case *every* individual to which I'm suitably similar has the property of *being human*, and false if *not every*

individual I'm suitably similar to has this property. "Jim is contingently human" is true if and only if some, but not all, individuals to which I'm suitably similar have the property of *being human*. "Jim is impossibly a walrus" is true if and only if none of the individuals that I'm suitably similar to have the property of *being a walrus*. In addition, "Jim is possibly a walrus" is true just in case at least one individual to which I am suitably similar has this property.

Before I move onto the alternative analysis of counterfactuals, I'd like to address an objection which some might raise against my account of suitable similarity as it pertains to modality.[36] It may be stated as follows:

> Consider a recombination with respect to which the actual individual, or state of affairs, most similar to it is not very similar at all. Suppose we judge this meagre degree of similarity to be a merely accidental fact. This being the case, we'll be reluctant to assert that a recombination represents a possibility if and only if there is a very similar actual individual or state of affairs, as we may consider the non-existence of a very similar individual or state of affairs to be just as accidental as the non-actuality of a possible individual or state of affairs.

In response to such an objection, I must first point out that my account makes no use of the notion of something being 'very' similar. Indeed, an actual individual or state of affairs may, in principle, be regarded as very similar without being regarded as *suitably* similar, and vice versa. Second, I must reiterate that judgements of suitable similarity are highly context-relative — they depend on the person making judgements and her interests in making them. Thus, though an individual or state of affairs may not be deemed suitably similar according to one criterion, it may be so deemed according to another. Which criteria are the ones that count in a given context will, again, depend on who's

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[36]The following objection was brought to my attention by Bryson Brown.

making the judgements and her interests in doing so.[37] Therefore, even though we surely all agree that it's impossible for Caesar to be a prime number — because the fact that 2 is a prime number is not suitably similar to the recombination which represents Caesar as being a prime number — given some perverse criterion of similarity, we might assert that 2 being a prime number *is* suitably similar to Caesar being a prime number. (Likewise, we could so gerrymander the counterpart relation as to establish that grapefruits or rocks or even numbers are possibilities for me.) However, I doubt we would ever, in all seriousness, so construe a criterion of similarity — I can't see any interests which would, practically speaking, motivate one to do so. In all likelihood, we would judge that Caesar being a prime number is impossible because all other states of affairs suitably similar to it (say, contradictions in terms) are actually-false.

Moreover, as Brown has pointed out, similarities can be 'linked' at various levels. As we recognize what kinds of things (individuals or states of affairs) are suitably similar to which, we get a better sense of which rearrangements of properties and relations (schematically speaking) respect the nomological or other constraints on similarity in a given context. As our commitments to such similarity-constraints become clearer, we are able to bridge quite large gaps between what is actual and what is possible. Thus, we needn't appeal solely to precise similarity-criteria to determine whether or not something is possible — we may also use criteria which emphasize *structural* similarities. So, even

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[37]Similarly, according to Lewis, similarity orderings vary from context to context, depending on the kind of similarity in which one is interested. Furthermore, for Lewis, counterpart and accessibility relations vary with context, depending on the sorts of similarities between worlds and individuals we wish to deal with.

though it may accidentally be the case that, according to some precise similarity-condition(s), no actual situations are suitably similar to a particular recombination, we can insist that the recombination is possible on the basis of certain schematic-structural similarities it has to certain actual states of affairs.

With respect to counterfactual conditionals, the modal-realistic analysis proceeds in the following way: a counterfactual "A > C" is true at our world if and only if some world at which both A and C are true (or, some A-and-C-world) is 'closer' — i.e. more similar — to our world than any world in which A is true and C is false (or, any A-and-not-C-world). For example, the statement "Were I to drop my computer from two stories up, it would break" is true at this world if and only if some world in which the antecedent and consequent are both true is closer to this world than any world in which the antecedent is true and the consequent is false. The relation of closeness Lewis speaks of is evidently a *similarity* relation. Instead of appealing to similarities between worlds, the alternative analysis of counterfactuals appeals to the similarities such conditionals bear to *actual* situations. Consider the counterfactual conditional "Were I to drop my computer from two stories up, it would break upon impact." With respect to counterfactuals, two similarity-criteria need to be invoked. The first is derived from the conditional's *antecedent* (call it the 'A-criterion') — it specifies the set of actual situations in regard to which the truth of the counterfactual is to be evaluated (call these the 'A-situations'). Let's say that the first criterion is that of *being a situation in which another computer — or suitably similar object — is dropped from two stories.* So, in the present case, the A-situations are those in which computers or suitably similar objects are dropped from two

stories. The second similarity-criterion is determined by emphasizing *certain events in the A-situations* (call it the 'C-criterion') — the conditional is taken to be true if and only if the recombination it expresses is *more* similar to the A-situations, with respect to the C-criterion, than any recombination in which A is true but C is false. Let's assume (very plausibly) that, in the A-situations, the computers in question break upon impact. Hence, we may specify the C-criterion to be that of *being a situation wherein a computer — or suitably similar object — breaks upon impact.* Therefore, the recombination in which my computer is dropped from two stories and breaks upon impact obviously satisfies the C-criterion to a greater extent than any recombination in which my computer is dropped from two stories yet survives the impact. Thus, "Were I to drop my computer from two stories up, it would break upon impact" is *true*. Counterfactuals whose antecedents are *never* actually-true are to be treated in the same way. Consider the conditional "Were water to decrease in volume when frozen, my water bottle wouldn't have broken in the freezer last night," which is true because we know of certain liquids which *do* decrease in volume when frozen and, thus, do not so expand as to break the containers they're frozen in. The A-situations here are those which involve the freezing of liquids which decrease in volume when frozen. Assuming that, in such situations, the liquids' containers do *not* break when the liquids freeze, we can specify the C-criterion as that of *being a situation in which the breakage of the container that a liquid is frozen in does not coincide with the liquid's change-in-state to solid.* Given this criteria, the recombination described by the conditional is more similar to the A-situations than any recombination in which water decreases in volume when frozen and my water bottle still breaks when its contents

freezes. (It's important to note that a counterfactual specifies a recombination, and that the latter embodies at least two sub-recombinations, namely those specified by the antecedent and the consequent.)

Like the alternative analysis of modality, the alternative analysis of counterfactuals suggests that the similarities between recombinations and actual states of affairs determine the truth or falsity of counterfactual conditionals. Moreover, the alternative analysis of counterfactuals allows similarity to be context-relative. Though the A-criterion must emphasize some characteristic of the state of affairs specified by the antecedent, and the C-criterion must emphasize some event occurring in the A-situations, there is a great deal of *flexibility* regarding what can be emphasized. The characteristics we choose to emphasize, and thus our similarity-criteria themselves, are functions of our interests in a given context. Therefore, a given counterfactual may be deemed true in one context while false in another. Suppose, for example, that my computer is encased in inch-thick titanium. So, in regard to the same counterfactual as above — i.e., "Were I to drop my computer from two stories up, it would break upon impact" — let's specify our A-criterion as that of *being in a situation in which an object clad in inch-thick titanium is dropped from two stories*. This being the case, our A-situations are just those in which objects clad in inch-thick titanium are dropped from two stories. Suppose that, in these A-situations, the objects which are dropped do *not* break on impact. This being the case, let's have as our C-criterion that of *being a situation in which an object survives impact*. Hence, in the present case, the counterfactual "Were I to drop my computer from two stories up, it would break upon impact" fails to satisfy the C-criterion. So, the

recombination expressed by this conditional is *less* similar to the A-situations, according to the C-criterion, than recombinations in which I drop my (titanium clad) computer from two stories and it survives the impact, from which it follows that the counterfactual is false.

Let's now consider how Lewis analyses the content of our doxastic states. Lewis says that the entire content of one's belief system is captured

> by a class of possible individuals — call them the believer's *doxastic alternatives* — who might, for all he believes, be himself. Individual X is one of them iff nothing that the believer believes, either explicitly or implicitly, rules out the hypothesis that he himself is X. These individuals are the believer's doxastic possibilities. But they are not different possible ways for the world to be; rather, they are different possible ways for an individual to be, and many of them may coexist within a single world ... Suppose that all of someone's doxastic alternatives have a certain property; then he believes, explicitly or implicitly, that he himself has that property.
>
> One property that an inhabitant of a world may have is the property of inhabiting a world where a certain proposition holds. ... So if all of someone's doxastic alternatives inhabit worlds where a certain proposition A holds, then he himself believes that A holds at his world, whichever world that may be. We may say, simply, that he believes the proposition A (28-29).[38]

I will now give the alternative analysis of doxastic-state content. Obviously, an actual individual possesses many properties, both intrinsic and extrinsic. Among such extrinsic properties are those of inhabiting a world where such-and-such is the case — e.g., ρ may

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[38]Similarly, in an essay entitled "Propositional Objects," Quine characterizes the content of propositional attitudes in terms of possible worlds. His efforts here are motivated, in large part, by the difficulties he takes to arise from conceiving of propositional objects in sentential terms. Quine does not take a modal-realist stance — his view is a sort of ersatzism according to which the relevant characteristics of 'worlds' are represented mathematically.

be a world where there exist barking cats or mooing cows or talking donkeys. We have opinions about whether or not we possess certain properties — for example, I believe that I am six-feet tall and that I inhabit a world in which white-furred polar bears exist. With respect to certain other properties, we have no opinions — for example, I have no idea if I live in a world which includes talking donkeys (say, on some distant planet) or if I live in a world of one- or two-way eternal recurrence. And, there are other properties which we're simply unable to consider, being so unlike any of the properties to which we *do* have cognitive access that no amount of imaginative recombining would enable us to grasp them. (It's very likely that there are some properties of the latter kind present in our world.)[39] There are obviously many ways that an actual individual might have been, many properties — both intrinsic and extrinsic — she might have possessed but actually doesn't. Let's call these an individual's *non-actual possibilities*. (Access to non-actual possibilities is provided either precisely by the features of ρ and recombinations thereof or schematically by our second-order mathematics.) For some of an individual *S*'s non-actual possibilities — let's use the letter '*P*' to denote this subset of non-actual possibilities — *S* believes nothing (either implicitly or explicitly) which rules out the hypothesis that she herself is among *P*. The subset, *P*, of *S*'s non-actual possibilities is comprised of those possible individuals which coincide perfectly with the properties *S*

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[39]The only way we can grasp properties of the latter sort is schematically, by means of our second-order mathematics. Let's call properties of this kind *foreign* properties, by which is meant either properties that we can't gain cognitive access to by recombining *any* features of ρ — i.e., alien properties — or properties to which we cannot gain cognitive access by recombining any features of ρ *to which we already have cognitive access*. The difference between the former subset of foreign properties and the latter is, of course, that the latter may be instantiated in ρ.

believes herself to possess and not-possess. These individuals are *S*'s doxastic alternatives. All possibilities belonging to *P*, with respect to myself, have the properties of, e.g., being six-feet tall and inhabiting a world in which white-furred polar bears exist, and *fail* to possess such properties as being blonde-haired. But, of course, being (non-actual) ways in which *S* might have been, the members of *P* possess properties with respect to which *S* has no opinion (i.e., she neither believes nor disbelieves that she possesses them) and properties which are completely foreign to her. For instance, I have no opinion for or against the hypotheses that I live in a world with talking donkeys or a world of one-way eternal recurrence.[40] Similarly, I have no idea as to my precise weight — I believe that I weigh somewhere between 180 and 185 pounds, but I believe nothing that rules out the conjecture that I weigh 181 pounds or that I weigh 183 pounds. Therefore, an individual *S*'s doxastic alternatives possess all the properties which *S* believes herself to possess, and fail to possess all of those properties which *S* believes she doesn't possess; but each of S's doxastic alternatives also possesses certain properties with respect to which *S* herself has no opinion and, perhaps, certain properties which *S* cannot fathom in any precise way. *S* believes nothing which rules out the hypothesis that she *is* any one of these doxastic alternatives.

To this point in my analysis of doxastic-state content, I've said nothing that's incompatible with Lewis' modal realism. What distinguishes Paradise on the Cheap's account of doxastic alternatives from the modal-realistic one is that the former, instead

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[40]Assuming that I *do* believe that I live in a world of one-way eternal recurrence, I may believe nothing which rules out the idea that I inhabit the 19th or the 1027th epoch of the world.

appealing to possible worlds, makes appeal to *recombinations* of features of this world. Doxastic alternatives are simply possible recombinations of ρ-features, which are all similar in that a certain subset of their properties perfectly match all of the beliefs an actual individual has regarding her own properties (including what kind world she lives in). In regard to the other properties possessed by these recombinations, an individual, *S*, neither believes nor disbelieves that she possesses them. Therefore, in all that *S* believes, there is nothing to rule out the hypothesis that she herself is the actualization of one of these recombinations. There is nothing in what I believe that rules out the conjecture that I am actually combined with the property of being in a world with talking donkeys or with the property of weighing 184 pounds or with that of being in a world of one-way eternal recurrence. Moreover, assuming (a) that ρ is a world of one-way eternal recurrence, (b) that I live in the 19th epoch — yet have no opinion as to which epoch I live in — and (c) that there can be recombinations of ρ-features which are also actually the case,[41] it follows that there's nothing among my beliefs to rule out the thesis that I am the recombination existing in the 1019th epoch.

So, according to Paradise on the Cheap, the entire content of a doxastic agent's belief system is to be characterized as the set consisting of (a) recombinations, *R*, with

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[41]I take it to be fairly obvious that there can be actual recombinations of other actual phenomena, such as talking donkeys or barking cats. (In the same way, Lewis allows that actual individuals may have some possibilities that are likewise actual.) This being the case, as we don't have a complete list of the actual recombinations, there will be instances in which we have trouble determining whether or not a recombination is actual. But such cases don't pose problems for my account since (with Lewis) I wish to say that the actual is itself possible and, therefore, that the distinction between actual and non-actual recombinations is irrelevant to my semantics.

respect to which there is nothing in what the agent believes to rule out the possibility that she is any one member, and (b) herself.[42] All recombinations *R* pertaining to a particular doxastic agent, *S*, are similar in a very specific way: they, along with *S* herself, constitute *S*'s doxastic alternatives. Hence, *S* is similar to each member of *R* in that she is likewise a doxastic alternative. In regard to content, we're dealing with a very large — perhaps infinite — number of recombinations for any one agent's belief system. It is practically impossible for us to grasp all such recombinations individually and, thereby, to figure them into our explanations. For this reason, it might be better to refrain from talk of individual recombinations here and, instead, speak of *similarity-projections*.[43] Classes of similarity projections can be represented formally, e.g, $\{x \mid$ nothing in what *S* believes eliminates the hypothesis that she herself is $x\}$. The latter thus represents all of *S*'s doxastic alternatives — all elements in the set satisfy the property indicated (they're all similar in that they possess this property) and, therefore, the set represents the entire content of *S*'s belief system. Though, due to practical limitations, we're unable to grasp every individual one of *S*'s doxastic alternatives (and, hence, the entirety of *S*'s belief system), we grasp the constraint on membership in the set of doxastic alternatives and can see in this constraint the potential for an infinity of doxastic alternatives. One may also, I presume, provide an interpretation for the objects in the set itself and thus specify, for example, that they are either recombinations or *S* herself. Roughly, one might specify the set in the following way:

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[42]Presumably, an agent is herself among her own doxastic alternatives.

[43]Bryson Brown is to be credited for introducing me to the concept of projections.

> $\{x \mid [(x=S) \veebar (x$=possible recombination)] & nothing in what S believes eliminates the hypothesis that she herself is $x\}$

It appears, then, that the similarity projections provide a way by which to represent the totality of one's belief system in terms of recombinations.

Like modal realism, Paradise on the Cheap also gives an analysis of the content of individual beliefs. One is said to believe, explicitly or implicitly, that one possesses a certain property A if all of one's doxastic alternatives — or recombinations R — possess that property. (Such properties include the property of inhabiting a world in which a particular proposition a holds.) All of my doxastic alternatives possess the properties of being six-feet tall and of inhabiting a world in which white-furred polar bears exist. Therefore, I am said to believe that I have such properties and, hence, that I'm six-feet tall and that white-furred polar bears actually exist. In terms of similarity projections, we say that S believes she inhabits a world in which a particular proposition a holds just in case all members of her projection class (defined immediately above) represent individuals who occupy worlds at which a holds.

Lewis takes a property to be the set of all its instances — "*all* of them, this- and other-worldly alike" (50). By analysing properties as the set of all their actual *and* non-actual instances, Lewis avoids a common objection to taking properties to be the sets of their instances, namely that different properties may happen to be coextensive. The set of renates and the set of cordates, for example, only appear to be accidentally-coextensive when we ignore their other-worldly instances. Lewis analyses relations in the same way.

> An instance of a dyadic relation is an ordered pair of related things; then we may take the relation again to be the set of its instances — all of them,

> this- and other-worldly alike. ... In the same way, a triadic relation can be taken as a set of ordered triples, and so on. Also we can include relations of variable degree, since there is no reason why pairs and triples, for instance, cannot both belong to a single set (52).

One way we might try to analyse properties in terms of Paradise on the Cheap is by claiming that a property, or *n*-adic relation, is just the set of its actual instances and its instances occurring in recombinations. Thus, the property of *being six-feet tall* is to be analysed as the set of all the six-foot tall things existing in ρ coupled with all of the six-foot tall things that we gain access to via our imaginative recombinations of features of ρ. Furthermore, the relation *mother of* is to be analysed as the set of all ordered pairs, *x,y* — *x* being the mother of *y* — both in the actual world and grasped by means of imaginative recombination. As was the case with content, similarity projections might be a better way in which to represent properties as the set of all their actual and non-actual instances. Thus, we may analyse the property of *being six-feet tall* by means of the set {*x* | *x* is six-feet tall}, and relation of *mother of* with {*x,y* | x is the mother of *y*}.[44] Again, such sets don't give us cognitive access to each instance of a property, but they *do* give us access to the constraints on set membership — which are just the relevant similarity-criteria — and, thereby, to the characteristic(s) definitive of an instance of a property.[45] (And, by

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[44]Presumably, as discussed in regard to content, we can provide interpretations for the objects of such sets in terms of, e.g., actual and recombined instances of properties. For example, {*x* | [(*x*=possible recombination) ⩒ (*x*=actual individual)] & *x* is six-feet tall}.

[45]Because we, at ρ, have cognitive access to conditions of membership in property sets, and because our cognitive access is limited to what's provided by the features of ρ, it follows that the information supposedly 'encoded' in the other-worldly extensions is really a matter of what, here at this world, we grasp as a property (in terms of what is required or equivalent to getting the similarity relation right).

considering the set of properties as a whole, we can grasp its potential infinitude.) Projection classes can even specify any spatiotemporal constraints which apply to particular properties and relations — for example, membership constraints may only allow certain properties/relations to occupy certain spatiotemporal positions, and they may assert that certain properties/relations can only occupy certain sizes and shapes of space-time.

Of course, the non-actual things which instantiate properties in our recombinations are, *ex hypothesi*, not real. Hence the main point of contrast between the modal-realistic and the alternative analyses of properties and relations: the latter considers many property- and relation-instantiations to be *unreal* but acceptable projections of what is real. (The latter instantiations are 'acceptable projections' because they are *suitably similar* to actual instantiations — as suggested above, the criterion of suitable similarity with respect to any property is just the constraint on membership into the set of projections.) And, of course, there are many properties and relations to which we lack precise cognitive access and, of the properties and relations to which we *do* have precise cognitive access, there are many *instantiations* to which we lack such access; but the same limitations apply under modal realism. Moreover, just as modal realists posit the existence of a plurality of real possible worlds and possible individuals, proponents of Paradise on the Cheap acknowledge that there are myriad ways in which the actual world and actual individuals might have been. We are able to grasp some of these ways precisely by imaginative recombination and the others schematically by means of our second-order mathematics. Thus, Paradise on the Cheap makes provision for just as

many properties, relations, and instantiations as does modal realism; and the former affords the same degree of cognitive access to such properties, relations, and instantiations as does the latter. So, one might conclude that if modal realism avoids the objection that a property or relation may be coextensive, then so does Paradise on the Cheap.

There is, however, a significant problem with the alternative analysis of properties just discussed. Andrew Irvine, in commenting on a mature draft of this paper, argues that, with respect to Paradise on the Cheap, identifying properties with the sets of all their actual and non-actual instances will *not* avoid coextensionality problems such as that between the set of renates and the set of cordates. He says,

> if by 'instances' we mean thin individuals (i.e., haecceities), then both 'being a renate' and 'being a cordate' will be identified with the same set, {a, b, c, ...}. In contrast, if by 'instances' we mean thick individuals (i.e., facts or states of affairs), then 'being a renate' will be identified with {Ra, Rb, Rc, ...} and 'being a cordate' will be identified with {Ca, Cb, Cc}, but we won't have succeeded in eliminating properties.

