Imagining Possibilities[1]

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This paper argues that the imaginability of propositions of a certain kind under certain special circumstances implies their possibility. It then attempts to use that conclusion in doing some modal epistemology. In particular, the paper argues that the conclusion justifies some ascriptions of possibility and that it promises to justify some ascriptions of impossibility.

1. Introduction

We know a lot about what is possible.[2] How do we come by such knowledge? Some of it is formed like this: we try to imagine that something holds; we find that we can imagine that it does; and we infer that it is possible. For instance, my belief that there might have been butterflies with golden wings was formed like that.

Modal arguments within philosophy often derive their power from our imaginative abilities. Consider conceptual analysis. When philosophers offer analyses, we may seek to refute them by showing that the *analysans* and *analysandum* can come apart. And the most convincing such attempts are ones where we describe suitable circumstances which we can clearly imagine. For when we can clearly imagine the described circumstances, we tend to think that they are possible.

Although many of our beliefs about what is possible rest upon our imaginative abilities, imaginability does not imply possibility. Consider the children's story about a competition between the sun and the wind, in which each tries to get an unwary man's coat off his back. When we hear that story,

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[2]   A standard caveat: throughout this paper, I am only concerned with metaphysical possibility and necessity.

we imagine each of the sun and the wind doing their best to beat the other—an impossible competition.

We all accept that imaginability is some sort of guide to possibility but it is far from clear how to explain the connections between them. Worse, it is not clear what connections need explaining. For as we've seen, imaginability alone does not imply possibility. So how are they linked?

This paper offers an answer to that descriptive question. I defend a thesis stating that the imaginability of propositions of a certain kind under certain special circumstances implies their possibility. I also seek to identify ways of putting my conclusions to practical use. There are definite limits to my aims, however: I make no attempt to explain whatever connections exist between imaginability and possibility.

As well as inferring possibility from imaginability, we tend to infer impossibility from unimaginability. Towards the end of this paper, I argue that my earlier conclusions regarding the connections between imaginability and possibility promise to justify many inferences from unimaginability to impossibility. It is an interesting open question whether the promise can be kept, however, for reasons described later.

The structure of the rest of the paper is as follows. First, there is a discussion of the imagination and of certain imaginative phenomena which will be central to my subsequent arguments. Then §3 formulates two equivalent principles connecting imaginability and possibility. §§3.1–5, the heart of the paper, defend one of the principles.

§4 explores ways of putting the principles formulated in §3 to practical use in modal reasoning. §5 considers inferences from unimaginability to impossibility in the light of the arguments of §§3.1–5. The paper closes with §6, which identifies an important class of philosophical arguments which rely upon inferences from imaginability to possibility but which cannot be supported using this paper's conclusions.

The arguments contained in §§3.1–5, the sections which defend an account of some connections between imaginability and possibility, rest upon seemingly empirical claims about our imaginative abilities. Those arguments can, accordingly, be buffeted with empirical weapons. Their vulnerability seems inevitable. For it is hard to see how arguments for connections between imaginability and possibility can proceed without relying at some point upon substantive claims about the workings of our imaginations. The following section introduces some ideas which are central to the assumptions which assume prominence in §§3.1–5.

2. The imagination

Here are some paradigmatic cases of imagining: mentally rehearsing realisations of narratives, as when one imagines Humpty-Dumpty sitting on a wall

then having a great fall; daydreaming about wide open spaces; and running through mental imagery, as when one conjures up an image of an equilateral triangle resting upon one of its sides and rotates it by 60°.

While mental images are often an important component of imaginative acts, such acts rarely consist solely of qualitative representations of visual phenomena (images of red blobs and the like). Consider, for instance, what happens when you picture yourself being trampled by a cow. You do not merely conjure up a tableau in which something looking much like you is trodden on by something looking much like a cow. Rather, the scene is one in which you—not merely something looking like you—are under the feet of a cow—and not merely something looking much like a cow.

Imagining is to be distinguished from mere supposing. We can suppose for the sake of argument that almost anything obtains. We cannot imagine as much. For instance, I can suppose that Bob is both dead and not dead, but I cannot imagine that he is.

As the preceding comments should make clear, this paper is not drawing upon a sophisticated theory of the imagination. The relatively primitive state in which this leaves one of its central notions is, I think, unproblematic. Philosophers have freely employed other ordinary mental notions, like belief, in their discussions, and our everyday understanding of the imagination seems secure enough for it to play a similarly important role.

I shall now illustrate some phenomena which are central to the subsequent discussion. Janet works alongside Clark Kent. She idly imagines Clark being outlived by Superman. She later makes the supposition that Clark is actually Superman. If she were bearing her later supposition in mind, could she then imagine Clark being outlived by Superman?

Surely not. For suppose that Janet is bearing in mind her supposition that Clark is actually Superman. Then her supposition has, I claim, the following effect: if she imagines Clark being outlived by Superman, she thereby imagines Clark being outlived by himself. But the latter circumstance isn't imaginable. This example illustrates how suppositions about what is actually the case can affect our imaginative abilities.[3] In what follows, claims about what we can do while 'bearing suppositions in mind' are expressed by talk about what we can do 'under' those suppositions.

The preceding example also illustrates how sometimes, if one imagines something, one thereby imagines something else. Here is another example of that phenomenon. Make the supposition that Clark Kent is actually Superman. Under your supposition, imagine Superman capturing Jack the Ripper.

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[3] Yablo remarks similar phenomena when he writes: "[r]emember that the Ancients found it conceivable that Hesperus should outlast Phosphorus only because they took it that Hesperus and Phosphorus were distinct" (Yablo (1993), p. 33; see also footnotes 48 and 76 of Yablo's paper).

Then, I claim, you thereby imagined Clark capturing Jack the Ripper, because your imaginative act was under your earlier supposition.

I assume that when someone imagines that P, and thereby imagines that Q, they do not merely "imagine that Q" in some nonstandard sense. This assumption is essential to certain arguments below. For some of those arguments take the following form: we could never imagine that Q; but if we were to make the supposition that R actually holds, then if we were to imagine that P under that supposition, we would thereby imagine that Q; so we cannot imagine that P, under the supposition that R actually holds.[4]

The reader will later be asked to make many more suppositions about what is actually the case. It is important that those requests are understood correctly. For instance, make the supposition that pigs do not actually fly. Under that supposition, can you imagine that pigs fly?

Someone might answer that question negatively, on the grounds that she cannot imagine that pigs both do and do not fly. But that would be a mistake. Her supposition is meant merely to be that, *in the actual situation*, pigs do not fly. And the question about her imaginative abilities under that supposition should be construed as asking whether she can imagine a situation—whether actual or nonactual—in which pigs fly.

3. Two principles

Here is the first of the principles argued for below:

> (1) Each unshakeably imaginable and accessible nonmodal proposition is possible.

That principle is equivalent to the following one:

> (2) No impossible and accessible nonmodal proposition is unshakeably imaginable.

What do those principles say? What is it for a proposition to be 'accessible' or 'unshakeably imaginable'?

Consider the proposition that Surtees admired St Bernard. We do not, I assume, know