Because, according to Paradise on the Cheap, possibilities — and, hence, possible individuals — are grounded in the features of ρ, we have it that any given individual represents itself in all recombinations of which it is a part (including those recombinations which consist exclusively of the individual in question). Therefore, an individual has the same haecceity (or 'thisness') in any recombined state of affairs.[46] Let's specify the similarity-criterion as that of *being a renate or a cordate or both* (a very plausible condition, I think). Thus, any individual which is both a renate and a cordate is

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[46]For an account of Paradise on the Cheap's amenability to Kripkean views on haecceities and haecceitism, see Section D of the present chapter.

possibly just a renate and possibly just a cordate. Similarly, all just-renate individuals are possibly just-cordate individuals, and all just-cordate individuals are possibly just-renate individuals. Moreover, all just-renate and just-cordate individuals are possibly renate-and-cordate individuals. And since individuals represent their own possibilities, it follows that all individuals which are in the set of renates are also in the set of cordates, and vice versa. So, the set of renates and the set of cordates are coextensive. It's important to note that modal realists are *not* faced with this result. For Lewis, an individual only ever represents *one* possibility for itself, namely the one that it *itself* actualizes. All the other possibilities for an individual are represented by its *counterparts*. Thus, if we require that two individuals must each be renates or cordates or both in order to be counterparts, it follows that the possibilities for any particular renate-and-cordate, just-renate, and just-cordate will consist of myriad *different* individuals. Therefore, the set of all renates and the set of all cordates will *not* have the same membership, from which it follows that the two sets will not be coextensive.

One might think that the present difficulties over properties can be resolved by specifying renate- and cordate-instances more robustly, instead of just in terms of haecceities. Thus, one may specify the members of the set of renates and the set of cordates, respectively, as individuals with properties in addition to those of *having a kidney* and *having a heart*. This being the case, one could distinguish the individuals in the set of renates and the set of cordates by the other properties they possess. So although, according to Paradise on the Cheap, individuals represent their own possibilities, one would be able to say that there are instances of the property of *having a*

kidney which are distinct from instances of the property of *having a heart* (because the former have different properties than the latter), and vice versa. However, this strategy fails because, in following it, we analyse the properties of *having a heart* and *having a kidney* by appealing to other properties; and to use properties to explain properties is just circular.

I have two suggestions as to how this dilemma might be avoided. First, we may choose to abandon Paradise on the Cheap's analysis of properties. But, assuming that this course of action is undesirable, our second option (in my opinion) is to leave quantification, over actual individuals and non-actual recombinations, out of the analysis and focus instead on the *similarity* conditions which allow us to distinguish between recombinations bearing just the one property and those bearing just the other.[47] Indeed, in contrast to my interpretation of Irvine's objection, Bryson Brown sees the latter as a rejection of my use of quantification over recombinations period. Recombinations *do not exist* — and, so, cannot be the values of any bound variables — from which it follows that, in quantifying over all renates or all cordates, I quantify over just the actual renates or the actual cordates. Hence, assuming that all actual renates are also cordates, and that all actual cordates are also renates, we have it that the set of all renates is coextensive with the set of all cordates (regardless of whether we understand the property-instances to be 'thick' or 'thin' individuals). I don't wish to debate whose interpretation — Brown's

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[47]I am indebted to Bryson Brown for suggesting this response to Irvine and for contributing, in large part, to its articulation.

or mine — is the correct one;[48] and I don't really have to because the solution to be proposed immediately (the one that *doesn't* involve complete abandonment of an alternative analysis of properties) neutralizes Irvine's objection on either view!

Based on what was said in note 45, it is clear that an understanding of a property, in terms of the relevant similarity-criteria (which we can distinguish from other similarity relations associated with, or based on, different properties) is essential to any cognitive access we have to Lewis' multi-world property extensions and how/why they differ across worlds even though they overlap at ρ. Given this grasp, our understanding of the metaphysics of properties is grounded in the *actual* world, in the distinct similarity-relations which link cordates *qua* cordate and renates *qua* renate. Our ability to correctly use Lewis extensional account of properties (whether as realists or fictionalists) *presupposes* that we, at ρ, can grasp the difference between the properties of *being a renate* and *being a cordate* without having to observe that their extensions are distinct. (All we need in order to grasp the difference between the two properties is access to the relevant similarity-criteria.) Therefore, the features of ρ are what provide us with the wherewithal to use modal realism to explain properties. With our this-worldly access to similarity-criteria we may, as suggested by Ian Hinckfuss, speak *as if* there are instances of renates which are *not* instances of cordates, and vice versa, by *supposing* modal realism to be true — as opposed to *asserting* its truth. Hinckfuss argues, roughly, that we can suppose modal realism to be true *without* committing ourselves to the existence of

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[48]In fact, it appears that each interpretation could be classified as a distinct objection to the Paradise-on-the-Cheap analysis of properties suggested above.

non-actual worlds and individuals.[49] In using modal realism suppositionally to analyse properties, we employ a sort of 'quasi-quantification' over property-instances, i.e., we talk as if there really are non-actual individuals to quantify over; and thus, in the set of renates and the set of cordates, we include suppositional individuals which are just-renates and just-cordates, respectively. (It does no harm to speak or think in this way, so long as don't confuse quasi-quantification with real quantification, as the latter applies exclusively to really-existing phenomena.) This being the case, and because the suppositional just-renates and just-cordates are *ex hypothesi* different individuals, it follows that the set of renates includes some supposedly-extant instances which the set of cordates does not, and vice versa. Thereby, we are able to analyse properties as the sets of their instances while avoiding problems of coextensionality and without committing ourselves to the truth of modal realism (even though we don't need modal realism to understand the distinctness of properties).[50]

Hinckfuss also claims that "it is frequently useful to express certain economical truths using sentences exhibiting a false prodigal ontology and hence [that] it is absurd to demand of the economicalist that she amend her speech to mirror her economical beliefs"

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[49]If we use modal realism in a suppositional context, we commit ourselves to truth of certain conditionals, the antecedents of which consist of something like "If modal realism is true, ..." and the consequents of which consist of assertions made in modal-realistic language. See Section C of the present chapter, in which I discuss Hinckfuss' views in far greater detail.

[50]Quasi-quantification does nothing to help Paradise on the Cheap avoid problems of coextensionality. Even if we *suppose* that non-actual recombinations really exist — and, hence, that there exist just-renate and just-cordate instances — it remains that, according to Paradise on the Cheap, an individual, *S*, is part of every recombination which is a possibility for *S*. Thus, we fall prey to Irvine's objection as *I* interpret it.

(596). Thus, proponents of Paradise on the Cheap can use modal realism to give a suppositional analysis of properties while adhering consistently to their economical convictions. However, our grasp of similarity constraints, in virtue of which we're able to correctly employ Lewis' extensional analysis of properties, is also what yields cognitive access to recombinations which are just-renates and those which are just-cordates. Indeed, the fact that there are suitably similar recombinations — with respect to either *being a renate* or *being a cordate* — which have one property but lack the other (a point which Irvine does not contest) indicates that these two similarity-criteria are distinguishable. So, although quantifying over recombinations (whether we use real or quasi-recombination), and thereby identifying properties with sets of the latter, gets us into trouble with coextensionality in the ways discussed above, we can still identify a property with the *similarity-criteria* that allows us to distinguish between recombinations which possess it and those which don't. Thus, we are able to give a Paradise-on-the-Cheap analysis of properties in terms of such similarity-criteria — an analysis which doesn't encounter the problems which Irvine points out for the earlier one.

I should present a more detailed picture of how, in general, we judge states of affairs to be suitably similar. Evidently, we grasp (epistemically and/or doxastically) how properties, natural kinds, and objects behave based on how we see them behave in this world. In general, these actual phenomena constitute our only precise means of gaining cognitive access to what is possible and impossible for ρ-individuals and ρ itself. In judging whether or not a sentence is possibly true, we 'bridge out,' so to speak, from the individuals, properties, and kinds dealt with therein to certain *actual* individuals,

properties, and kinds.[51] We thus judge whether or not the former are suitably similar to the latter and whether the *arrangement* of the former is suitably similar to the way in which the latter are arranged. The arrangement of properties, individuals, and kinds is key here since we, of course, regard certain applications of properties to individuals and kinds (via recombination) as permissible while we regard others as impermissible. For example, to the natural kind *cat* corresponds the property of *being a cat*. Hence, one may assert of any individual cat — or each individual in the set of all cats — that it possesses the property of being a cat. Moreover, in addition to the property of *being an individual which barks*, there exist particular instances of barking (whether the latter be identified with certain sounds or physiological processes or something else). Thus, one may say of any particular bark that it possesses a property of having a particular pitch, registering certain levels on a recording device, or being causally linked with certain physiological processes. However, it's very unlikely that we'll assert the possibility of *a bark which has the property of being a cat*. Instead, we'll deny that recombinations in which the property of *being a cat* is applied to an individual occurrence of barking are suitably similar to any actual property-individual combination. Our linguistic conventions, and conceptual schemes, are such that to speak of a bark which has property of *being a cat* is to talk nonsense. By contrast, to speak of barking cats — whether in regard to individual cats or the natural kind corresponding to the set of all cats — is to speak of a possible state of affairs (as opposed to an impossible one) since the arrangement of properties,

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[51]Thanks go to Bryson Brown for the 'bridging out' metaphor, as well as for suggestions which led me to this view of how we determine suitable similarity.

individuals, and kinds is suitably similar to certain actual arrangements of properties, individuals, kinds (in which, e.g., dogs and cats possess the properties of being able to bark and meow, respectively).

This account of how we judge states of affairs to be suitably similar emphasizes the limits we have with respect to alien individuals and alien properties. But, as mentioned at various points above, we are able to grasp alien possibilities schematically via second-order mathematical structures. It's time that I give a more detailed account of the second-order apparatus employed by Paradise on the Cheap. Brown has suggested that we might characterize the schematic descriptions in terms of Ramsey sentences.[52] I'll illustrate by means of a simple example: the geometrical truth that, given any two points, there is one and only one line joining them. Instead of expressing this idea in first-order language, like so

$$(\forall x,y)\,[(\text{Point}(x) \,\&\, \text{Point}(y) \,\&\, \sim(x=y)) \supset (\exists z)\,(\text{Line}(z) \,\&\, \text{On}(x,z) \,\&\, \text{On}(y,z) \,\&\, (\forall w)\,(\text{Line}(w) \,\&\, \text{On}(x,w) \,\&\, \text{On}(y,w) \supset w=z))]$$

we express it in second-order quantified language:

$$\exists(\text{P,L,O}):\,(\forall x,y)\,[(\text{P}(x) \,\&\, \text{P}(y) \,\&\, \sim(x=y)) \supset (\exists z)\,(\text{L}(z) \,\&\, \text{O}(x,z) \,\&\, \text{O}(y,z) \,\&\, (\forall w)\,(\text{L}(w) \,\&\, \text{O}(x,w) \,\&\, \text{O}(y,w) \supset w=z))].$$

Thus, we abstract from any particular identification of what these properties are. The latter formulation specifies neither the properties *Point* or *Line* nor the relation *On* — it

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[52]According to Brown, Ramsey's idea was to abstract away from any particular identification of the properties to which we refer in scientific theories and just assert the existence of some properties satisfying the relations that the theories' properties must. See F.P. Ramsey, *The Foundation of Mathematics and other Logical Essays*, 212-15, 231. (Page references provided by Hempel in note 60 of "The Theoretician's Dilemma," page 216.)

merely asserts the existence of some properties (whatever they are) which satisfy a certain relation. This second-order abstraction describes, schematically, the structure of some alien states of affairs, as does the following:

$$\exists(A,B,C): (\forall x,y,z)\,(A(x,y)\ \&\ B(x,z) \supset C(z,y)).$$

No interpretation is given to the properties quantified-over in such Ramsey sentences; and thus, the latter allow us to recognize the structure of ways which ρ and/or its parts might have been even though there are specifications of these properties, and the individuals which instantiate them, to which we do *not* have cognitive access.

Via the process of Ramsification, we are able to represent, in a highly vague and schematic way, many possibilities which we cannot grasp by means of precise imaginative recombinations. In giving my alternative analyses of modality, counterfactuals, doxastic-state content, and properties, I didn't say very much about alien phenomena or how they're handled by Paradise on the Cheap — I focused, instead, on those possible states of ρ and ρ-individuals to which we have precise cognitive access. My intent was not to mislead — I had resolved to get more specific about alien phenomena and second-order structures only after showing the full use to which the notion of recombination, along with similarity projections, can be put with respect those things to which we have precise cognitive access. (The latter entities *do* figure more prominently in our alterative analyses.) In any event, I will now survey some ways in which alien phenomena, as they pertain to modality, counterfactuals, content, and properties, can be handled by Paradise on the Cheap.

We can regard a second-order structure as representing possibilities if and only if

ρ is suitably similar to it in certain ways (as when certain specifications of its properties yield actual truths). Recall the sentence "$\exists$(A,B,C): ($\forall x,y,z$) (A(x,y) & B(x,z) $\supset$ C(z,y))" — its properties might be deemed possible because the relations in which they stand resemble the structure of the following actual truth "($\forall x,y,z$) (Mother(x,y) & Daughter(x,z) $\supset$ Grandmother(z,y))." We may even evaluate the truth and falsity of counterfactuals which deal with alien phenomena — either or both the antecedent and consequent of such conditionals are specified in schematic terms. All one has to do is come up with an A-criterion and a C-criterion, specify a set of A-situations, and judge whether the latter satisfy the C-criterion with respect to the state of affairs that the counterfactual describes (whether the counterfactual is given in precise terms, schematic terms, or a combination of the two is unimportant).

Alien phenomena figure more importantly in Paradise on the Cheap's analysis of content. A person, *S*, most likely has some beliefs about what sorts of relations hold between properties (unspecified) in the world; and surely *S* has no opinion concerning whether various relations in which alien properties can exist actually hold at ρ. These relations — or structures — are part of what determine an individual's doxastic alternatives, as *S* believes nothing to rule out the hypothesis that she lives in a world where some of these relations hold. We lack precise cognitive access to many of these structures and, so, we can only grasp them schematically and specify them using our second-order mathematical apparatus. Therefore, contrary to what I might have insinuated earlier on in this section, it takes schematic mathematical representations, in addition to ρ-features and recombinations thereof, to fully specify one's doxastic

alternatives and, hence, one's belief system. This being the case, if we want to give an interpretation to the objects in our sets of similarity projections, we should give a characterization like the following: $\{x \mid [(x=S) \veebar (x=$(recombination $\vee$ schematic structure))] & nothing that S believes rules out the possibility that she is $x\}$. The actual properties, recombined properties, and second-order schemas which together represent the content of S's entire belief system are all similar to one another in that they all represent properties which, given what S believes, she cannot rule out the conjecture that she possesses them.

Paradise on the Cheap can also yield analyses of alien properties. We can characterize the latter as the sets of all their instances via sets of similarity projections. Thus, we may say of an unspecified property that it is, for example, quadradic, that it stands in certain relations to other properties, or it's instantiated only in certain parts or kinds of space-time. Consider the following sets:

$\{A \mid \exists(w,x,y,z)\ [A(w,x,y,z)]$ & and A is alien$\}$

$\{P \mid (\forall x,y)\ [(P(x) \& P(y) \& \sim(x=y)) \supset (\exists z)\ (L(z) \& O(x,z) \& O(y,z) \& (\forall w)\ (L(w)$ & $O(x,w) \& O(y,w) \supset w=z))]$ & P is alien$\}$.

It must be specified, as part of the membership constraints of the set, that P is alien — otherwise non-alien properties will be allowed into the set, which is not what we want.

Therefore, just like actual individuals and non-actual recombinations, the second-order structures appealed to in our explanations of modality, counterfactuals, content, and properties can be judge in terms of similarity. Our second-order mathematical structures provide a basis on which I can respond to an objection that some will likely raise against

the central role which imaginative recombination plays in Paradise on the Cheap. Bryson Brown stated this objection very well in some comments he addressed to me:

> [T]he possibilities here, in broad, are infinite, but we can only imagine things one at a time. So our semantics for possibility will intuitively fall short of capturing the infinity of possibilities, unless we include things we don't imagine, but could. And if we include those, how shall our semantics for them go? Do we imagine them, and find them sufficiently similar to things we do imagine? But that won't work, since we're trying to get hold of the possibilities we don't ever imagine![53]

My reply is to stress that we *do* grasp those possibilities which aren't imagined specifically by recombination. Some of these are given schematically by our second-order mathematics and are suitably similar to features of the actual world and/or to things which we *do* specifically imagine by recombination (e.g., their properties may be judged to share the same structure).

Moreover, we can expand our grasp of possibilities beyond that which is provided by individual imaginative recombinations and schematic structures via sets of similarity projections. What we do here is construct sets whose members are all and only those elements satisfying particular similarity-criteria. For example, we can represent all talking donkeys with $\{x \mid x \text{ is a talking donkey}\}$, or all dyadic properties with $\{P \mid \exists(x,y)\ P(x,y)\}$. (We might wish to be more specific when we define a set like that of the talking donkeys, as follows: $\{x \mid [(x=\text{actual individual}) \veebar (x=\text{recombination})] \,\&\, x \text{ represents a}$

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[53]This objection is rooted in Descartes "Meditation Two," in which he emphasizes, among other things, that "I [Descartes] grasp that the wax is capable of running through innumerable changes of this sort, even though I am incapable of running through these innumerable changes by using my imagination" (22).

talking donkey}.[54]) So, in grasping constraints on membership in these similarity sets, we also acknowledge that their members (both actual and non-actual) may be *infinite* in number. Of course, because possibilities are grounded in this world, one must be able to grasp the totality of the actual and recombined individuals, or states of affairs, included in such sets. This grasp is achieved via *vague* mental recombinations — thereby, many actual and recombined possibilities are apprehended in one act of imaginative recombination. For example, I can consider the possibility of someone, or something, being less than six-feet tall (say, from 5'6" up to, but not including, 6') — a possibility under which many actual individuals and recombinations are subsumed — without resorting to a continuum of thoughts. Likewise, one act of imaginative recombination gives me access to the similarity-criteria constraining membership in the set of talking donkeys. This act of mental recombination is so vague that, in performing it, I don't imagine any particular talking donkeys; but, in its vagueness, it 'covers' each actual or recombined talking donkey. Thus, I leave similarity to carry the ultimate semantic burden. But, as Brown has suggested, our ability to make similarity judgements is both fundamental enough (in, for example, learning, induction, and how we judge possibilities and the truth values of counterfactuals) and, perhaps, rich enough a notion to carry the load.

Overall, then, the possibility of alien properties, individuals, and states of affairs is

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[54]Recall that, in note 20, I use the term 'represent' (with respect to Paradise on the Cheap) in such away that it's synonymous with 'ground.' Thus, to say that a set represents all talking donkeys is to say that all possible talking donkeys are *grounded in*, or *constituted by*, that set (the latter being, in turn, grounded in the features of ρ).

adequately grasped via an understanding of their structure (i.e., the relations which hold between them). Indeed, to the extent that alien phenomena are important to our alternative analyses of modality, counterfactuals, content, and properties, we need nothing more than a schematic understanding of them; and we needn't assert their existence. The challenge for Lewis is to show the philosophical need for alien properties and individuals to exist and constitute the semantic value of sentences concerning alien phenomena (which must, of course, be formulated in schematic terms).

There's an epistemological appeal to the alternative analyses of modality, counterfactuals, content, and properties which modal-realistic analyses of the same phenomena lack. The alternative analyses make appeal to actual situations, actual individuals, second-order mathematical structures, and recombinations, and similarity-based projections, not to possible worlds. Actual situations, actual individuals, and recombinations are far more epistemically accessible than any truths about other worlds (and, given a naturalized ontology for mathematics, so are our projection sets and second-order mathematical structures). For one thing, we can be *caused* to be aware of the existence of the former things as well as truth and falsity of sentences about them. The fact that the means of analysis which Paradise on the Cheap employs are much more cognitively accessible than those employed by modal realism perhaps constitutes an explanatory advantage of the former theory over the latter.

C. It should now be clear the approach one ought to take in using Paradise on the Cheap to analyse modality, counterfactuals, doxastic-state content, and properties. Though I have shown that Paradise on the Cheap provides satisfactory explanations of

these phenomena, I have *not* demonstrated explicitly that Paradise on the cheap can explain *everything* which Lewis claims to explain via modal realism (call these *Lewis-phenomena*). I have not provided alternative explanations for, among other things, verisimilitude, causation, and epistemic-state content.[55] To give explanations of all such phenomena in terms of Paradise on the Cheap would require me to match, or come close to matching, the 60-odd pages which Lewis spends discussing the theoretical benefits of modal realism (in §§1.2-1.5 of *OPW*). Due to the spatial and temporal limitations I'm currently under, pursuing this strategy simply isn't feasible. But, not to worry: this infeasible strategy is also *unnecessary*, as the arguments of this section will make apparent.

Instead of providing an explicit account of all the theoretical benefits of Paradise on the Cheap, I shall employ a strategy based on material presented by Ian Hinckfuss, in his excellent paper "Suppositions, Presuppositions, and Ontology" (henceforth "SPO"). This strategy (call it the Hinckfussian strategy) allows one to give alternative analyses of all the phenomena with which Lewis is concerned by using modal realism as a *suppositional* theory, as a hypothetical deductive tool for deriving conclusions in the language of Paradise on the Cheap. Key to the Hinckfussian strategy are the notions of *supposition* and *presupposition*. Suppositions, Hinckfuss says, are "dialectical commitments of a sort. Any participant whose locution is governed by a supposition is

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[55]Lewis discusses verisimilitude and causation in *OPW*, §1.3, and epistemic-state content in §1.4.

reasonably expected to speak *as if* the supposition is true" (600).[56] Suppositions are to the assertions they govern as the antecedent of a conditional locution is to its consequent. Presuppositions are inherited by dialogues via suppositions which have been operative in a large majority of dialogues within the larger dialectical community.[57] As with suppositions *simpliciter*, the commitment generated by an assertion governed by an appropriate presupposition is merely a conditional with the presupposition as antecedent and the expressed proposition as consequent — the conditional may well be true even though its consequent is false. Only if there are *no* suppositional or presuppositional commitments does an assertion overtly expressing a proposition, *p*, commit every participant in a dialogue to *p*. (The distinction between suppositions and presuppositions needn't concern us any further here — in the discussion which follows, it's of no matter whether an assertion is governed by a supposition or by a presupposition. For the latter reason, I shall henceforth use the terms 'supposition' and 'suppositional commitment,' and their variants, in discussing both suppositions and presuppositions.)

Thus, assertions do not always commit us to the propositions overtly expressed by them; "[r]ather, assertions made under the scope of a supposition commit us to a conditional of which the proposition expressed is the consequent and the supposition is the antecedent" (Hinckfuss 597). According to Hinckfuss, "nobody has to commit

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[56]According to Hinckfuss, suppositional commitments should be *communal* — if any participant in a dialogue has them, then *all* participants in the dialogue should have them.

[57]By *dialectical community* is meant the union of "all the dialogues in which everybody in a community is or has been engaged into one big dialogue — the community dialogue" (Hinckfuss 602). Presuppositions, then, are the set of all those suppositions which a very large proportion of the community's dialogues have in common.

themselves to the existence of events, properties, or possible worlds simply because they say something that entails the existence of events, properties, or possible worlds — given that what they say is governed by appropriate presuppositions" (617). We can treat ontologically-prodigal statements like those made in the language of modal realism as suppositional and, in this way, we can make ontologically-prodigal assertions about possible worlds, possible individuals, &c. without committing ourselves to the truth of modal realism. For example, the statement "There are other worlds at which polar bears are furless" may be governed by the *supposition* that modal realism is true. Making the former assertion under the latter supposition commits one neither to the existence of non-actual worlds nor furless polar bears but to the truth of the conditional "If modal realism is true, then there are other worlds at which polar bears are furless."

It may turn out that, in general, modal realism is easier to use than Paradise on the Cheap, i.e., that the former's analyses of modality, counterfactuals, &c. are heuristically simpler than those of the latter. I will now demonstrate how modal realism can be used suppositionally to deduce the economical conclusions of Paradise on the Cheap. Consider the following passage, in which Hinckfuss specifies how such deductions are carried out:

> [c]onstructions with lean ontological commitments are equated by what Field calls *bridge laws* with propositions quantifying over items such as possible worlds and truth values, all couched in a syntax whose logic is learnt on mother's knee involving no more than individual variables, predicates, simple propositional operators and a couple of simple quantifiers. Assumptions with a lean ontology are then transformed via the bridge laws to corresponding propositions concerning an item or items of the fictional ontology. These may be supplemented by further premises gleaned from a false but presupposed auxiliary theory about the fictional

> ontology. Deduction then proceeds. The presupposed bridge laws then allow an ontologically economical substitution for the ontologically prodigal conclusion. ...
> ...
> More generally, the picture is this. We have some economical propositions, E_1, ..., $E_{n(e)}$. We have some bridge laws, B_1, ..., $B_{n(b)}$, which equate economical propositions to propositions concerning the fictional items within the prodigal ontology and perhaps, though not necessarily, some non-fictional items as well, and which, together with E_1, ..., $E_{n(e)}$ entail the prodigal propositions, P_1, ... $P_{n(p)}$. We also have some propositions, A_1, ..., $A_{n(a)}$, which derive from a presupposed auxiliary theory A concerning fictional items. From these and P_1, ... $P_{n(p)}$, we deduce our prodigal conclusion P_c. Finally, we have a bridge law, B_r, which allows us to deduce an economical conclusion E_c (607-8).

I had two motives in Section B. First, I wanted to show, by way of example, how analyses are carried out in terms of Paradise on the Cheap. Second, I wanted to develop certain key concepts of Paradise on the Cheap (e.g., recombination, suitable similarity, and second-order schematic structures), concepts which are vital to the formulation of our economical propositions E_1, ..., $E_{n(e)}$ and bridge laws B_1, ..., $B_{n(b)}$. These concepts comprise the bulk of the apparatus needed to employ modal realism as a suppositional theory in performing alternative analyses of Lewis-phenomena. In regard to Paradise on the Cheap, E_1, ..., $E_{n(e)}$ are propositions concerning the features of ρ, recombinations of the features of ρ, schematic representations, and suitably similar states of affairs. B_1, ..., $B_{n(b)}$ are principles equating propositions about ρ-features, ρ-recombinations, schematic representations, and suitably similar states of affairs to propositions about possible worlds, possible individuals, and similarity orderings relevant to such phenomena. Of course, the propositions P_1, ..., $P_{n(p)}$ have to do with possible worlds, possible individuals, and similarity orderings. Our auxiliary theory, A, is modal realism; and the propositions

A_1, ..., $A_{n(a)}$ are propositions deriving from the latter.

In order to, *à la* Hinckfuss, use modal realism as a *suppositional* theory to provide a perhaps simpler method for analysing modality, counterfactuals &c. in terms of Paradise on the Cheap, we must modify Hinckfuss' account somewhat. We must introduce a class of phenomena to be analysed — for example, particular instances of necessities, contingencies, counterfactual conditionals, instances of verisimilitude, causation, and doxastic- and epistemic-state content. Furthermore, *two* different sets of bridge laws (instead of just one) must be introduced — *both suppositional*. First, those asserting false-yet-supposedly-true equivalencies between the things to be analysed, e.g., $\Diamond p$, and items in the prodigal ontology, e.g., $\exists x$ (Possible world x & p is true in x). Second, those asserting false-yet-supposedly-true equivalencies between items in the prodigal ontology and items in the economical ontology, e.g., $\exists x$ (Possible world x & p is true in x) $\equiv$ p',p (suitably similar / p' is actual).[58] Analyses proceed in the following way:

(1) $\Diamond p$

(2) $\Diamond p$ & ($\Diamond p \equiv \exists x$ (Possible world x & p is true in x))

(3) $\exists x$ (Possible world x & p is true in x) & ($\exists x$ (Possible world x & p is true in x) $\equiv$ p',p (suitably similar / p' is actual)

(4) p',p (suitably similar / p' is actual)

The two sets of bridge laws derive, respectively, from two suppositional theories. The

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[58]I.e., the actual state of affairs p' is suitably similar to the recombination/schematic structure p. As a recombination, p may be actual (and therefore real) — such as talking donkeys which exist on, say, some distant planet — or non-actual and *ex hypothesi* unreal. Moreover, being *ex hypothesi* alien, the individuals, states of affairs, or properties represented by schematic structures are not real.

first — modal realism — equates Lewis-phenomena with entities in the prodigal ontology. (To put the point another way, the first suppositional theory specifies the usual possible-worlds semantics for expressions of modality, counterfactuals, doxastic and epistemic states, truth-like theories, &c. in terms of ontologically-prodigal entities like possible worlds and possible individuals.) The second theory — a false theory which we're supposing to be true — links entities in the prodigal ontology with entities in the economical ontology of Paradise on the Cheap. (It's interesting to note that the second set of bridge laws — specified below — suggest how to carry out analyses strictly in terms of Paradise on the Cheap; and they indicate the kinds of items in the economical ontology which, in one way or another, do the relevant explanatory work. Indeed, if these bridge laws *do* yield analyses then Paradise on the Cheap stands completely independent of modal realism, except for any heuristic convenience which the latter may afford. And, even if they *don't* yield analyses, they may at least indicate the direction in which analyses may be sought.) The deduction's conclusion — 4 — is, of course, the economical analysis of the phenomenon to be analysed in 1. Thus, the deduction from 1 to 4 serves to analyse Lewis-phenomena in terms of economical entities. (I must stress that I am *not* trying to reduce modal realism to Paradise on the Cheap here. I am merely illustrating how, by *supposing* (falsely) that certain equivalencies hold between the entities of my ontology and the entities of Lewis' ontology, we can use modal realism as a deductive tool for carrying out alternative analyses of Lewis-phenomena.)

The class of things to be analysed is given to us by Lewis in *OPW*, as is the theory which explains these things via entities in the prodigal ontology (i.e., Lewis' theory of

modal realism). Hence, in constructing the suppositional model for analysing Lewis-phenomena via Paradise on the Cheap, the only thing left for proponents of Paradise on the Cheap to do is develop the theory which asserts equivalences to hold between the items of the prodigal ontology and those of the economical one. I won't attempt to give a precise logical formulation of this false-yet-supposedly-true theory here. Rather, I shall simply account for the bridge laws which arise from it; for it is the latter, in particular, which we require for our analyses.

The first two bridge laws can be specified as follows:

(1) *A possible world* is equivalent to *a recombination of ρ-features to which the actual world is suitably similar plus, perhaps, certain schematic structures.*

(2) *A possible individual* is equivalent to *a recombination of ρ-features to which the actual world is suitably similar plus, perhaps, certain schematic structures.*

(The second-order schematic structures, of course, serve to represent alien components in possible states of ρ.) The reader will notice right away that the Paradise-on-the-Cheap equivalent to a possible individual is the same as the Paradise-on-the-Cheap equivalent to a possible world (which is perfect since, for Lewis, worlds just are another kind of individual.)[59] One might object that to assert the same alternative equivalent for both possible worlds and possible individuals is disadvantageous, since in doing so we lose the

[59]Indeed, in one context, we may treat a recombination/schematic structure as equivalent to a possible world and, in another context, we may treat the same recombination/schematic structure as equivalent to a possible individual (in much the same way as, according to modal realism, one possible world may be duplicated as part of another, more-inclusive world).

distinction between modality *de dicto* and *de re*,[60] but according to Paradise on the Cheap, the distinction between *de dicto* and *de re* modality does not run parallel to modal realism's version of the distinction, according to which *de re* modality is quantification over possible individuals and *de dicto* modality is quantification over possible worlds. Therefore, for Paradise on the Cheap, the difference between modality *de dicto* and *de re* does not depend on anything like a distinction between different types of recombinations/schematic structures; rather this distinction corresponds to a distinction between *a state of affairs included in* a recombination/schematic structure and *a property possessed by* a recombination/schematic structure. The alternative analysis of *de dicto* modality requires us to emphasize the states of affairs included in recombinations/schematic structures — the alternative analysis of *de re* modality requires us to emphasize the properties possessed by recombinations/schematic structures.[61] Consider a particular recombination, *r*, *according to which* a *is the case*. If certain actual states of affairs are suitably similar to *r* in the relevant respect(s) — respects which may

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[60] *De dicto* modality pertains to states of affairs, while *de re* modality pertains to the properties possessed by individuals. Consider (a) a state of affairs in which barking cats exist and (b) an individual cat (say my cat, Roy) which possesses the property of *being able to bark*. To (a), the sentence "Possibly: barking cats exist" (*de dicto*) applies, and to (b) applies a sentence like "My cat, Roy, possibly barks" (*de re*). Therefore, in *de dicto* position, modal operators modify entire sentences (e.g., "Barking cats exist") while, in *de re* position, they modify predicates (e.g., 'barks').

[61] I am *not* suggesting that recombinations/schematic structures are somehow maximal individuals. My distinction between *de dicto* and *de re* modality corresponds simply to the parts of recombinations/schematic structures which one *emphasizes* in a given context. For example, the recombination of a talking donkey can be seen as representing a state of affairs — namely the existence of a talking donkey — as well as an individual — namely a donkey which talks. Modality *de dicto* and *de re* emphasize the former and latter, respectively.

or may not involve the presence of *a* — then we say that the former states of affairs are suitably similar to *r* (according to which *a* is the case), which allows us to conclude that possibly *a* is the case, in the *de dicto* sense. For example, imagine a recombined state of affairs, *r*, in which our solar system is the same as it actually is except in one respect: that Jupiter is the fourth planet from the sun and Mars is the fifth. Given that our actual solar system is suitably similar to *r*, we have it that possibly (*de dicto*) Jupiter is the fourth planet from the sun and Mars is the fifth. By contrast, consider a recombination, *r'*, in which a particular *property*, *A*, is specified. If certain actual individual-property combinations are suitably similar to *r'*, then we're permitted to conclude that *r'* possibly possesses *A*, in the *de re* sense. Let's take, for instance, a this-worldly cat — say my cat, Roy — and recombine it with the ability to bark. Obviously, this is a recombination according to which Roy has the property of being able to bark. If we consider certain elements of ρ to be suitably similar to this barking-Roy recombination (e.g., barking dogs and meowing cats), then Roy possibly barks (*de re*).

For clarity of exposition, let's call the recombinations/schematic structures which, depending on context, we suppositionally treat as equivalent to possible *worlds* 'recombinations/schematic structures$_1$' and the recombinations/schematic structures which, depending on context, we suppositionally treat as equivalent to possible *individuals* 'recombinations/schematic structures$_2$.' Furthermore, let's speak of recombinations/schematic structures in general simply by using the term 'recombinations/schematic structures.'

By definition, recombinations include no alien phenomena. In contrast, some

possibilities consist of nothing but alien phenomena — these are expressed exclusively in terms of our second-order schematic structures. Regarding any of the recombinations/schematic structures which we consider in our analyses, it is precise and schematic characteristics to which we *do* have cognitive access that we use to judge suitable similarity. Naturally, there are in principle many recombinations/schematic structures$_1$ and recombinations/schematic structures$_2$ which are so complex that, practically speaking, we can't grasp them in their entirety (i.e., we can't entirely imagine them in any practical length of time) — and the same goes for many possible worlds and possible individuals. But, still, in each case of analysis, it is just the parts of the recombination/schematic structure which we *do* grasp (whether precise or schematic) that figure significantly into our judgements of suitable similarity. We determine that the actual world, or parts of it, are suitably similar (or not) to a recombination/schematic structure in virtue of the fact that certain aspects of the actual world, or the parts of it in question, are suitably similar (or not) to certain grasped-characteristics of the recombination/ schematic structure. For example, we deny that either ρ or any of its parts are suitably similar to a recombination which includes an object, the surface area of which is both completely red and completely green at the same time t. And, we may judge ρ, or a certain part of it, to be suitably similar to a recombination which includes barking cats and *ex hypothesi* no elements which violate our conditions on suitable similarity. Likewise, modal realists decide how similar non-actual worlds and individuals are to ρ and parts thereof based on certain features of those worlds and individuals to which they have cognitive access (including the structural characteristics of alien

phenomena which can be grasped via second-order mathematics). And, of the worlds and individuals which are too complex to understand in their entirety but which they still regard as possible, modal realists hypothesize — implicitly or explicitly — that these worlds and individuals do not contain any impossible elements (such as logical contradictions).[62]

The third bridge law, which has to do with similarity orderings, asserts the following equivalences:

> (3a) *Similarity orderings between the non-actual world and ρ* are equivalent to *similarity orderings between recombinations/schematic structures$_1$ and ρ.*
>
> (3b) *Similarity orderings between non-actual worlds* are equivalent to *similarity orderings between recombinations/schematic structures$_1$.*
>
> (3c) *Similarity orderings between non-actual individuals and actual individuals* are equivalent to *similarity orderings between recombinations/schematic structures$_2$ and parts of ρ (i.e., between recombinations/schematic structures$_2$ and actual individuals).*
>
> (3d) *Similarity orderings between non-actual individuals* are equivalent to *similarity orderings between recombinations/schematic structures$_2$.*

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[62]Impossible worlds and individuals — for the modal realist — and non-suitably-similar recombinations/schematic structures — for the proponent of Paradise on the Cheap — vary depending, respectively, on how the modal realist construes counterpart and accessibility relations and how the proponent of Paradise on the Cheap construes the principles of suitably similarity. If, for example, we consider walruses to be suitably similar to humans in certain respects (or, to be counterparts of humans), we may judge ρ, or certain ρ-parts, to be suitably similar to recombinations according to which I am a walrus (or, worlds in which I have walrus-counterparts). On the other hand, if we *don't* regard walruses as suitably similar to humans (or, if we refrain from regarding walruses as counterparts of humans) we'll say that ρ, or the relevant parts of ρ, are *not*-suitably similar to a recombination in which I am a walrus (or, that there are no possible worlds in which I have a walrus-counterpart). In much the same way, Kripke teaches us in *Naming and Necessity* that a counterfactual state of affairs is possible or impossible depending on what we take to be the essential and accidental properties of the individuals involved (assuming that we're willing to attribute accidental and essential properties to things).

Moreover, the fourth and final bridge law asserts

> (4a) *Accessible worlds* are equivalent to *recombinations/schematic structures$_1$ which are suitably similar to one another and/or the actual world.*
>
> (4b) *Counterparts* are equivalent to *recombinations/schematic structures$_2$ which are suitably similar to one another and/or parts of the actual world.*

Of course, all judgements of similarity carried out in our analyses will be based on just those features of recombinations and features of ρ to which we have cognitive access. Likewise, modal realists judge similarities — including those which determine counterpart and accessibility relations — on the basis of just those aspects of worlds and individuals to which they have cognitive access. (Among such aspects are various structural characteristics, some of which hold of the actual world and while others hold at alien worlds. Those which hold at ρ are known *naturally* — via, for example, induction from the behaviour of this-worldly features — and those which hold at alien worlds are know *stipulatively* by means of the second-order abstractions discussed towards the end of Section B.)

With these bridge laws established, we are now ready to carry out alternative analyses of Lewis-phenomena using modal realism suppositionally. At this point, one might ask *why* I would want to use this suppostional apparatus, given that I've already formulated enough economical concepts — recombinations, similarity projections, schematic structures, and similarity — to explain Lewis-phenomena *without* appeal to modal realism. (In other words, I've specified a wholly distinct semantics for Lewis-phenomena in terms of recombinations, similarity projections, schematic structures, and similarity.) The reason is that I wish to take advantage of the *heuristic fertility* of the

latter. Modal realism may be believed to be logically simpler (and more transparent) than Paradise on the Cheap — a point recognized by Hinckfuss in saying that "[t]here seems little doubt that a presupposed increase in ontology can bring us logical simplicity" (607). For one thing, modal realism's extravagant language can encode consequence relations in its syntax that are not (or not so easily) encoded in the economical language of Paradise on the Cheap. The greater simplicity enjoyed by the conceptual apparatus of modal realism makes it easier to use than Paradise on the Cheap; and therefore, by using the former suppositionally, we can more easily perform our alternative analyses of Lewis-phenomena.

Possible worlds, possible individuals, similarity orderings, and counterpart and accessibility relations constitute the fundamental explanatory concepts of modal realism — in *OPW*, all Lewis phenomena are explained by appeal to just these entities. Therefore, given the (false) equivalences which the second set of bridge laws assert between modal realistic and alternative entities, it follows that we can use the suppositional apparatus outlined above to analyse all of the phenomena Lewis is concerned with in terms of Paradise on the Cheap. Before moving on, I'll give a few examples to illustrate.

Using the suppositional apparatus, I will give a more expedient analysis of a counterfactual conditional than the one given in Section B above. The thing to be analysed here is the truth of a statement "A > C." Again, Lewis equates the truth of this statement with the fact that some world at which both A and C are true (or, some A-and-C-world) is more similar to ρ than any world in which A is true and C is false (or, any A-

and-not-C-world), given the relevant similarity-criteria. By means of the second set of bridge laws — the ones equating modal-realistic and alternative entities — we translate Lewis' analysis and, thereby, arrive at the alternative one: "A > C" is true because, given the relevant criteria of similarity, at least one recombination/schematic structure$_i$ according to which both A and C are the case is more similar to ρ (i.e., certain characteristics of it) than any recombination/schematic structure$_i$ according to which A is the case but C is not. Thus, we say that an A-and-C-recombination/schematic structure$_i$ is suitably similar to ρ because it satisfies the similarity-criteria to a greater degree than does any A-and-not-C-recombination/schematic structure$_i$. Notice how many of the concepts used in the straight Paradise-on-the-Cheap analysis are not used in the suppositional analysis; but the results of the two analyses are the same. For we can stipulate that the relevant similarity-criteria are determined, respectively, by some attribute of A and certain events which take place in the world-parts specified by A. These criteria single out the parts of ρ to which A-and-C (i.e, the state of affairs described by the entire counterfactual) must be suitably similar.

Lewis' analysis of counterfactuals is key to his account of causation. Consider the following passage:

> Suppose that two wholly distinct events occur, C and E; and if C had not occurred, E would not have occurred either. I say that if one even depends counterfactually on another in this way (and if it's the right sort of counterfactual, governed by the right sort of closeness of worlds) then, E depends causally on C, and C is a cause of E. To be sure, this is only the beginning of a counterfactual analysis of causation. Not all counterfactuals are of the right sort, and it is a good question how to distinguish the ones that are from the ones that aren't. ... And not all effects depend counterfactually on their causes; ... (23).

Despite the shortcomings that Lewis identifies in his preliminary analysis of causation, we can still use our suppositional apparatus to give a counterfactual analysis of causation in terms of Paradise on the Cheap.[63] The counterfactual relevant to C and E is "not-C > not-E," the truth of which Lewis would analyse in terms of the fact that at least one not-C-and-not-E-world is more similar to ρ than any not-C-and-E-world. According to our second set of bridge laws, we have the following analysis of the truth of "not-C > not-E": given the relevant criteria of similarity (which depend on certain characteristics of not-C), at least one recombination/schematic structure$_i$ according to which both not-C and not-E are the case is more similar to ρ than any recombination/schematic structure$_i$ according to which not-C is the case but not-E isn't. So, a not-C-and-not-E-recombination/schematic structure$_i$ is suitably similar to ρ because it satisfies the similarity-criteria to a greater degree than does any not-C-and-E-recombination/schematic structure$_i$; and since the not-C-and-not-E-recombination/schematic structure$_i$ is suitably similar to ρ, we say that "not-C > not-E" is true and, therefore, that C is the cause of E.

Let's now look briefly at verisimilitude. As indicated in Chapter 1, Lewis claims that a theory is close to the truth, with respect to ρ, to the extent that ρ resembles some

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[63]Lewis seems optimistic that a viable counterfactual analysis of causation can be given, as attests the following passage:

> You may or may not share my optimism about an analysis of causation in terms of counterfactual dependence of events. But even if you give up hope for an analysis, still you can scarcely deny that counterfactuals and causation are well and truly entangled.
> Causal theories of this, that, and the other have been deservedly popular in recent years. These theories are motivated by imagining cases where normal patterns of counterfactual dependence fail (Lewis 23).

world where that theory is exactly true. The alternative analysis of verisimilitude is very straightforward: given certain similarity conditions, we say that a theory is close to the (actual) truth to the extent that ρ is similar to some recombination/schematic structure$_1$ according to which that theory is exactly true.[64] Furthermore, it would seem that truthlike theories themselves specify, at least in part, the appropriate recombinations/schematic structures$_1$ in regard to which we're to judge similarity; and the applications of such theories select the relevant *regions* of similarity in both ρ and recombinations/schematic structures.

Lewis doesn't say much about epistemic-state content — he chooses, rather, to concentrate on belief states, "passing over the added complications that arise when we distinguish someone's knowledge from the rest of his system of belief" (Lewis 28). Based on the modal realistic analysis of belief-state content, coupled with what Lewis does say about *knowledge*, we can put together a partial modal-realistic analysis of epistemic-state content as follows:

> The content of someone's total system of knowledge is to be characterised by a class of possible individuals — call them the knower's *epistemic alternatives* — who might, for all she knows, include herself. Individual X is one of them iff nothing that the knower knows, either explicitly or implicitly, rules out the hypothesis that she herself is X. These individuals are the knower's epistemic

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[64]It's important note, in regard to both modal realism and Paradise on the Cheap, that verisimilitude can be construed *locally* as well, in which case we speak of theory being true or close-to-true (as the case may be) for a certain parts of recombinations/schematic structures$_1$ and worlds.

Furthermore, it's interesting to note that we can Ramsify the sentences of our theories — and thereby abstract from the particular properties they deal with — in order to grasp structural 'laws' (i.e., second-order relations between properties) which are exactly true for certain alien possibilities (whether represented via schematic structures or worlds).

> possibilities, and are different possible ways for an individual to be, and many of them may coexist within a single world.

To provide a more complete account of epistemic-state content, particularly an account of individual instances of knowledge, is beyond the scope of my discussion here. (I aim merely to provide satisfactory alternatives to explanations which Lewis gives for certain phenomena — my task, at present, does not include filling in gaps in Lewis' explanations.) So, I'll simply use the suppositional apparatus to give a partial analysis of epistemic-state content in terms of Paradise on the Cheap. Our second set of bridge laws implies that we're to analyse one's total system of knowledge as *a set of recombinations/schematic structures*$_2$. A certain subset of the properties represented by each of these recombinations/schematic structures$_2$ match perfectly the properties, intrinsic and extrinsic, which a knower, *S*, knows herself to possess.[65] Each of these recombinations/schematic structures$_2$ posses other properties which exceed *S*'s knowledge of herself; but there's nothing in what *S* knows to rule out the hypothesis that she is, in fact, one of these recombinations/schematic structures$_2$. Of course, we cannot, practically speaking, grasp each individual recombination/schematic structure$_2$ relevant to a *S*'s total system of knowledge; and so, we may choose to represent the latter in a set like the following: $\{x \mid [(x=S) \veebar (x=(\text{recombination}_2 \vee \text{schematic structure}_2))]$ & nothing that *S* knows rules out the possibility that she is $x\}$.

We can more closely follow Hinckfuss' model of deduction ("SPO" 608) to deduce economical conclusions from economical premises. Taking our bridge laws, B_1,

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[65]I shall ignore any questions concerning what counts as satisfactory conditions for knowledge, as they're irrelevant to the task at hand.

..., $B_{n(b)}$, to be those which we specified just above — which assert equivalencies to hold between modal-realistic entities and alternative entities — and the propositions, A_1, ..., $A_{n(a)}$, of our auxiliary theory to be propositions of modal realism, we can make inferences from premises, E_1, ..., $E_{n(e)}$, stated in terms or Paradise to the Cheap to conclusions, E_c, also stated in terms of Paradise on the Cheap. (Of course, B_1, ..., $B_{n(b)}$ and A are to be regarded as *suppositional* in the present case.) To perform our deductions from economical premises to economical conclusions may, in some cases, be heuristically superior to using strictly the conceptual apparatus afforded by Paradise on the Cheap (in the way I discussed on p. 67). Consider, for example, the following deduction, which proceeds from the alternative account of "Necessarily *p*" to that of "Possibly *p*":

> (1) *"All actual states of affairs suitably similar to a recombination/schematic structure,* r *(including* r *itself*[66]*) are actual"* [economical premise] & (*"All states of affairs suitably similar to a recombination/schematic structure,* r, *are actual"* ≡ *"a state of affairs,* q, *is true of all possible worlds"* [bridge law][67])
>
> (2) "q *is true of all possible worlds"* [prodigal premise] & "q *is true of all possible worlds* ⊃ q *is true of at least one possible world"* [auxiliary proposition]
>
> (3) "q *is true of at least one possible world"* [prodigal conclusion] & ("q *is true of at least one possible world"* ≡ *"Some states of affairs suitably similar to a recombination/schematic structure,* r, *are actual"* [bridge law])
>
> (4) *"Some states of affairs suitably similar to* r *are actual"* [economical conclusion]

This example is very simple — so simple, in fact, that the deductive detour though the suppositional apparatus may hardly seem necessary. But, while it *is* easy enough to infer

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[66]I assume that the relation *is a recombination of* is reflexive.

[67]The bridge laws used in this deduction are *variants* on the ones given above.

"Some states of affairs suitably similar to *r* are actual" from "All states of affairs suitably similar to *r* are actual," there might be some deductions from economical premises to economical conclusions which, if carried out strictly in the language of Paradise on the Cheap, would be very complex and difficult to perform. In such cases, the suppositional apparatus supplied by our bridge laws and auxiliary theory may come to our rescue by giving us a simpler logical structure by which to carry out our inferences. Therefore, I'm not saying that the suppositional apparatus is needed, in all cases, to reason with considerable ease in terms of Paradise on the Cheap; I'm merely pointing out, rather, that this apparatus *is* available to us *should* we find it more difficult to reason strictly in terms of Paradise on the Cheap.

So, we have now seen how modal realism can be used to as an aid to performing the analyses of Paradise on the Cheap. But, as discussed towards the beginning of the present section, that we so employ modal realism does not commit us to its truth. As Hinckfuss points out, economically-minded theoreticians (like myself), if they don't believe in the truth of the bridge laws (as I don't believe in the truth of those equating modal-realistic entities with alternative entities), can at least *suppose* them to be true. In using a bridge law suppositionally, we are not committed to its truth, but merely to a conditional, the antecedent of which is composed at least partly of the bridge law. Moreover, when we use modal realism as a suppositional theory, we don't use it to deduce any conclusions which cannot, in principle, be deduced using just Paradise on the Cheap. Rather, as mentioned above, owing to the fact that modal realism may well be logically simpler, and thus easier to use, than Paradise on the Cheap, we use modal

realism suppositionally into order to more-easily deduce conclusions (i.e., perform analyses) in terms of Paradise on the Cheap.

Hinckfuss suggests that it's often useful to express and/or derive certain economical truths using sentences exhibiting a false prodigal ontology, like the one provided by modal realism. I don't mean to imply that modal realism has been (or even can be) shown 'flat-out' to be false. Rather, Hinckfuss's lesson, I think, is that a theory's usefulness is something quite independent of its truth. So, we could remain undecided as to the truth of theories like modal realism and mathematical plantonism yet still use their conceptual apparatuses as heuristically-fruitful suppositional frameworks. We can *assume*, for all intents and purposes, that modal realism is false and still take advantage of it suppositionally. This being the case, it follows that false theories can be serviceable and, so, that *serviceability is not a good reason for belief*! Even if prodigal statements are useful in providing explanations of true propositions — just as modal realism plays a useful role in giving alternative analyses of Lewis-phenomena — their being so useful needn't be regarded as evidence for their truth.[68]

Obviously the economical and prodigal statements which are equated by the bridge laws in the present case do not, on my account, have the same truth values; and therefore, they are *not* synonymous. As pointed out by Hinckfuss, "[t]he bridge laws do not even provide the conditions under which the expressions in question are true, for the ontologically excessive truth conditions are false [so we assume] regardless of the truth or

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[68]Cf. *OPW*, page 3, in which Lewis says "Why believe in a plurality of worlds? — Because the hypothesis is serviceable, and that is reason to think that it is true." I shall return to this issue in Chapter 3.

falsity of their ontologically economical counterparts" (609). Thus, outside of the suppositional context, we cannot take statements made in terms of modal realism to be equivalent to statements made in terms of Paradise on the Cheap. According to Hinckfuss, because fictionalists and economicalists need not, indeed must not, take prodigal propositions to be equivalent to any economical counterparts,

> [i]t is absurd to demand that economicalists either provide an analytic reduction of prodigal discourse in economicalist terms or give up their economicalism. Should the appropriate bridge laws be presupposed, this demand is clearly misplaced and any acceptance of this challenge by economicalists is equally unnecessary and lacking in an appreciation of the role of supposition and presupposition in discourse. But it is not just that the reduction is unnecessary.... There is absolutely no reason to expect that such a reduction will be possible. The traditional ontological game is loaded against the economicalist (613).

Paradise on the Cheap (as it has been presented up to this point) is, schematically speaking, just such a reduction of modal realism — my discussion thus far indicates that the bare structure of the two theories is the same (i.e., their individuals and properties exist in the same schematic relations). The bridge laws stated in this section indicate that there is a one-to-one correspondence between the entities and properties dealt with by each theory — they show that modal realism and Paradise on the Cheap can be represented via the same set of Ramsey-sentences.[69] However, because the semantics for Paradise on the Cheap are *ex hypothesi* distinct from those of modal realism, we can insist that even though these theories share a schematic structure, to precisify the latter in modal-realistic terms yields far different truth conditions than does precisifying it in terms

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[69]But, as we shall see in the next section, the isomorphism falls apart when we apply Kripke's view on rigid designation, *a posteriori* necessity, and haecceitism to Paradise on the Cheap.

of Paradise on the Cheap. So, assuming that Hinckfuss is correct, the fact that we cannot reduce modal realism to Paradise on the Cheap (in any way that preserves the former's semantics) is not reason for us to disfavour the latter. (In Hinckfuss' words: "the job [of the economicalist] is not to find non-existent *semantic* equivalences" (614; emphasis added).)

Hinckfuss also believes that it's absurd to demand that economicalists even amend their speech to match their economical beliefs, let alone provide economical substitutes for the prodigal ontology which they reject. In regard to Paradise on the Cheap, we *are* able to speak in a way which reflects our economical beliefs but, admittedly, speaking in terms of recombinations and schematic structures is much more complicated (and less concrete) than speaking in terms of possible worlds and possible individuals.[70] The conceptual apparatus supplied by Lewis's modal realism gives us a convenient way to reason about the possibilities we grasp by imaginative recombination and second-order structures. In thinking and speaking of particular ways in which ρ, or its individuals, might have been we can suppose them to be actualized at other 'worlds'; and, via our bridge laws, we can also characterize such possibilities in terms of recombinations and schematic structures.

D. As promised earlier (in note 34 of the present chapter), I will now illustrate a significant advantage which Paradise on the Cheap possess over modal realism: the former is flexible enough to allow one to coherently accept all of Kripke's theories on

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[70]According to Hinckfuss, "it is incorrect to demand ... that any economicalist discourse must be as perspicuous as its prodigal counterpart — if the whole point of prodigal discourse is to enhance our perspicuity' (618).

rigid designation, *a posteriori necessity*, and haecceitism (as they're presented in *Naming and Necessity*).[71] As we shall see, if Paradise on the Cheap allows for these things — which modal realism cannot allow for, on pain of incoherence — the former ceases to constitute a schematic reduction of the latter. I shall begin by showing why modal realists cannot accept Kripke's views while maintaining any sort of theoretical coherence.

According to Kripke, in describing a counterfactual situation in which, for example, my cat Roy is sleeping on the couch at time *t* (instead of sitting at the window — what he's actually doing at *t*), we are not stipulating a situation in which another cat, qualitatively-similar or -identical to Roy, is sleeping; rather we're stipulating a state of affairs wherein Roy himself (*this particular* cat I call 'Roy') is sleeping on the couch. In contrast, according to Lewis, no two worlds have *any* parts in common. For Lewis, any non-actual possible world that represents Roy as sleeping on my couch is not a world in which Roy himself is now sleeping on the couch — it is a world in which a *counterpart* of Roy, a cat qualitatively-similar or -identical to Roy, is sleeping on a counterpart of *the particular* couch in my living room.[72] So, if we're committed to the truth of modal realism, we must reject the idea that proper names are rigid designators. Neither 'Roy' nor any other proper name refers to the same individual in all possible worlds since, in

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[71]I am not suggesting here that one ought to accept Kripke's view on haecceitism, rigid designation, and the necessary *a posteriori* — I'm merely arguing that, with Paradise on the Cheap, one has the option of such acceptance.

[72]To say that a world *w* 'represents,' in the way specified by Lewis, that Roy is now sleeping on the couch is to say that 'according to' *w* Roy is sleeping on the couch, though, in fact, it isn't Roy sleeping on the couch at *w* but one of his counterparts. Only the *actual* world — the world in which *the particular* cat I call 'Roy' exists — represents Roy himself.

non-actual worlds, proper names designate mere counterparts of the individuals they refer to at this world. Not even terms like 'this table,' uttered in certain contexts, refer to the same individual in all possible worlds, according to modal realism — in non-actual worlds, 'this table' refers to a counterpart of *this* actual table.

Furthermore, part of Kripke's second argument for *a posteriori* necessity — the part pertaining to ordinary individuals — fails under Lewis' modal realism. From Kripke's claim that an object's origins are essential to that object, it follows that, necessarily, a table *T* was made from the block of wood *b*. However, Lewis tells us that actual objects don't exist at any other worlds, which implies that their origins don't either. On Lewis' account, non-actual worlds *represent T* as having been made from *b*; but such worlds contain only counterparts of *T* and *b*, not *the particular* actual table we at this world call '*T*' nor *its particular* actual origins *b*. Kripke's conception of how possible worlds represent is incompatible with Lewis' — Kripke would insist that a possible world which represents *T* as having origins *b* must be a possible world which includes the particular table *T* and its particular origins. Therefore, if one both accepts Kripke's constraints on representation and believes, with Lewis, that non-actual worlds contain only counterparts of this-worldly individuals, then one is compelled to the conclusion that statements such as "*T* was made from wood *b*" are true only at the actual world and, so, do *not* express necessary truths. Similarly, assuming both Lewis' counterpart theory *and* Kripke's views on representation, the statement "Hesperus is Phosphorus" is true only at this world and, as such, expresses a merely contingent truth. According to Lewis' modal realism, *the planet* we call both 'Hesperus' and 'Phosphorus' at this world doesn't exist at

any non-actual world — only its counterparts exist at such worlds; and hence, only counterparts of Hesperus and Phosphorus are identical at other worlds. Therefore, because Lewis asserts that actual individuals do not exist at other worlds (and that non-actual individuals don't exist at this world), his modal realism cannot accommodate Kripke's second argument for *a posteriori* necessity as it pertains to ordinary individuals.

Among the cases of *a posteriori* necessity excluded by Lewis' modal realism are the Kripkean haecceities mentioned earlier. The haecceity, or 'thisness,' possessed by an individual like my cat, Roy, consists of the property of *being the cat who, at this world, is called 'Roy'*,[73] i.e., the property of *being this cat*. According to Lewis' modal realism, any counterpart of Roy at any other world is *not* the cat who's called 'Roy' at this world. Accordingly, it is only at this world that Roy possesses the property of *being this cat* and, therefore, the statement 'Roy has the property of *being this cat*' is not necessary, though it is known *a posteriori*. To be sure, modal realism allows for individuals to possess Kripkean haecceities: any individual *x* at any world *w* can possess the property of *being the individual referred to as* 'x' *at* w, or *being this individual*. However, though the latter are non-qualitative properties of individuals, they still supervene on the qualitative character of the worlds in which they occur. For example, suppose that, in world *w*, my counterpart calls my cat's counterpart 'Boy.' In *w*, then, my counterpart and Roy's counterpart exist in certain spatial and temporal proximities to one another, and my counterpart makes certain utterances and/or writes down certain symbols in referring to

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[73]Of course, '*being the cat called "Roy"*' is shorthand for *being the cat named 'Roy' at such-and-such time by so-and-so in such-and-such place*.

Roy's counterpart as 'Boy.' Indeed, were such qualitative facts not among the features of *w*, Roy's counterpart would fail to the have property of *being the cat called 'Boy' at* w. Thus, the haecceitistic differences which follow from Kripke's account in *Naming and Necessity* (henceforth *NN*) simply don't occur according to Lewis' modal realism. Ergo, Lewis' modal realism does not allow Kripkean haecceitism.

Lewis rejects the idea that possible worlds have overlapping parts — that's the principal reason why his modal realism is incompatible with Kripke's haecceitism, his theory of rigid designation (as it pertains to proper names), and his second argument for *a posteriori* necessity[74] (as it pertains to individuals). Lewis uses the following example to describe world-overlap:

> The simplest way that part of another world could represent [Hubert] Humphrey — our Humphrey — is by identity. He might lead a double life, in two worlds at once. He himself, who is part of the actual world, might be part of the other world as well. ... The other world represents him as existing because he is part of it. He exists at the other world because, restricting our quantification to the parts of that world, he exists. This leading of double lives is what best deserves to be called 'trans-world identity' (198).

Lewis goes on to say that world-overlap "is the only view that fully respects the 'he himself' intuition: rival views say that Humphrey himself *might* have won, and that he himself is somehow *represented* as winning, but only this view says that he himself *does* win" (199). Indeed, in *NN*, Kripke is an outspoken advocate of the 'he himself' intuition — he would insist that a counterfactual situation in which Humphrey wins the presidential election is a situation in which *Humphrey himself*, the man referred to as

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[74]Kripke's first argument for *a posteriori* necessity is given on pp. 35-37 of *NN*.

'Hubert Humphrey' at this world, wins the presidential election. Lewis gives strong reasons why modal realists should not accept world-overlap. I don't want to get into these reasons here, as they would take the present discussion too far off its intended course.[75] I assume (rightly, I think) that Lewis arguments against world-overlap establish conclusively that modal realists ought not subscribe to the latter. Therefore, because Lewis' modal realism does not accommodate overlap, it cannot accommodate the 'he himself' intuition; and because it can't accommodate the latter, it can accommodate neither Kripke's haecceitism nor his views on rigid designation and *a posteriori* necessity in their entirety.

As implied earlier, Lewis' modal realism rules out Kripke's theory of rigid designation and his second argument for necessary *a posteriori* truth only as they pertain to *proper names* and *ordinary individuals*, respectively. The idea that general terms designate rigidly is perfectly compatible with Lewis' modal realism. According to Kripke, the term for a natural kind, *k*, refers in any possible world to any individual possessing the essential properties, *P*, of the right kind (the latter being determined at this world). Thus, the members of *k* are united across possible worlds by their possession of *P*. The relation which unites the members of *k*, then, is just a relation of similarity —

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[75]But I should say something about Lewis' most significant argument against world-overlap, which has to do with the *accidental intrinsic properties* of individuals. He says, "[W]hat I do find problematic — inconsistent, not to mince words — is the way the common part of two worlds is supposed to have different properties in one world and in the other" (199). The *problem of accidental intrinsics* is thus the problem of finding an intelligible way for an individual's intrinsic properties to differ from one world to another. If, for example, I exist at more than one world: how can I have five fingers on my right hand at this world and *six* fingers on my right hand at another world? For Lewis' complete arguments against overlap, see *OPW*, §4.2.

they all have *P* in common. The members of *k* at other worlds needn't be *the particular* members of *k* in the actual world. Non-actual individuals, mere counterparts of *k*-members, can belong to *k* so long as they possess *P*. Hence, even if there are no actual individuals at other worlds, the general term '*k*' refers to the same kind in all possible worlds. In this way, Lewis' modal realism allows for general terms to be rigid designators (regardless of whether Lewis himself believes that general terms designate rigidly), and if a general term '*k*' designates rigidly in the way specified by Kripke, then all members of the natural kind *k* possess properties *P* in all possible worlds, which implies that the statement "All *k* possess *P*" expresses a necessary truth which is known *a posteriori*. So, even if a person is committed to Lewis' modal realism, she can still accept Kripke's second argument for *a posteriori* necessity as it applies to natural kinds. But, of course, Kripke wants his theory of rigid designation and his second argument for necessary *a posteriori* truth to succeed not only for general terms and natural kinds but also for proper names and individuals. Therefore, neither Kripke nor anyone who adheres to his position can be committed to modal realism.

One might object, however, to the remarks I made earlier about Kripke's haecceitism being incompatible with modal realism. Lewis purports to explain away apparent instances of haecceitistic difference.[76] He claims that the only way a modal realist who rejects world-overlap can handle haecceitistic differences is by asserting some kind of *non-qualitative counterpart relation*. But Lewis argues that "[t]here is no way to make sense of a non-qualitative counterpart relation" (230) — in fact, he regards the

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[76]See *OPW* 231-35.

phrase "non-qualitative counterpart relation" as a contradiction in terms.[77] He then proceeds to argue that apparent cases of haecceitistic difference really *aren't* cases of haecceitistic difference. He begins by claiming that "lesser possible individuals, inhabitants of worlds, proper parts of worlds, are possibilities too. They are ways that something less than an entire world might possibly be. A possible person, for instance, is a way that a person might possibly be" (230). Furthermore, he says,

> I might have been one of a pair of twins. I might have been the first-born one, or the second-born one. These two possibilities involve no qualitative difference in the way the world is. Imagine them specified more fully: there is the possibility of being the first born twin in a world of such-and-such maximally specific qualitative character. And there is the possibility of being the second-born twin in exactly such a world. The haecceitist says: two possibilities, two worlds. They *seem* just alike, but they must differ somehow. They differ in respect of 'cross-identification'; that is, they differ in what they represent *de re*, concerning someone. Hence they must differ with respect to the determinants of representation *de re*; and these must be non-qualitative, since there are no qualitative differences to be had. I say: two possibilities, sure enough. And they do indeed differ in representation *de re*: according to one I am the first-born twin, according to the other I am the second born. But they are not two worlds. They are two possibilities within a single world. The world contains twin counterparts of me, under a counterpart relation determined by intrinsic and extrinsic similarities (especially, match of origins). Each twin is a possible way for a person to be, and in fact is a possible way for me to be. I might have been one, or I might have been the other. There are two distinct possibilities for me. But they involve only one possibility for the world: it might have been the world inhabited by two such twins. The haecceitist was quite right when he thought that purely qualitative worlds gave us too narrow a range of distinct possibilities. He concluded that worlds must not be purely qualitative. He'd have done better to conclude that *worlds* gave us too narrow a range of possibilities. The parts of worlds must also be put to use (231).

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[77]For the purposes at hand, I'll assume (with good reason) that Lewis successfully refutes the position that there are non-qualitative counterpart relations. See *OPW* 229-30 for his arguments.

Consider also how Lewis deals with another apparent instance of haecceitistic difference:

> Likewise for the apparent haecceitistic differences that arise if we live in the seventeenth epoch of a world of eternal recurrence. The possibility which represents me *de re* as living instead in the 137th epoch is not some other world that differs haecceitistically from ours; it is my this-worldly duplicate in the 137th epoch. Insofar as he is my counterpart (that is, on those resolutions of vagueness that make him my counterpart despite the fact that we are worldmates) he is a possibility for me; that is all I need mean when I say that I might have been him (232).

Kripke would reject both of these examples outright, as they both violate the 'he himself' intuition. He would say that the world with the twins, w_1, doesn't represent *any* possibilities for Lewis, let alone two, since *ex hypothesi* the twins are counterparts of Lewis and, as such, neither of them are *the particular person* who we, at this world, call 'David K. Lewis.' Similarly, Kripke would say that, supposing that the actual world is a world of eternal recurrence, Lewis' duplicate in the 137th epoch fails to represent a possibility for Lewis because *ex hypothesi* the duplicate is Lewis' counterpart and, so, isn't Lewis himself.

If we allow that the *exact same* individual can exist in two epochs of this world, then perhaps, on Kripke's account, we can say that the Lewis in the 137th epoch represents a possibility for the Lewis of the 17th epoch; and thus, we can avoid having to assert a haecceitistic difference. But if the exact same individual *cannot* exist in different epochs, then Kripke's account tells us that the possibility that Lewis might have existed in the 137th epoch must be represented by other worlds. One of these worlds, w_2, is qualitatively-identical to the actual world and differs from the latter only insofar as a person in the 137th epoch (instead of the seventeenth) has the property of *being the person*

who, at this world, is called 'David K. Lewis'. Thus, the actual world would differ from w_2 *haecceitistically*. Likewise, the only way that world w_1 (the one with the twins) can represent two possibilities for Lewis is if both twins are Lewis himself. However, assuming that Lewis himself cannot be both twins, then w_1 represents, at most, *one* possibility for Lewis. (Let's say w_1 represents the possibility of Lewis being the *first-born* twin.) Accordingly, the second possibility has to be represented by other worlds, one of these worlds, w_3, being qualitatively-identical to w_1 but differing from w_1 haecceitistically, i.e., in the fact that the second-born twin has the property of *being the person who, at this world, is called 'David K. Lewis'*.

Lewis discusses other examples of apparent haecceitistic difference, and his success in demonstrating that they aren't, in fact, instances of haecceitistic difference depends on his appeal to counterparts. Moreover, let's take a look at another example. Imagine two non-actual worlds, w_1 and w_2, which are identical in every *qualitative* respect. *Ex hypothesi*, table T — *this* table, the one I'm currently sitting at — exists at w_1, but instead of being in my kitchen at time t (where it actually is at t) it is in my front room. *Ex hypothesi*, T does *not* exist at w_2 — at w_2, there's another table, V, which is qualitatively identical to T in every respect, including in the qualitative aspects of its origins.[78] Thus, there are no qualitative differences between T and V. The only difference between them is that T has the property of being the table that I, at this world, refer to as 'T' — the property of *being this table* — while V does not. In describing (part of) w_1, I

[78]I.e., T and V were made from qualitatively-identical pieces of wood taken from qualitatively-identical positions in qualitatively-identical piles, the wood was taken from qualitatively-identical places in qualitatively-identical forests, and so on.

stipulated a situation in which the table I call '*T*' is placed in my front room at *t*. In describing (part of) w_2, I merely stipulated a situation wherein *a table*, not *T*, is placed in my front room at *t*. In stipulating the existence of *T* at w_1, I implicitly stipulated *T*'s origins as well, since *T* couldn't exist at w_1 without its origins. These origins (and origins generally) have their own haecceities — for example, *T* was made from *particular* pieces of wood taken from *particular* trees in a *particular* forest. Hence, in stipulating the existence of *T* at w_1, I also stipulated the existence of *these* pieces of wood, *these* trees, and *this* forest. But, in stipulating the existence of *V* at w_2, I implicitly stipulated origins *different* from those of *T* — *V* is not *T*; and so, the former does not share the origins of the latter. *V* does not come from the *particular* wood/trees/forest that *T* comes from. So, though *V*'s origins are qualitatively-identical to *T*'s origins, the former aren't the same as the latter. Therefore, the property of *being T*, at w_1, doesn't supervene on the qualitative character of *T*'s origins. The worlds w_1 and w_2 are qualitatively-identical; but they're distinct in how they represent *de re* the table in my front room at *t* — w_1 represents the table as being *T*, or *this table*, while w_2 represents it as being *V*, which is a table other than *this* one. The worlds w_1 and w_2 differ *haecceitistically*. Lewis would say that the table at a non-actual world w_1 isn't really table *T* — the table I'm actually sitting at — but is instead a counterpart of *T* (call the latter *T'*); he'd say that table *V*, at w_2, is likewise a counterpart of *T*. Accordingly, Lewis would argue that *T'* doesn't have the property of *being the table which, at this world, is called 'T'* and, therefore, that there is no haecceitistic difference between w_1 and w_2. But, of course, if counterpart theory is replaced with the 'he himself' intuition (or, in the present case, the 'it itself' intuition),

the haecceitistic difference between w_1 and w_2 stands. Therefore, Kripke's haecceitism cannot be reconciled with modal realism.

However, Paradise on the Cheap is amenable to the 'he himself' intuition. Under Paradise on the Cheap, in describing a recombination in which my cat, Roy, is sleeping on the couch instead of sitting at the window, I am *ex hypothesi* describing a counterfactual situation in which Roy himself is combined with a different activity and a different spatial location. And since, according to Paradise on the Cheap, Roy represents himself in any recombination, it follows that the proper name 'Roy' designates rigidly. Indeed, any actual individual x represents itself in any recombined situation which it is part of; and so, Paradise on the Cheap allows for any proper name 'x' to designate the same individual in all recombinations. Similarly, the fact that any individual x represents itself in any recombination implies that, in any recombination that counts as possible (i.e., that's suitably similar to certain parts of ρ), x has the properties we take to be essential to it. Therefore, for any individual x belonging to any natural kind k, any recombination which represents x is a situation in which x itself possesses the properties P essential to its natural kind. In any recombination, then, the general term 'k' refers to individuals of the same kind, namely those individuals which possess P; and thus, in all recombinations, 'k' designates the same natural kind. Hence, Kripke's views on rigid designation can be accomodated in the framework supplied by Paradise on the Cheap.

Moreover, because Paradise on the Cheap accommodates rigid designation, it also allows for the success of Kripke's second argument for the necessary *a posteriori*. If individuals are represented by themselves in recombinations, then in any recombination

any individual x possesses its essential properties, which implies that x possess these properties necessarily. So, provided these properties are known empirically, the fact that x possesses them is a necessary *a posteriori* truth, and if in every recombined situation, every member of a natural kind k possesses the properties P essential to its kind, then it is necessarily the case that things belonging to k possess P. Provided it is known by experience that P comprises at least part of the essence of k, the statement "All members of k have P" expresses an *a posteriori* necessity.

Finally, the fact any individual x represents itself in recombination implies that, in any recombination, x has the property of *being the individual referred to as 'x' at the actual world*, or of *being this individual*.[79] Thus, Kripkean haecceities are allowed by Paradise on the Cheap; and so are Kripke's *haecceitistic differences*. Via imaginative recombination, I can in principle stipulate two qualitatively-identical recombinations which consist solely of our solar system and the earth's inhabitants. Each of these recombinations contains a certain cat which lives in Moncton, New Brunswick. These cats are qualitatively-identical in every respect (including in their origins); but one of the cats is the cat that I, at this world, call 'Roy.' So, though the cats are qualitatively-identical, they differ in that one has the property of *being the called who, at p, is called 'Roy'* while the other doesn't. I stipulated one recombination in which my cat, Roy, lives in Moncton and another in which a cat with origins qualitatively-identical to Roy's lives

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[79]One proviso: for any individual x to have the property of *being the individual called 'x' at this world*, x must be designated by a proper name, whether it be 'Roy' or '*T*' or simply 'this table' or 'this rock.'

in Moncton.[80] Only one of these counterfactual situations — the former — is one in which a cat has the non-qualitative property of *being Roy*. Therefore, these recombinations differ haecceitistically.

Thus, because modal realism rules out Kripke-style views on modality while Paradise on the Cheap does not, it's evident that Paradise on the Cheap does *not* have the same consequences as modal realism in regard to necessity and possibility. Paradise on the Cheap cannot be a reduction of modal realism, not even schematically! The former allows that the exact same property-instances can be found in various different recombinations, actual and non-actual — the latter insists that no one property-instance can exist in two different worlds. Hence, the relations which exist between properties according to modal realism is different from the relations which exist between properties according to Paradise on the Cheap. This being the case, the two theories do *not* share the same set of Ramsey-sentences.

It isn't really recombinations, schematic structures, or projection-sets which ground possibilia;[81] rather, it is the features of ρ and the characteristics they possess which, given certain criteria, make them similar to our recombinations, projection sets, and schematic structures.[82] (It is only for simplicity that I sometimes speak as though it is

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[80]By imaginative recombination, I can consider the possibility of a cat which is qualitatively identical to Roy by applying consistently in my imagination, e.g., the qualitative character of Roy's mother and father to other cats and the qualitative character of Roy's development, birth, and growth to another cat.

[81]This point was mentioned in regard to recombinations in the first chapter.

[82]Please note that the present comments on the foundation of possibilities are provided, in part, to clarify and revise some of the remarks I made on representation, or grounding, in

these last three things which are themselves the bases for possibilia.) Recombination is a mental activity and recombinations are mental phenomena (which, depending on how one views the mind, may be equated to particular brain states). Like second-order schemas and projection sets, they are merely tools for grasping the ways in which ρ and its parts might have been. ρ and its parts are what recombinations, schematic structures, and projection sets are ultimately based on — they provide us with things to recombine, structures to both abstract from *and* recombine, and similarity-criteria with which to define set-membership. Furthermore, the features of ρ provide us with the wherewithal to determine suitable similarity: the characteristics we emphasize, the things we deem more important than others in certain contexts. Given, then, that ρ itself is what possible individuals and possible states of affairs are grounded in, it's not surprising that actual individuals represent themselves in counterfactual situations.

Moreover, just because modal realism violates the 'he himself' intuition doesn't imply that we cannot use the former suppositionally without violating the latter. The fourth bridge law asserts an equivalence between counterparts and recombinations/schematic structures$_2$ which are suitably similar to each other. This law, along with the others, is *ex hypothesi* fictitious; and therefore, as any recombination is suitably similar to itself, there is no reason why we cannot take actual individuals to represent themselves in recombinations. So, there is no reason why we cannot use modal

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Chapter 1. I must also stress that, in saying that the actual world is what grounds possibilia, I am not specifying the truth conditions for Paradise on the Cheap strictly in terms of the features of ρ — other things are needed for the semantics, including recombinations of these features and relations of suitable similarity.

realism suppositionally while still abiding by the 'he himself' intuition.

That modal realism can be employed suppositionally in the way described in Section C is testament to the heuristic fertility of the theory. But, as Hinckfuss emphasizes, any heuristic conveniences afforded by modal realism do not constitute any good reason to think that it is true — the theory can be convenient even when we take it to be false. I will now turn to arguing that, save perhaps in its heuristic/suppositional role, we should abandon modal realism and replace it with Paradise on the Cheap as our preferred theory of possibilia.

Chapter 3: Relinquishing realist commitments to modal realism, but entertaining instrumentalist ones

We have just seen, in the last chapter, that Paradise on the Cheap can bear the explanatory load which Lewis purports modal realism to bear. Thus, the groundwork has been laid for a theory that can explain modality, counterfactuals, content, and properties just as well (if not better) than modal realism *without* requiring realist commitments to possible worlds. Perhaps there are some instances in which the alternative analysis of certain phenomena is just too complex for any human agent to carry out; but the existence of such cases would not imply that Paradise on the Cheap is in any way inferior to modal realism with respect to explanatory power. As was established in Chapter 2, Section C, modal realism can be employed as a suppositional tool for carrying out the analyses of Paradise on the Cheap. With our four bridge laws, we can derive alternative explanations of modality, counterfactuals, doxastic and epistemic states, and properties and relations directly from modal realistic explanations of the same. If the conceptual apparatus of Paradise on the Cheap is too complex to use for a given analysis, then perhaps we can employ the suppositional apparatus discussed in the previous chapter, according to which we take the modal-realistic analysis of a phenomenon and translate it via our bridge laws into an alternative analysis of the phenomenon. But if the suppositional method is also too complex, practically speaking, to use in this analysis, then modal realism is likewise too complex to be used. With the suppositional apparatus available to the alternative theorist, Paradise on the Cheap is limited only to the extent that modal realism is limited.

Because the explanatory power of Paradise on the Cheap is equal to that of modal

realism, I shall argue below that modal realism can at best serve as a valuable *heuristic device* for dealing with various philosophical problems. In other words, the view that there *really is* a world in which Billy Pilgrim exists, has come unstuck in time, is abducted by Tralfamadorians, survives the Dresden raid, and so on can only play the role of a convenient fiction, as one step in an expedient means of deriving alternative analyses of Lewis-phenomena. But that modal realism is heuristically convenient is *not* sufficient ground on which to commit oneself to the existence of other worlds. We don't have sufficient reason to take *Slaughterhouse-Five* as anything more than a fairly large recombination.

I use the term 'heuristic device' to denote a theory which is *convenient* — one that makes particular goals we have somehow easy to achieve. It may or may not be the case that a heuristic device H is *necessary* in order to achieve such goals — the latter might be realizable without the use of H, though with greater difficulty. In other words, relative to our goals, heuristic devices may or may not be *dispensable* (practically speaking, since they are always dispensable in principle). As a heuristic device, then, modal realism could perhaps bring of all the benefits which Lewis purports that it brings to Philosophy more easily than could Paradise on the Cheap. And we might even *need* modal realism to reap these benefits, despite the fact that, in principle, they can be reaped by means of the conceptual apparatus supplied by Paradise on the Cheap.

Lewis' modal realism is a theory asserting the *existence* of possible worlds — in arguing for it, Lewis presupposes a *realist* conception of theories. It will be useful, then, to establish, for the purposes of this discussion, what a realist conception of theories is.

According to Mary Hesse, "Realism is a generic term for a number of views, all holding that theories consist of true or false statements referring to 'real' or 'existing' entities" (407). And, as Carl G. Hempel points out, "[t]o assert that the terms of a given theory have factual reference, that the entities they purport to refer to actually exist, is tantamount to asserting that what the theory tells us is true ..." (220). So, a realist about theories would say that a statement like "Billy Pilgrim is a member of world w_{tralf}"[83] refers to actual entities, namely Billy Pilgrim and world w_{tralf}, and that its truth or falsity depends on whether or not Billy Pilgrim in fact exists at w_{tralf}.[84] Furthermore, to assert that the terms 'Billy Pilgrim' and 'w_{tralf}' (along with various other terms denoting various possible worlds and possible individuals) have factual reference is to say that modal realism's claim that *possible individuals exist at possible worlds* (along with the many other claims that modal realism makes) is true.[85]

Lewis argues for modal realism via a strategy of *inference to the best explanation.* He claims that the fruitfulness of modal realism gives us good reason to think that it's

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[83]World w_{tralf} is a world which includes the planet Tralfamadore.

[84]I wish to ignore issues surrounding Lewis' so-called 'counterpart' relations here, as they are not relevant to the present discussion. Rather than speaking of the existence of a *counterpart* of Billy Pilgrim, or a *counterpart* of Tralfamadore, at w_{tralf}, I'll speak of the existence of Billy Pilgrim and Tralfamadore *simpliciter* at w_{tralf}, even though (according to Lewis) the Billy Pilgrim of w_{tralf} is not the same individual as the Billy Pilgrim of other worlds and the Tralfamadore of w_{tralf} is not the same planet as the Tralfamadore of other worlds.

[85]Presumably, to say that the things a theory tells us are true is just to say that the theory itself is true.

true (4). He argues that because modal realism furnishes the best available explanation[86] of certain phenomena (such as counterfactuals and future contingents) we are justified in believing in its truth. Setting aside, until Chapter 4, concerns surrounding the standards of inference to the best explanation , let's assume (with plausibility, I think) that inference to the best explanation is justification-conferring, that a theory's ability to provide the best explanation of a particular set of phenomena is good enough reason to believe in the existence of the entities posited by the theory and, therefore, good enough reason to believe that the theory is true. That a theory provides the *best* available explanation of a particular set of phenomena implies that there are *no* alternative theories providing better explanations (and that there are no alternative theories whose explanations are *just as good*) of that set of phenomena. But, the arguments of Chapter 2 have shown us that Paradise on the Cheap must succeed, that the phenomena Lewis purports modal realism to explain can be explained without asserting the existence of non-actual worlds or non-actual individuals. Therefore, there is an alternative theory which accounts at least *as well* for the phenomena that modal realism is supposed to account for and which doesn't have the heavy ontological baggage of Lewis' theory. And because Paradise on the Cheap *doesn't* have a controversial ontology, it is *preferable* to modal realism.

Before I argue this last point, I should point out that perhaps it is more accurate to say that the ontology of recombinations isn't *as* controversial as that of modal realism. As mentioned toward the end of Chapter 2, recombinations are a kind of mental phenomena; and how we ultimately characterize these phenomena depends on our theory

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[86]I take 'best explanation' and 'best available explanation' to be synonymous.

of the mind. Despite the fact that recombinations aren't tangible (unless, of course, they're identical to brain states), they belong to the realm of the actual; and we can hardly deny that we ourselves perform imaginative recombinations. However, Andrew Irvine has suggested to me that to identify the concept of a recombination with that of a *mental recombination* will cause difficulties for Paradise on the Cheap. In particular, Irvine argues that to identify recombinations with mental artifacts of one kind or another is extremely limiting, as we simply don't have enough mental activity to produce all possibilities for ρ and ρ-individuals. Moreover, if possibilia are grounded strictly in terms of mental phenomena, it would follow that there would be *no* possibilia in a world without sentient creatures — a consequence I don't want for my theory. It seems, therefore, that I should ground possibilia more explicitly in terms of the features of ρ and weaken the status of mental recombination to that of a means by which we gain access to such possibilia. Accordingly, I could say that a possibility consists in the fact that certain parts of ρ can be recombined with certain other parts of ρ in a way which is acceptable to us (and, of course, such a recombination is acceptable just in case it's suitably similar to certain actual states of affairs). Along these lines, it is arguable that possibilities are rooted in the features of ρ and, thus, that there would be possibilities for this world and its parts even if there were no sentient creatures to gain cognitive access to them.[87]

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[87]Though, in my opinion, Irvine's objection stands, it should be noted that imaginative recombinations are not as limited a way of representing possibilia as one might suspect. It is not the case that a recombination represents *just* one possibility. In imagining a particular talking donkey, for example, we represent the possibilities of various other talking donkeys, if only vaguely. Likewise, in imagining — as Vonnegut did — that Billy Pilgrim was abducted by aliens from Tralfamadore, we imagine various recombinations; and assuming that these recombinations are suitably similar to features of

Lewis makes an analogy between set-theoretic realism and modal realism.

Regarding the former, he says,

> Philosophers might like to see the subject reconstructed or reconstrued; but working mathematicians insist on pursuing their subject in paradise, and will not be driven out. Their thesis of plurality of sets is fruitful; that gives them good reason to believe that it is true.
>
> Good reason; I do not say it is conclusive. Maybe the price is higher than it seems because set-theory has unacceptable hidden implications — maybe the next round of set-theoretical paradoxes will soon be upon us. Maybe the very idea of accepting controversial ontology for the sake of theoretical benefits is misguided — so a sceptical epistemologist might say, to which I reply that mathematics is better known than any premise of sceptical epistemology. Or perhaps some better paradise might be found. ... Conceivably we might find some way to accept set theory, just as is and just as a nice home for mathematics, without any ontological commitment to sets. But even if such hopes come true, my point remains. It has been the judgement of mathematicians, which modest philosophers ought to respect, that *if* that is indeed the choice before us, then it is worth believing in vast realms of controversial entities for the sake of enough benefit in unity and economy of theory' (4).

Regarding modal realism, Lewis says,

> [It] is fruitful; that gives us good reason to believe that it is true.
>
> Good reason; I do not say it is conclusive. Maybe the theoretical benefits to be gained are illusory, because the analyses that use *possibilia* do not succeed on their own terms. Maybe the price is higher than it seems, because modal realism has unacceptable hidden implications. Maybe the price is *not* right; even if I am right about what theoretical benefits can be had for what ontological cost, maybe those benefits are just not worth those costs. Maybe the very idea of accepting controversial ontology for the sake of theoretical benefits is misguided. Maybe — and this is the

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ρ in certain specified ways, it follows that in representing the possibility of Billy Pilgrim being abducted by Tralfamadorians we also represent various other possibilities, like those of Billy Pilgrim and the planet Tralfamadore. Furthermore, by imagining Billy Pilgrim to be abducted by aliens from Tralfamadore, we represent — in a vague fashion — the possibilities of numerous other individuals being abducted by numerous other beings from numerous other planets.

> doubt that most interests me — the benefits are not worth the cost, because they can be had more cheaply elsewhere (4-5).

If all the benefits brought to mathematics by set-theoretic realism can be had without ontological commitment to sets and constructions thereof, then it makes no sense to say (as Lewis does) that it's worth it for working mathematicians to subscribe to set-theoretic realism "for the sake of enough benefit in unity and economy of theory." Provided that mathematics can be explained just as well *without* reference to real sets as it can by appealing to them, it seems that one's theory of mathematics would be more unified and economical *without* a messy ontology![88] Similarly, it appears that Paradise on the Cheap is more unified and more economical than modal realism.

It should be emphasized that I'm not simply concerned with the superiority with which set-theoretic realism explains mathematics or modal realism explains Lewis-phenomena. Rather, I'm concerned with *total views*, with how theories like modal realism and set-theoretic realism 'fit' into our overall system of belief and knowledge. That is to say, I'm concerned with how *unified* and *economical* modal realism is relative to our overall system of belief and knowledge. Paul Benacerraf exemplifies a 'total-view' approach. Regarding mathematical platonism, he says,

> One of its primary advantages is that the truth definitions for individual mathematical theories thus construed will have the same recursion clauses as those employed for their less lofty empirical cousins. Or to put it another way, they can all be taken as parts of the same language for which we provide a single account for quantifiers regardless of the sub-discipline under consideration. Mathematical and empirical disciplines will not be distinguished in point of logical grammar. I have already underscored the importance of this advantage: it means that the logico-grammatical theory

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[88]See H. Field, *Science Without Numbers*.

> we employ in less recondite and more tractable domains will serve us well here. We can do with one, uniform, account and need not invent another for mathematics. This should hold true in virtually every grammatical theory coupled with semantics adequate to account for truth. My bias for what I call a Tarskian theory stems simply from the fact that he has given us the only viable systematic general account we have of truth. So, one consequence of the economy attending the standard view [i.e., platonism] is that logical relations are subject to uniform treatment: they are invariant with subject matter. Indeed, they help define the concept of 'subject matter' (411).

Thus, in discussing the advantages of platonism, Benacerraf points out how well the latter unifies with our general account of truth, with how we specify truth conditions for empirical propositions, for example. Similarly, in discussing platonism's shortcomings, he points out that "it appears to violate the requirement that our account of mathematical truth be susceptible to integration into our over-all account of knowledge" (412). Therefore, Benacerraf isn't just concerned with the implications of platonism for mathematics — he discusses platonism's implications for our theories *in general*. Likewise, when I consider whether modal realism (or set-theoretic realism) provides the best available explanation, I consider whether it does so relative to our *total system* of belief and knowledge, that the value obtained by subtracting its *total explanatory shortcomings* from its *total explanatory benefits*[89] is greater than that of any rival theory.[90]

Of course, 'unity' and 'economy' are comparative terms. Rather than calling theories unified and economical *period*, it makes more sense to call them *more* or *less* unified and economical in comparison to other theories. Asserting the existence of set-

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[89]Call this value the *total explanatory value* of a theory.

[90]I'll assume, for the purposes of this discussion, that explanatory value is *decidable* (though it most likely isn't).

theoretic entities, and having to account for their existence and our knowledge of them, makes our theory of mathematics less economical than a theory which doesn't posit the existence of such entities, whose only ontological commitments pertain to the world of physics, chemistry and biology. Without an account of how set-theoretic realism fits into our total view — without an account of how it coheres with our already-accepted theories of, e.g., knowledge and the physical world[91] — the former unifies less with our total view than a theory which doesn't assert the existence of obscure set-theoretic phenomena.

Of course, unity and economy aren't *necessary* conditions on inference to the best explanation. We can imagine a theory which is neither unified nor economical but which still constitutes the best available explanation of a particular set of phenomena. Nevertheless, one might argue that amongst theories which are explanatorily equivalent (such as modal realism and Paradise on the Cheap) we should prefer the one that's most unified and/or most economical.[92] Theories like modal and set-theoretic realism assert the existence of entities which are *different in kind* from the entities posited by our already-accepted bodies of theory. I use 'kind' in an intuitive sense here — we can regard phenomena like real sets and possible worlds as being 'of different kinds' than, say, medium-sized physical objects and sub-microscopic particles because (a) possible worlds

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[91]This assumes, falsely, that we *do* have generally-accepted theories of knowledge and the physical world. At the very least, however, we should require that theories such as set-theoretic and modal realism cohere with the epistemologies and physical theories which, generally speaking, we take seriously — i.e., which we entertain as candidates for truth (or sufficient closeness to truth) at our world.

[92]I'm assuming here that we have *reasonably reliable measure* of degree-of-unity and degree-of-economy.

are totally isolated, and (b) it's difficult to see how real sets could be so causally related to us as to allow us to have knowledge of them. Because the nature of real sets and possible worlds is radically different from the nature of things whose existence we already accept (or whose existence we entertain as serious possibilities for this world), the nature of the former may not be understood as easily as the nature of the latter. In consequence, the existence of other worlds and real sets, along with the truth of modal and set-theoretic realism, might be regarded as *less* plausible. On the other hand, theories which unify very well with our total view do *not* posit the existence of any entities different in kind from those posited by our already-accepted bodies of theory. Such theories are highly intelligible — we needn't extend the conceptual and terminological apparatus of our present total view very far (if at all) in order to understand and express them. Thus, their truth is generally taken to be significantly *more* plausible.[93] Because poorly-unified theories are more likely to be considered, to some extent, less intelligible and less plausible, it seems that one is *less likely* to regard them as constituting a good, or the best, explanation of a certain set of phenomena.

One respect in which modal and set-theoretic realism fail to unify with our total view, or conceptual scheme, is worth emphasizing: neither theory tells an epistemological story for its subject matter. Modal realism doesn't suggest how we come to know, or

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[93]In addition, because more-unified theories deal with entities which are *more like* the entities whose existence is already posited by out total view, the referents of the terms of the former are *more like* those of the latter. Hence, the truth conditions of more-unified theories are *simpler* than the truth conditions of theories which are less-unified — less of an 'ontological leap' is required to specify the truth conditions of more-unified theories. Thus, theories of the latter sort might be regarded as stronger candidates for truth, or truthlikeness.

form beliefs about, Lewis-phenomena; and, set-theoretic realism doesn't really indicate how we come to know, or believe things about, mathematics. Being so detached from any theory of knowledge or belief, these views look pretty bizarre in light of our total view. Indeed, it's evident that a unified account of possibilia must embody some account of how we come to be reliable judges of truths about modality, counterfactuals, &c. While modal realism lacks such an account, it is arguable that Paradise on the Cheap does *not*, given the apparently essential roles which similarity and imaginative recombination play in how we learn and use modal-counterfactual notions.

Likewise, one might value theories which are more *economical* for their increased intelligibility and increased plausibility-of-truth. Modal realism asserts the existence of entities *not* already included in our total view (indeed, not of any *kind* already included in our total view)[94] — Paradise on the Cheap doesn't posit the existence of any such entities. The former adds to the conceptual and terminological apparatus of our total view, while the latter does not. Because modal and set-theoretic realism make some very odd additions[95] to our total view, they may be considered less intelligible and less plausible than theories which don't make such additions. Moreover, since modal realism and Paradise on the Cheap are explanatorily equivalent, the additions modal realism makes to our total view are in principle *unnecessary*. So, valuing greater intelligibility and greater

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[94]Indeed, if such things as non-actual worlds and non-actual individuals are at all part of our total view, they're positioned at the periphery of the latter, having relatively few connections to other components of our 'web' of belief and knowledge.

[95]Such additions are *very odd* in comparison to what was included in our total view *before* modal and set-theoretic realism came into the picture.

plausibility, one might prefer theories which don't makes such odd additions:[96] more economical ones like Paradise on the Cheap and a less-ontologically-laden theory of mathematics.[97]

However, the reasons, discussed just above, for preferring more-unified and more-economical theories in our explanations are merely *psychological*. That idea that more-unified and/or more-economical theories are more easily understood and are given greater plausibility of being true explains why a human subject might prefer such theories to less-unified and/or less-economical ones. Indeed, increased intelligibility and increased plausibility seem important to what human subjects think of as good explanations — the more intelligible a theory is and the more plausible it appears to be, the more 'sense' it makes as an explanation of a certain set of phenomena. But despite their psychological appeal, factors like increased intelligibility and plausibility do nothing to link unity and economy up with *truth*. A theory may be highly *un*intelligible and highly *im*plausible but may still express the objective facts of the matter, and an extremely plausible and extremely intelligible theory could be *false*, (or so we normally and naturally suppose). We might, in fact, account for the intelligibility and plausibility of particular theories by

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[96]Moreover, more-economical theories, because they specify *fewer* term-referents, have *simpler* truth conditions than theories which are less-economical. So, as with more-unified theories (see note 93), it may be thought that theories of the former type have a greater plausibility of being true, or close to the truth.

[97]As an example of a more economical theory of mathematics, take H. Field's account of pure mathematics, which appeals to stipulative systems of rules encoding schematic consequence relations. Being schematic, these systems are *candidates* for application to real-world properties and phenomena. (Thanks to Bryson Brown for this example.) See Field's *Science Without Numbers*.

citing the cognitive limitations of (at least some) human subjects,[98] or simply by citing the nature of our presently-accepted bodies of theory.

Throughout the history of science, there have been various, sometimes radical, changes in the theories (and *kinds* of theories) we find acceptable — changes in what is, generally speaking, more and less intelligible and plausible to people. What we consider to be intelligible and plausible *now* may well be subject to the same sorts of theoretical and paradigmatic changes which have occurred in the past. Therefore, the theories which we presently accept, or find intelligible and/or plausible, needn't reflect which entities actually exist and needn't be true. So, though the psychological appeal of theories which are more unified and/or more economical may cause human subjects to prefer such theories in their explanations, this appeal cannot, in itself, give us sufficient reason for believing that such theories are actually true.[99]

There is a stronger reason for preferring more unified and/or more economical theories in our explanations. If we accept some sort of *coherentism* as our theory of

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[98]Cf. Frank Jackson, who, in arguing against reductionism in the philosophy of mind, says, "The wonder is that we understand as much as we do, and there is no wonder that there should be matters which fall quite outside our comprehension" (407).

[99]In fact, theories which are more unified can even be significantly *less* intelligible and *less* plausible. As Hempel points out, we can use Craig's theorem to eliminate a theory's theoretical terms (i.e., those terms referring to unobserved entities) while preserving the deductive connections between the theory's observation sentences (i.e., the theory's inputs and outputs) — assuming, of course, that a division between the language's observational and theoretical terms can be drawn. However, without its theoretical terms, this theory would require an *infinite* set of axioms in order to maintain its deductive connections. Though the latter sort of theory presumably unifies very well, the size of its axiom-set seems to take away from its intelligibility and, hence, its plausibility (as well as from its *economy*).

epistemic justification (as I, along with many others, think we should), then we ought to value greater unity and greater economy.[100] Generally speaking, a coherence theory of epistemic justification (or CTEJ[101]) asserts that beliefs are justified to the extent that they *cohere* with our overall system of belief and knowledge (i.e., with our *total view*). Coherence is a vague notion — I've yet to encounter a specific definition of it. Still, I think we can identify certain elements to be included in a definition of coherence. Among these are unity and economy. Evidently, for a theory to cohere with our total view, it must in some sense *unify* with the latter. Both the concepts of coherence and unification suggest some sort of 'fit' with our total view, a fit which goes beyond mere consistency.[102] Indeed, it seems that the more unified a theory is, the more it coheres with — and adds to the explanatory coherence of — our total view. Since, according to a coherence theory of justification, justification increases with coherence, it follows that, other things being equal, the more unified a theory is, the more justified we are in believing that it's true.

Economy, at least in the case of Paradise on the Cheap, enhances coherence

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[100]I won't argue for a version of coherentism here, but will assume that our beliefs *are*, in fact, justified by some coherence relation. In "Holistic Coherentism," BonJour gives a thorough characterization of a coherence theory of justification as well as a defence of its tenability. Even some epistemological *foundationalists* attribute to coherence an important role in justification. See also Robert Audi's "Fallibilist Foundationalism and Holistic Coherentism" for an account of the importance coherence can have in a foundationalist theory of justification.

[101]This acronym derives from BonJour's *CTEK*, or coherence theory of empirical knowledge. See his "Holistic Coherentism."

[102]In "Holistic Coherentism," BonJour argues that consistency is not, in itself, sufficient for justification via coherence.

because economical theories have 'leaner' ontologies.[103] Paradise on the Cheap doesn't have the peculiar and unnecessary ontology had by modal realism. The former coheres better with our total view and, therefore, we are more justified in accepting it than we are in accepting modal realism. So it appears that a CTEJ would warrant the use of *Occam's razor*[104] in the present instance — we should, it seems, prefer Paradise on the Cheap to its less-economical rival.

If we reject set-theoretic realism and, instead, accept a theory providing equally satisfactory explanations at less ontological and epistemological cost (the latter theory being more economical and better unified with our total view), the only room there is for set-theoretic realism in mathematics is as a heuristic device. Similarly, since the benefits brought to philosophy by modal realism can indeed be had more cheaply — in Paradise on the Cheap — then modal realism, as it asserts the existence of an extremely large number of possible worlds, possible individuals, and similarities between them, could at best serve as a device for heuristic convenience.

One may also attack modal and set-theoretic realism by insisting that an ontology

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[103]Bryson Brown has pointed out that mere leanness is not so important. "But," he says, "leanness in the sense of making do, metaphysically, with what is useful in an account of psychology of belief (i.e., what can actually have some impact on our beliefs, according to our best account of human psychology) is important, since otherwise our metaphysics is subject to serious skeptical worries." (This passage is quoted, with slight editorial adjustments, from some comments addressed to me over email.) See the discussion of semantic naturalism below for a more detailed exposition of the importance which the psychology of belief and learning has in metaphysics.

[104]According to Ernest A. Moody, Occam employed the principle of parsimony "as a methodological principle of economy in explanation. He invoked it most frequently under such forms as 'Plurality is not to be assumed without necessity' and 'What can be done with fewer [assumptions] is done in vain with more'; ..." (307).

is not viable unless it has an explanatory connection to our linguistic usage and our ability to use language. The idea was presented to me in some written comments by Bryson Brown, a portion of which I will now reproduce.[105]

> My own view is that ontology does no good here unless it has an explanatory connection to our usage/ability to use the language. Roughly, semantics that has no explanatory force with respect to our use of language is a kind of linguistic supposition that gains no credibility from its mere success as semantics. This means I'm defending some sort of semantic naturalism, and also means I'm unable to offer anything like the standard set-theoretical semantics for mathematics, except as a purely formal semantics which can provide a sort of extension of the language and a uniform linguistic resource by means of which we can link various areas of mathematics together. The 'real' semantics of mathematics, on such a view, is much more complicated, since it has to link up with the causal connections by means of which we can learn to do mathematics — here some sort of inferential approach to the fundamentals may be the root of things, since rule following and rule learning are fundamental human capacities, and learning mathematics involves learning certain rule-governed procedures, from counting to calculating to proving. Similarly, when we think in modal or counterfactual terms, we do something that we have been taught how to do by the inculcation of certain claims, certain inferences, and certain patterns of reasoning. That the rules of both mathematical and modal/counterfactual discourse can be systematically captured by means of suppositional ontologies doesn't, in my view, provide *any* evidence, even prima facie evidence, for those ontologies *unless* they are given some role in grounding our learning/capacity to use these linguistic devices.

In contrast, it is arguable that imaginative recombinations and judgements of suitable-similarity *do* play a role in our capacity to reason about possibilia, i.e. that they are the means by which we gain cognitive access to many of the possibilities for ρ and ρ-individuals. Therefore, semantic naturalism, if true, provides us with further reason to think that Paradise on the Cheap provides good explanations of Lewis phenomena. But

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[105]I've taken the liberty of making some very minor editorial adjustments to Brown's comments, which were conveyed to me via email.

to argue in favour of semantic naturalism is beyond the scope of this essay. I have given other theoretical considerations against accepting the truth of modal realism, and *for* accepting that of Paradise on the Cheap, and will rest content with them. I mention the present approach as just another route one might take to challenging Lewis. (However, it is also interesting to note that by naturalizing Paradise on the Cheap's ontology, we'd be doing more than pleasing proponents of semantic naturalism. By characterizing the ontology of second-order schematic structures, projection sets, and recombinations in terms of actual natural phenomena,[106] we would potentially make Paradise on the Cheap more unified and economical, not to mention more plausible. I won't pursue the naturalization of Paradise on the Cheap here.)

Now, the question arises of whether we have sufficient reason to think that modal realism, as a heuristic device, is true, that the entities whose existence it posits actually exist. In "The Theoretician's Dilemma," Hempel discusses what he calls

> the *paradox of theorizing*. It asserts that if the terms and the general principles of scientific theory serve their purpose, i.e., if they establish definite connections among observable phenomena, then they can be dispensed with since any chain of laws and interpretive statements establishing such a connection should then be replaceable by a law which directly links observational antecedents to observational consequents.
>
> By adding to this crucial thesis two further statements which are obviously true, we obtain the premises for an argument in the classic form of a dilemma:
>
> If the terms and principles of a theory serve their purpose they are unnecessary, as just pointed out; and if they do not serve their purpose they are surely unnecessary. But given any theory, its terms and principles

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[106]For example, as suggested above, we choose to identify recombinations with particular kinds of brain states.

> either serve their purpose or they do not. Hence, the terms and principles of any theory are unnecessary.
>
> This argument ... will be called the *theoretician's dilemma* (186).

By parity of reasoning, supposing that Paradise on the Cheap does everything which Lewis purports that modal realism does, then modal realism *isn't needed.*[107] We can, for example, work out the semantics of counterfactual conditionals and modalised statements by appealing solely to the features of this world, i.e., *without* having to assert the existence of phenomena like possible worlds and possible individuals.

However, Hempel rejects the theoretician's dilemma, saying that

> the question posed by the theoretician's dilemma can be raised ... in regard to the two alternative conceptions of the status of a theory [i.e., realism and instrumentalism]. Concerning Ramsey's formulation, we may ask whether it's not possible to dispense altogether with the existentially quantified variables which represent the theoretical terms, and thus to avoid the ontological commitment they require, without sacrificing any of the deductive connections that the Ramsey sentence establishes among VB-sentences [i.e., the sentences of a theory's *observational* language]. And in regard to theories conceived of as inferential devices, we may ask whether they cannot be replaced by a functionally equivalent set of rules — i.e., one establishing exactly the same inferential transitions among VB-sentences — which uses none of the 'meaningless marks.'
> To both questions, Craig's theorem gives an affirmative answer by providing a general method for constructing the desired kind of equivalent. But again, in both cases, the result has the shortcomings mentioned in section 8. First, the method would replace the Ramsey-sentence by an

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[107]It should be made clear that modal realism does not fit perfectly into Hempel's picture, as it is *not* a scientific theory. Scientific theories posit the existence of unobserved and/or unobservable entities which presumably stand in some causal relationship(s) to what we do and/or can observe. However, as mentioned earlier, Lewis claims that every possible world is isolated from every other — neither other worlds nor their contents can exist in causal relationships with our world or any of its contents. Thus, modal realism is a *metaphysical* theory. As we shall see in Chapter 4, the fact that non-actual world are so isolated raises serious concerns about whether the standards of inference to the best explanation even apply to modal realism.

> infinite set of postulates, or the body of inferential rules by an infinite set of rules, in terms of VB, and would thus lead to a loss of economy. Second, the resulting system of postulates or of inferential rules would not lend itself to inductive prediction and explanation. And third, it would have the pragmatic defect, partly reflected already in the second point, of being less fruitful heuristically than the system using theoretical terms[108] (222).

Hempel's first objection to the theoretician's dilemma would hold, in some form, for Paradise on the Cheap if the latter were somehow practically impossible to construct and/or use.[109] Were this the case, Paradise on the Cheap certainly would be heuristically deficient. It would in no way make our goals easier to achieve; rather, we *couldn't* use it to achieve our goals, practically speaking, and given that we *can* construct and use modal realism, the latter would be heuristically preferable to Paradise on the Cheap. In the absence of other heuristically-adequate rivals, modal realism would be heuristically *necessary* to achieving our goals.

Hempel's second objection doesn't apply to the present discussion. We don't intend to use either Paradise on the Cheap or modal realism to make predictions; and, at least in principle, these theories both provide reasonably satisfactory accounts of the various sorts of phenomena we're concerned with (e.g., modality and counterfactuals). However, the third objection Hempel makes to the theoretician's dilemma *does* apply. According to Hempel, theoretical terms (referring to such non-observational entities as

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[108]Cf. Hinckfuss, in which it is pointed out that we needn't 'economize' our theories in this way — we simply use our ontologically-lavish theories as useful suppositions for carrying out inferences.

[109]As was demonstrated in Section B of the second chapter, Paradise on the Cheap *can*, in fact, be used on its own to carry out at least some analyses of Lewis-phenomena.

possible worlds) have "definite heuristic value because they stimulate the use and invention of powerfully explanatory concepts for which only some links with experience can be indicated at the time, but which are fruitful in suggesting further lines of research that may lead to additional connections with the data of direct observation" (206). Thus, one may claim that despite the fact that the Paradise on the Cheap can do everything Lewis wants modal realism to do (at least when the former takes advantage of modal realism's *suppositional* role), modal realism has the potential to lead to other theoretical benefits. For example, due to the notion of possible worlds and/or possible individuals, theorists may develop other plausible explanations of Lewis-phenomena or even plausible explanations of other things. Furthermore, future research on modal realism may lead to the conclusion that the latter theory can explain everything which Paradise on the Cheap can *as well as* some things that Paradise on the Cheap cannot explain. If, as things turn out, modal realism can explain all of these phenomena better than any combination of Paradise-on-the-Cheap-plus-other-theories can, then we certainly do have good reason to accept modal realism over Paradise on the Cheap,[110] to believe that the former constitutes the best available explanation of these phenomena and, so, that it is *true*.[111] But it remains to be seen whether modal realism can explain additional phenomena which Paradise on the Cheap cannot, and whether it can do so in a way which is superior to any

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[110]Recall my assumption that the explanatory superiority of theory gives us good reason to think that it's true.

[111]If Paradise-on-the-Cheap-plus-other-theories and modal realism are explanatorily equivalent, we're still justified in accepting the latter provided that it's more unified and economical than the former.

Paradise-on-the-Cheap-plus-other-theories combination. Until it is shown that modal realism is, in fact, capable of performing the latter functions, we are *neither* justified in believing in its truth *nor* in asserting the existence of the entities it posits. Until such explanatory superiority is established for modal realism, we are left with no reason to accept the latter instead of Paradise on the Cheap.[112] Still, if modal realism has the potential to satisfactorily explain other phenomena, and if Paradise on the Cheap — and any Paradise on the Cheap-plus-other-theories combination — lacks this potential, then the heuristic fertility of modal realism is *greater* than that of Paradise on the Cheap in the present regard.

Similarly, modal realism has a definite heuristic advantage over Paradise on the Cheap if the former is somehow *easier to use* than the latter (generally speaking). For example, it may well be that modal realism's conceptual apparatus is logically simpler and/or more intelligible; and perhaps modal realism is somehow easier to use *psychologically* than Paradise on the Cheap.[113] However, that modal realism is easier to use than Paradise on the Cheap is *not* sufficient reason to assert the former's truth. Even

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[112]But the potential for explanatory superiority may give us good reason *not* to dismiss modal realism, as we might have better reason to think that it's true given further evidence.

[113]For example, subjects might construct truth conditions for counterfactual conditionals with greater ease if they *believe* that the statements' antecedents and consequents actually refer to phenomena in other worlds. (Of course, these modal-realistic truth conditions could then be translated, via false bridge laws, to truth conditions stated in terms of Paradise on the Cheap. I realize that, in this respect, I am going beyond what Hinckfuss requires of economical theories.) Likewise, it may be easier for a mathematician to carry out proofs and calculations if she believes that the symbols she uses refer to real mathematical objects.

if modal realism is the *only* theory which can, in practice, be used to achieve our goals, it doesn't follow that we're warranted in thinking that it's true. (As mentioned in Chapter 2, one of Hinckfuss' lessons is that even false theories can be very serviceable and, therefore, that a theory's usefulness is not an adequate basis on which to commit to its truth. The same can be said for a theory's convenience.) *Sufficient reason* requires that a connection be made between the heuristic convenience of modal realism and its truth, such that the former logically implies the latter or, at least, that the former makes the latter very probable. There appears to be no reason to believe that such a connection can be established.[114] Therefore, it's evident that the heuristic value of modal realism cannot, on its own, establish (or give us sufficient reason to believe in) the former's truth. The considerations which we derived from Hempel's objections to the theoretician's dilemma do not justify us in preferring the modal realism to Paradise on the Cheap on realist terms.

However, the reasons discussed above for why modal realism may qualify as a valuable heuristic device, over and above Paradise on the Cheap, are reasons why *instrumentalists* about theories might prefer modal realism to Paradise on the Cheap. According to an instrumentalist conception of theories, "theoretical statements are not candidates for truth or reference, and theories have no ontological import" (Delaney 379). Hempel characterizes the instrumentalist position as follows:

> Those finally, who, like contemporary nominalists, reject such strong ontological commitments, may adopt a conception of scientific theories,

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[114]Indeed, if a form of Paradise on the Cheap is preferable, in my 'total-view' sense, then the argument that *the convenience with which modal realism provides subjects in determining, say, the truth conditions of counterfactuals is best explained by the truth of modal realism* cannot be made.

> not as significant statements, but as intricate devices for inferring, from intelligible initial statements, expressed in terms of the antecedently-understood vocabulary VB, certain other, again intelligible, statements in terms of that vocabulary. The nominalistically-inclined may then construe theoretical terms as meaningless auxiliary marks, which serve as convenient symbolic devices in the transition from one set of experimental statements to another (221).

Put more simply, C. F. Delaney says that instrumentalism is "a kind of anti-realistic view of scientific theories wherein theories are construed as calculating devices or instruments for conveniently moving from a given set of observations to a predicted set of observations" (379). Instrumentalist theories and heuristic devices are used for *similar* purposes — with both, we aim to carry out certain tasks *conveniently*, i.e., to achieve certain goals. In its suppositional role, modal realism is used along instrumentalist lines — as a deductive tool for deriving Paradise on the Cheap's explanations of Lewis-phenomena.

In fact, it appears that the standards of acceptance for heuristic devices are the same as those for instrumentalist theories. Presumably, we judge the success of both heuristic devices and instrumental theories on the basis of *how* convenient, or effective, they are to use in performing particular tasks.[115] Presumably, we determine the instrumental/heuristic device which we are most justified in using for a given set of tasks by figuring out which device *most successfully* carries out these tasks.[116] For, if a theory

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[115]I recognize that the extent to which a device is convenient, and the device that is *most* convenient for a certain task, may vary from person to person. But, for simplicity, I'll ignore this difficulty here.

[116]Moser, Mulder, and Trout state the following, rather 'rough and ready', *principle of instrumental rationality*: "If you intend that a situation, *X*, occur and you believe, in agreement with your evidence that another situation, *Y*, is the most effective means to *X*,

is *not* the best tool we have for success, then we evidently have greater reason to use the theory which *is* the best tool — relative to certain goals, there's no reason why we shouldn't use the most effective one — and there's obviously *less* reason to use a theory which isn't. So, to be acceptable from an instrumentalist's point of view, modal realism must be a *more* convenient means to Lewis' ends than any rival theory (including, of course, Paradise on the Cheap).[117] In other words, the *total heuristic value* of modal realism must be greater than that of Paradise on the Cheap (and any other rival theory).[118] Therefore, even though, according to our initial assumption, Paradise on the Cheap has the same degree of explanatory power as modal realism, it may be that modal realism, because of the conveniences it provides, is the more convenient tool for dealing with the relevant philosophical problems. This being the case, instrumentalists would prefer to derive alternative explanations of Lewis-phenomena by using modal realism and the bridge laws suppositionally, rather than by using just the conceptual apparatus supplied by Paradise on the Cheap.

Regardless of where our instrumental preferences lie (or where they ought to lie), to Lewis, accepting modal realism *just is* to accept that there *actually exists* a world

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then you should rationally aim to have *Y* occur" (130).

[117]As an instrumental device, the role of the conceptual apparatus comprised of modal realism and the bridge laws can be paralleled to that of a function. Modal-realism-plus-bridge-laws takes the Lewis-phenomena to be analysed as arguments and yields alternative explanations of these phenomena as values.

[118]The overall heuristic value of a theory is obtained by comparing the degree to which the theory is *convenient* with the degree to which it is *inconvenient*. Let's assume, for the purposes at hand, that such values are decidable.

(among many others) at which Billy Pilgrim has come unstuck in time. He intends his theory to be taken in a *realist* sense; and he wouldn't be satisfied by its being acceptable only on instrumentalist grounds. But, barring any further evidence indicating that modal realism *is* explanatorily superior to Paradise on the Cheap, we have no choice but to disappoint him.

Much has been said in this chapter about inference to the best explanation. The following, final, chapter will focus on the question of what, if any, explanatory standards Lewis is permitted to employ in justifying his modal realism.

Chapter 4: Modal realism and the standards of inference to the best explanation

Strong considerations have now been given in favour of the view that modal realism should be replaced by Paradise on the Cheap as our 'going' theory of possibility (assuming, of course, that modal realism was our going theory in the first place). In *OPW*, Lewis is more-or-less explicit about the strategy by which he argues in favour of modal realism, namely *inference to the best explanation* (or *IBE*). For one thing, he says that we should accept modal realism because it is serviceable, because it provides us with a plethora of theoretical benefits, in particular the analyses of modality, counterfactuals, content, and properties discussed in Chapter 2. Thus far I have been assuming that Lewis permissibly employs IBE in regard to modal realism, and I haven't given consideration to the question of what sorts of IBE, if any, are applicable to this theory. So, I'd like to finish with a discussion of whether any standards of IBE apply to modal realism and, if so, what those standards are. Moreover, I would like to compare modal realism to Paradise on the Cheap and, thereby, bring to light any discrepancies between the IBE-standards which are acceptable for the former and those which are acceptable for the latter.

One of the key morals to be drawn from the material presented in Chapter 2, Section C is that modal realism can be serviceable *without* being true — modal realism can be used suppositionally to carry out alternative *analyses* of Lewis-phenomena as well as *inferences* from premises concerning the entities cited by Paradise on the Cheap (e.g., ρ-features, recombinations, and schematic structures) to conclusions concerning the same.

In addition, Hinckfuss suggests a way in which modal realism may be used to perform inferences about Lewis-phenomena *simpliciter* — consider the following passage:

> Bridge laws which are regarded as semantically or logically true by some philosophers may be regarded as presupposed falsehoods by others to much the same effect. For example, given 'semantic' rules:
>
> (1) (∃x) Possible world x
> (2) □*p* ≡ (x)(Possible world x ⊃ *p* is true in x)
> (3) ◊*p* ≡ (∃x)(Possible world x & *p* is true in x)
>
> and the premise, say,
>
> (4) □*p*
> (*where proposition p* is expressed by sentence *p*),
>
> we can proceed:
>
> (5) (x)(Possible world x ⊃ *p* is true in x)
> 2,4, equivalence
> (6) (∃x)(Possible world x & *p* is true in x)
> 1, existential instantiation, 5, universal instantiation, modus ponens and existential generalization.
> (7) ◊*p*
> 3,6, equivalence (607)

Modal realism can be used as a means by which we can reason about modalities in clear, syntactically specifiable ways; and given further bridge laws,[119] it can also be used as a means by which to reason about all other Lewis-phenomena. In the present context, all such bridge laws — and, therefore, modal realism itself — are merely suppositional. Thus, Hinckfuss shows us yet another way in which modal realism can be at once useful and *false*. Hinckfuss concludes, then, that the fact that Lewis' plurality-of-worlds thesis

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[119]For instance, "(A > C) ≡ (∃x)(∀y)(Possible world x & possible world y) & (A and C are both true in x & A is true in y & C is false in y) & (x *is closer to p than* y)."

is serviceable does not, by itself, give us sufficient reason to believe that it is true.[120]

More generally, Hinckfuss asserts that "even if the ontologically-prodigal statements are useful in the provision of explanations of true propositions, their usefulness in this regard need not be regarded as evidence for their truth" (597). I find it interesting that Hinckfuss appeals to explanation here since, in the passage quoted just above, modal realism doesn't seem to have any explanatory function whatsoever (at least in the way Lewis understands the explanatory function of modal realism). Rather, it is merely a tool for deducing conclusions about unanalysed Lewis-phenomena from premises about the same. In such a capacity, modal realism is simply an instrument (and, as such, yields a kind of D-N explanation). The case is the same regarding the suppositional roles I specified for modal realism in Chapter 2 — Paradise on the Cheap plays the explanatory role, whereas the bridge laws derived from modal realism are, at best, mere expedients by which alternative explanations are made. If there is indeed anything explanatory about modal realism, it is the theoretical benefits which Lewis cites for it; and these theoretical benefits consist of modal realism's ability to analyse modality, counterfactuals, content, and properties. The fact that modal realism yields such analyses is the principal reason that, according to Lewis, it is serviceable. From these analyses follow various equivalence relations between Lewis-phenomena and items of the modal-realistic ontology, e.g., that modality *de dicto* and *de re* are equivalent to (i.e., are explained in terms of) quantification over possible worlds and possible individuals,

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[120]But, as we shall see immediately, there are different ways in which a theory is said to be 'serviceable,' some of which may give us more reason to believe that the theory is true than others.

respectively. These equivalences constitute bridge laws on the Hinckfussian model[121] — taken suppositionally, they are what Hinckfuss regards as serviceable about modal realism. On the Hinckfussian model, the analyses yielded by modal realism are useful only in a derivative sense: from them, one can infer certain equivalences to be used as convenient deductive tools. However, on Lewis' account, it is *the analyses themselves* which constitute modal realism's usefulness.[122] Therefore, the notion of serviceability appealed to in "SPO," and in my own arguments in Chapter 2, is evidently different from that appealed to by Lewis in *OPW*.

So, there is an ambiguity in the notion of serviceability that Hinckfuss fails to recognize — Lewis' conception of serviceability is quite different from Hinckfuss'. Though the kind of serviceability Hinckfuss speaks of in "SPO" doesn't justify one in believing that modal realism is true, Hinckfuss' argument fails to establish that the type of serviceability *Lewis* has in mind fails to provide sufficient warrant for belief in the same. My point, then, in identifying the equivocation in Hinckfuss' reasoning is that assuming Lewis, in his appeal to serviceability, legitimately employs a form of IBE, it doesn't follow from anything said in Hinckfuss that his form of IBE cannot form at least some basis for believing in modal realism's truth and, so, in the existence of possible worlds

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[121]Of course, other equivalences — true or suppositional — can serve as bridge laws, like those between items in modal realism's ontology and items in the alternative ontology. I choose not to mention such laws in the present context because they are irrelevant to the task at hand.

[122]Indeed, Lewis' analyses are useful to the philosophical community, as we've been trying to give accounts of modality, counterfactuals, content, and properties for a *long* time.

and individuals.

As suggested in previous chapters, Lewis' approach to IBE is essentially to appeal to the unity and economy afforded by his theory. In particular, with modal realism, our accounts of various seemingly-disparate phenomena are unified under one theory. Furthermore, modal realism promotes economy in the sense that it asserts the existence of a reasonably small number of entity-kinds.[123,124] To be sure, modal realism cannot foster *causal* explanations of any Lewis-phenomena (where, roughly and briefly, to give a causal explanation of a phenomenon is to identify its cause). Because worlds are isolated from one another — and, therefore, because there can be no causal interaction between worlds or the parts of different worlds — it follows that no non-actual worlds or individuals can have a causal impact on the Lewis-phenomena of this world. (Generally speaking, the Lewis-phenomena of any world cannot be influenced causally by any other worlds or other-worldly individuals.) The truth conditions for counterfactual conditionals and modalised statements, for example, are given in terms of possible worlds; and these semantics are *not* about causation — they're about making things true in a *very* different sense than causing something to be true. For Lewis, it makes sense only to speak of

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[123]Indeed, in performing explanations of Lewis-phenomena, the modal realist's premises have only to do with possible worlds and possible individuals, certain of their key characteristics, similarity orderings between them, and counterpart and accessibility relations.

[124]The fact that, as a consequence of its lavish ontology, modal realism affords less unity and economy than does Paradise on the Cheap (given a 'total-view' approach to unity and economy of theory) is presently beside the point. I am discussing the kind of IBE which Lewis puts to use and ignoring the question of whether or not, by the same IBE-standards, a different theory is more successful. (See Chapter 3 for arguments to the effect that Paradise on the Cheap is more unified and economical than modal realism.)

causation relative to individual worlds — not as occurring across worlds. Modal realists explain Lewis phenomena by showing how the latter are subsumed under the general principles of the theory (i.e., under what modal realism says about possible worlds, possible individuals, and the relations between them).

The question which must now be pursued is whether there are any non-causal approaches to IBE which Lewis may use permissibly.[125] Let's take a look at some types of noncausal explanation in order to see which, if any, apply to modal realism. In "Scientific Explanation: Causation *and* Unification," Wesley Salmon succinctly describes Hempel and Oppenheim's *deductive-nomological* (*D-N*) model of explanation, "according to which explanation consists in deductive or inductive subsumption of that which is to be explained (the explanandum) under one or more laws of nature" (4). (Salmon notes Hempel's insistence that causality does not play a crucial role in scientific explanation.) The D-N model is what Salmon calls a *mechanical* conception of explanation — "It involves achieving a knowledge of how things work" (Salmon 18).[126]

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[125]Note that, in what follows, the kinds of IBE I discuss are generally considered to be approaches to *scientific* explanation. In my discussion, I shall ignore the view, considered by Salmon, that "perhaps it is futile to try to explicate the concept of scientific explanation in a comprehensive manner. It might be better to list various explanatory virtues that scientific theories might posses, and to evaluate scientific theories in terms of them. Some theories might get high scores on some dimensions, but low scores on others ..." (Salmon 20). For simplicity's sake, I'll proceed on the assumption that there are, in fact, distinct breeds of IBE.

[126]I should give a clearer account of D-N explanation. According to the latter, explanations are sets of sentences such that (a) they are true, (b) they include at least one lawlike statement — hence *nomological* — and (c) they deductively imply what is to be explained — hence *deductive*. See Hempel and Oppenheim, "Studies in the Logic of Explanation."

The D-N model is evidently *not* a strategy available to Lewis. Modal realism does not explain modality, counterfactuals, content, or properties by appealing to any of the nomological characteristics of this or any other world; and therefore, modal realism isn't a theory about the laws which this or any other world are bound to operate by. Moreover, though mechanistic explanations don't directly appeal to causes, the entities appealed to in such explanations (i.e., the things that laws of nature are supposed to be about), though perhaps unobservable, are taken to exist in some sort of causal relationship(s) with explananda. But, as we already know, the entities appealed to in modal realistic explanations are, for the most part, not causally related to the things explained in terms of them.

Furthermore, in *Change in View*, Gilbert Harman acknowledges that noncausal explanations can support inference to the best explanation.[127] He says, for example, that Newton's explanation of Kepler's laws doesn't appeal to any prior events but, instead, shows how the approximate truth of Kepler's laws follow from *more general principles*. This example is thus a case of one set of laws being subsumed by another.[128] However, such explanations pertain to the laws which govern the actual world; and so, as with the D-N model of explanation, it is inapplicable to modal realism. However, Harman

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[127]"Sometimes one explains *S* by citing some prior events that caused or brought about or led up to *S*. *But other explanations are not like this*" (Harman 73; emphasis added).

[128]However, according to Bryson Brown, there *is* a causal element in the explanation of Kepler's laws. The latter are 'explained' in the sense that, given certain initial conditions, they follow from Newton's theory. The initial conditions *causally* make it the case that Newton's laws lead to Kepler's. (If those initial conditions weren't credible for the solar system, to a good approximation, the 'explanation' would be no good at all.)

presents another kind of noncausal explanation. He asserts that some mathematical proofs are more explanatory than others, where the relevant kind of explanation is noncausal — these more explanatory proofs make it *intelligible* why their theorems hold in a way that other proofs do not.[129] Notwithstanding that the epistemic significance of intelligibility is open to dispute, it would seem that modal realism is amenable to the latter sort of explanation. Such mathematical explanations have nothing to do with the causal-nomological ways of this or any other world — neither do modal-realistic analyses. We can say, therefore, that modal realism explains by making Lewis-phenomena intelligible in certain ways. For example, it makes modal notions intelligible by giving an account of what must be the case for states of affairs to be contingent, necessary, possible, and impossible; and it makes the truth and falsity of counterfactuals intelligible by specifying their semantics. (I.e., modal realism provides appealing semantics for the modalities and counterfactuals.) Moreover, it provides an understanding of doxastic-state content and properties and relations by giving

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[129]Similarly, Salmon discusses Friedman's formulation of the *unification* approach to scientific explanation, according to which "we increase our scientific understanding of the world to the extent that we can reduce the number of independently acceptable assumptions that are required to explain natural phenomena" (Salmon 5). Friedman's approach to explanation is similar to the Harmanian conception presently being examined in that the former and latter share an important idea, namely that "[t]o understand the phenomena in our world requires that they be fitted into the general world-picture" (Salmon 17). However, in "Greater Unification Equals Greater Understanding?" Paul Humphreys gives strong reasons against the unification approach to explanation, arguing that the theories with the most unified axioms aren't always the easiest to understand. He says, for example, that a common problem in formalizations is that "sheer economy can be counterproductive in leading to an understanding of the formalization" (188). But perhaps when combined with other qualities, such as elegance, clarity, and simplicity, such theories are easier to grasp.

straightforward accounts of what these phenomena consist in.[130] If mathematical proofs, in their ability to render theorems intelligible, have explanatory power then the same must be said of modal-realistic analyses in their ability to render Lewis-phenomena intelligible (provided, of course, that we allow that theories which explain may be false, as I think we must).

It appears that, on Harman's account, the brand of explanation presently being discussed shares some more general characteristics with mechanistic explanation. Harman uses the term 'explanation' to refer to something one understands which makes phenomena more intelligible, comprehensible, or coherent.[131] Such explanations, he adds, are always of the form *R because P, ..., and Q* — they explain *why* or *how* it is that something is the case. I must stress here that to explain 'why' something is the case, or to use 'because' in citing an explanation, is *not* always to cite a cause for the explanandum. Our linguistic conventions are such that it's proper, for example, to say that a certain counterfactual is true *because* such-and-such worlds are closer to ρ than such-and-such other worlds in response to a why-question (assuming, of course, the we've accepted — or supposed — Lewis' semantics for counterfactual conditionals). Therefore, we have it

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[130]By contrast, it's important to note that, as part of suppositional models, modal realism does not yield any intelligibility, at least not intelligibility that's in any way similar to that considered in the present context. In suppositional frameworks, one isn't interested in modal realism's ability to furnish understanding of Lewis-phenomena; rather, one is simply interested in what it affords deductively.

[131]For Harman, "[c]oherence in a view consists in connections of intelligibility among the elements of the view. Among other things these include explanatory connections, which hold when part of one's view makes it intelligible to one why some other part should be true" (65).

that the form of modal-realistic analyses can easily be made to coincide with that of Harman's explanations without any loss in the former's content. Hence, according to Harman's views on explanation, modal realism has *bona fide* explanatory power in its capacity to make Lewis-phenomena intelligible (regardless of whether the modal-realistic analyses are, in fact, correct). Furthermore, Harman says that *inference to the best explanation* occurs when one infers something that might explain the evidence — one starts by believing *e* and comes to believe *e because h*, where *h* is the best of competing explanations.[132] Taking evidence to include, in the present context, things like Lewis-phenomena,[133] it's open for Lewis to claim that modal realism is the theory which makes Lewis-phenomena most intelligible and that, as such, it furnishes the best explanation of these phenomena. However, as I argued in Chapter 3, the kind of unity and economy afforded by Paradise on the Cheap, in comparison to that afforded by modal realism, is such that the former theory arguably makes Lewis-phenomena more intelligible than does the latter (given a 'total-view' approach to theories). This being the case, the IBE-

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[132]"At least, it should be the best among competing explanations at the same 'level.' There might be a competing explanation that is better but that involves an improved version of some theory which one could not have been expected to think of. That would not keep one from being justified in reaching the conclusion one reached" (Harman 68).

[133]Although Lewis-phenomena aren't 'observable' in the traditional sense that yellow birds and green grass are observable, it's arguable that they still count as evidence. We all have a fairly strong, though rather unarticulated, grasp on what's possible and impossible and on which counterfactuals are true and which are false. Modal realism articulates these possibilities, impossibilities, truths, and falsehoods — it makes them intelligible and, so, explains them (if only in a very limited sense). Similarly, a vast majority of us accept that we have systems of belief and knowledge and that there are items known as properties and relations (never mind their ontological status). Again, modal realism is a means by which to make these things intelligible and, thereby, to explain them.

standards which I've derived from Harman's account imply that Paradise on the Cheap, not modal realism, constitutes the best explanation of Lewis-phenomena. Still, we have established that there is a type of IBE which Lewis may permissibly employ.

Despite the explanatory function which Harman's account allows modal realism to have, it's evident that Nancy Cartwright wouldn't regard modal realism's ability to make Lewis-phenomena intelligible as explanatory. In "The Born-Einstein Debate: Where Application and Explanation Separate," Cartwright distinguishes between explanation, on the one hand, and "the descriptive completeness of [a] theory, or its ability to subsume and describe the models that it should" (272), on the other hand. In other words, she distinguishes a theory's explanatory power from its *covering power*. Accordingly, she says that "explanatory power is no guide to covering power. The laws of a theory can cover a lot more phenomena than they can explain" (272). Consider the point she makes about quantum mechanics:

> So long as any phenomena can be fitted into the Schroedinger equation, and no single situation requires incompatible representations, quantum mechanics will be a consistent descriptively powerful theory. But it fails to be explanatory in a critical respect: it does not answer "the fundamental question, '*Why* does light act in some respects like an assemblage of corpuscles and in other respects like a spreading wave phenomenon?'". ...
>
> It is important to realize that a theory like this may have considerable covering power and yet remain forever explanatorily inadequate (275).[134]

As established above, modal realism's analyses *can* be given in response to why-questions — modal realism can tell us *why*, for example, certain counterfactuals are true

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[134]It's interesting to note here that Hempel and Oppenheim's D-N model allows some of the mere 'coverings' of which Cartwright speaks to count a real explanations. See note 126.

while others are not in a useful, non-circular way. However, Cartwright says that, for a derivation to be a genuine explanation within a theory, every one of the premises in the derivation must be nomologically licensed, i.e., each premise "must be tied by bridge principles of the theory to accurate physical descriptions of the situation" (280). As argued above, modal realism lacks causal-nomological relevance and, for this reason, does not satisfy Cartwright's standards for genuine explanations. Therefore, Cartwright would deny modal realism an explanatory role and, so, conclude that the standards of IBE aren't available to Lewis.

Still, modal realism has definite covering power. Via its analyses of Lewis-phenomena, modal realism manages to 'fit' a great deal of seemingly-disparate phenomena into its principles and, to that extent, it is a descriptively powerful theory. Besides, that modal realism isn't explanatory is not among the theory's shortcomings in Cartwright's eyes — she believes that explanation is a *false goal*. (One might charge Cartwright with having too narrow a view of what explanation consists in and, so, argue that there are forms of explanation which needn't appeal to the laws which govern this or any other world. However, because there are those like Harman who believe explanation of the latter kind is legitimate, I shall rest content and refrain from arguing against Cartwright here.)

Bas C. van Fraassen raises further questions concerning whether IBE is a strategy available to Lewis. In "The Pragmatics of Explanation," a chapter of *The Scientific Image*, he says the fact that a theory allows us to explain — that it has explanatory power — is a *pragmatic* virtue, "albeit a complex one that includes other virtues as its own

preconditions" (97). Furthermore, "[t]he word 'explain' can have its basic role in expressions of the form 'fact *E* explains fact *F* relative to theory *T*'" (van Fraassen, "Pragmatics" 101). van Fraassen claims that to say of a theory that it explains some fact is to assert a relationship between the theory and the fact, where this relationship is independent of the question of whether the real world, as a whole, fits the theory. Furthermore, he argues that

> explanation is not a special additional feature that can give you good reasons for belief in addition to evidence that the theory fits the observable phenomena. For 'what more there is to' explanation is something quite pragmatic, related to the concerns of the user of the theory and not something new about the correspondence between theory and fact.
>
> So I conclude that (a) the assertion that theory *T* explains, or provides an explanation for, fact *E* does not presuppose or imply that *T* is true or even empirically adequate, and (b) the assertion that we have an explanation is most simply construed as meaning that we have 'on the books' an acceptable theory which explains (100).[135]

Of course, all of van Fraassen's remarks in "The Pragmatics of Explanation" are limited to scientific explanation, which raises the question of whether or not what van Fraassen says can be applied to a metaphysical theory like modal realism. Lewis-phenomena are not 'observable' in the same way as the observable entities dealt with by the physical and

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[135]In "Is the Best Good Enough?" Peter Lipton suggests another way in which IBE can be accommodated by van Fraassen's constructive empiricism. Lipton says that "[i]n its simplest form, the account [i.e. inference to the best explanation] claims that scientists judge that the theory which would, if correct, provide the best explanation of the available evidence is also the theory that is likeliest to be correct" (91). Contra van Fraassen, Lipton argues one may have a constructive empiricist version of IBE. To derive the latter, we must simply understand 'correct' (in the quote immediately above) as *empirically adequate*, and we must allow that false theories may explain. "I [Lipton] see no special barrier to the former, and van Fraassen's own account of explanation allows the latter" (91-2).

natural sciences. But, still, it might be argued that the notion of *empirical adequacy* does apply to modal realism in that the consequences of the latter 'fit' with our modal/counterfactual talk and judgements (though followers of Kripke would object in some cases).

But even if we deny that the notion of empirical adequacy, along with van Fraassen's views on explanation, are inapplicable to modal realism, we can, as suggested in my discussion of Cartwright, regard modal realism as a *descriptive* theory, as a theory which provides *descriptions* of Lewis-phenomena. In note 133, I suggested that we have intuitive understandings of what's possible and impossible, of which counterfactuals are true and which are false, and of what consequence relations govern these things. Similarly, we have certain intuitions about doxastic and epistemic states and properties. We may choose to measure the success of modal realism, in part, by how well it fits with our intuitions about Lewis-phenomena (where our intuitions are characterized by our knowledge of Lewis-phenomena uninfluenced by theories which provide explicit analyses of them — such as modal realism and Paradise on the Cheap). For example, we might consider modal realism to be successful because, among other things, it asserts that certain things we take to be possible are in fact possible (or so I shall *assume* since, really, modal realism says little if anything about specific modalised claims), accounts for why some people disagree about whether certain situations are possible or impossible (by appeal to certain counterpart and accessibility relations), and attributes to us the beliefs and knowledge which, intuitively, we take ourselves to possess. To so measure the success of modal realism, i.e., on the basis of how well it fits with our intuitions of

Lewis-phenomena, is to appeal to what I shall call modal realism's *descriptive adequacy.* According to van Fraassen, a theory's empirical adequacy gives us good, but not conclusive or rationally compelling, grounds for believing that it's true. We might say, then, that on account of its descriptive adequacy, we have the same kind of grounds for believing in modal realism.

And, just as van Fraassen insists that a claim of empirical adequacy doesn't amount to a claim of explanation, that there must be more to explanation, we may insist that an appeal to the descriptive adequacy of modal realism does not qualify as explanation. The analyses carried out in terms of modal realism constitute the theory's descriptive power. However, modal realism's descriptive power is not the same thing as its explanatory power; and only the former can give us good (though not conclusive or rationally settling) reason to think that the thesis of a plurality of worlds is true.

van Fraassen holds that explanation is a *three-term* relation — between theory, fact, and context — instead of just a two term relationship between fact and theory, like the one which pertains to descriptions. Some important features of his theory of explanation are summed up in the following passage:

> Being an explanation is essentially relative, for an explanation is an *answer*. ... Since an explanation is an answer, it is evaluated *vis-à-vis* a question, which is a request for information. But exactly what is requested, by means of the question "Why is it the case that *P*?", differs from context to context. In addition, the background theory plus data relative to which the question is evaluated, as arising or not arising, depends on the context. And even what part of that background information is to be used to evaluate how good the answer is, *qua* answer to that question, is a contextually determined factor. So to say that a given theory can be used to explain a certain fact, is always elliptic for: there is a proposition which is a telling answer, relative to this theory, to the request

> for information about certain facts (those counted as relevant for *this* question) that bears on a comparison between this fact which is the case, and certain (contextually specified) alternatives which are not the case (156).

So, according to van Fraassen's view, scientific explanation is an *application* of science, not pure science. (He stresses that calling an explanation 'scientific' says nothing about its form or the kind of information presented. Rather, the label 'scientific' indicates only that "the explanation draws on science to get this information (at least to some extent) and, more importantly, that the criteria of evaluation of how good an explanation is, are being applied using a scientific theory" (155-56).) Explanation, he says, is a use of science to satisfy certain *desires*; "and these desires are quite specific in a specific context, but they are always desires for descriptive information" (156). So, the precise content of such desires, and the evaluation of how well they're satisfied, varies from context to context. van Fraassen thus concludes that "there can be no question at all of explanatory power as such ... . Nor can there be any question of explanatory success as providing evidence for the truth of a theory that goes beyond the evidence we have for its providing an adequate description of the phenomena" (156-57). In all cases, the success of an explanation is just the success of an adequate and informative description. "And while it is true that we seek for explanation, the value of this search for science is that the search for explanation is *ipso facto* a search for empirically adequate, empirically strong theories" (157). But van Fraassen argues that, because a satisfactory explanation of a given phenomenon can differ from context to context, even two theories which are strictly empirically-equivalent "may differ in that one can be used to answer a given

request for an explanation while the other cannot" (154).

So, on van Fraassen's view, explanations *just are* descriptions, where the relevant descriptions are selected and evaluated by contextual factors. For example, a description of the circumstances surrounding an automobile accident may include the presence of shrubbery which obscured the driver's vision and the faultiness of the automobile's breaks. The factor(s) appealed to in an explanation of why the accident occurred depends on the context, on the interests of the person who requests the explanation:

> [t]he civic planner 'keeps fixed' the mechanical constitution of the car, and gives his answer in the conviction that regardless of the mechanical defects, which made a fast stop impossible, the accident need not have happened. The mechanic 'keeps fixed' the physical environment; despite the shrubbery obscuring vision, the accident need not have happened if the brakes had been better (van Fraassen, "Pragmatics" 126).

Furthermore, the interests of the person requesting the explanation will determine whether the descriptive factor identified is satisfactory. Likewise, the descriptive material cited in a modal-realistic explanation depends on the context in which the explanation is made, as does whether or not it's acceptable. For example, the appropriate explanation to give in response to "How is it possible that *a*?" will involve giving a description of either restricted or unrestricted quantification over possible worlds, depending on the context in which the request is made. So, because explanation doesn't assert anything beyond what is already asserted by a theory's descriptions (i.e., because the former simply 'rehashes' different parts of the latter, depending on context), van Fraassen concludes that explanation does not provide any reasons, over and above a theory's descriptive capabilities, to believe that the theory is true.

So far, so good. Though van Fraassen's arguments imply that modal realism's explanatory capabilities don't, on their own, give us reason to believe in the theory's truth, they at least allow that, regardless, Lewis may use IBE. In "'World' is Not a Count Noun," van Fraassen makes no such allowances. In this article, van Fraassen criticizes the view that theory choice as practised by philosophers is legitimate and authoritative provided that it parallels science in regard to the criteria for theory choice. According to the latter view, scientists infer to (or at least accept) the best explanation, i.e., they weigh all the virtues and limitations of rival theories and believe the best of these to be true — philosophers are to be regarded as scientific and rational if they, like scientists, believe the *best* ontology to be true. In response to this position, van Fraassen points out that "'best' [in philosophy] does not refer to more accurate empirical predictions or control of nature but to theoretical virtues alone: answering philosophical questions, solving conundrums, resolving paradoxes" (146). Moreover, van Fraassen brings to light some important differences between philosophy and science in the following passage:

> The legitimacy of audacious postulation in science derives exactly from what is at stake in science but not in philosophy. The gleam in the scientists' eyes is the prediction and control of nature ... . If scientists come to believe a new postulate, then one of the bad consequences that may happen is that they contract a false belief. But the disvalue of that consequence pales into insignificance beside the values and disvalues of other possible consequences.
>
> Is it so with philosophy? Adoption of an ampliative method of audacious postulation in ontology may or may not lead to good philosophical theories, whatever 'good' in this context means. It comes most certainly with the risk — a risk not easily assessed — of giving us false beliefs about what there is. Are these risks outweighed somehow? ... As far as I can see, benefits we can hope to gain from metaphysics-played-well pale into insignificance beside the disvalue (small as it may be from a practical

> standpoint!) of falsely believing in the existence of unreal entities dreamt of only in our philosophy ("Count Noun" 147).

Evidently, then, van Fraassen believes that there is so little contact between philosophical theories and the world that IBE is not a legitimate method by which to choose among the former. To van Fraassen, there is no good reason to suppose that the accomplishments of philosophical theories — i.e., answering questions, resolving paradoxes, and solving conundrums — are broadly indicative of truth. Assuming that he's correct here, and given that philosophical theories are judged to be best explanations on the basis of how well they achieve their goals, it follows that the standards we use to judge best explanations in regard to philosophical theories have nothing to do with whether these theories are true. On the other hand, scientific theories are linked-up to the world in significant ways, and judgements as to which of these theories is a best explanation will be based on how well they foster the prediction and control of nature. Therefore, according to van Fraassen, a mode of theory-choice in ontology which is *of the same form* as a mode of theory-choice in science does not have the same status as the latter. Hence, "'World' is Not a Count Noun" leaves us with two conclusions concerning metaphysical theories like modal realism. First, the fact that modal realism constitutes the best explanation of Lewis-phenomena (assuming that it does), does not give us reason to believe that it's true. Second, even if IBE is a mode of theory-choice which we may legitimately pursue in science (in some circumstances) — i.e., if the goals of science set the standards of IBE — IBE is never a legitimate strategy to pursue in ontology. This being the case, IBE is unavailable to Lewis from van Fraassen's point of view.

Overall, then, it has been shown that Lewis doesn't fare very well when it comes to the standards of inference to the best explanation. The main reason for modal realism's poor success in the present regard is easily identifiable: the entities it deals with are, for the most part, completely causally and nomologically isolated from ρ. There's simply not enough contact between the entities of modal realism and the actual world. In contrast, the items whose existence is posited in Paradise on the Cheap are obviously not so isolated (save maybe the second-order schematic structures and similarity-projection sets; but perhaps we can avoid such isolation by naturalizing the ontology of these phenomena). Still, in its present state of articulation, Paradise on the Cheap is scarcely more amenable to the standards of IBE than modal realism. Paradise on the Cheap does not attempt to subsume Lewis-phenomena under laws of nature, nor does it cite causes for Lewis-phenomena. Furthermore, though Paradise on the Cheap enjoys a much greater degree of connection with ρ than modal realism does, the former's analyses have no relevance to prediction and control of the natural/physical world. Therefore, the goal of Paradise on the Cheap, which is to unify our analyses of modality, counterfactuals, content, and properties in an economical fashion, does not coincide with the goals which van Fraassen specifies for science. So, neither modal realism nor Paradise on the Cheap can, according to van Fraassen, take advantage of any of the forms of IBE available to science.

Nevertheless, the fact that the entities with which Paradise on the Cheap is concerned are, at least in large part, among the features of ρ gives us reason to think that Paradise on the Cheap can perhaps be transformed into a more scientific theory. In other

words, maybe the entities dealt with by Paradise on the Cheap — such as recombinations, schematic structures, and similarities — can be organized into a nomological structure. For example, we might assert psychological laws to the effect that people at least implicitly engage in imaginative recombinations and that it is through reasoning about these recombinations, and judging their similarity (or dissimilarity) to actual states of affairs, that they deem that certain states of affairs are possible, others impossible, that certain counterfactuals are true, and others false. Thus, we might be able to reconcile Paradise on the Cheap with a *mechanistic* account of explanation like Hempel and Oppenheim's D-N model. Perhaps Paradise on the Cheap could even be unified with other scientific theories and, in this way, play a role in the prediction and control of the natural/physical world. This being the case, any IBE standards which van Fraassen deems legitimate for scientific theories would also be legitimate for Paradise on the Cheap. All of this speculation about what Paradise on the Cheap could be made into is very interesting; but it's material for another project.

For now, I'll leave the metaphysician to her free meal.

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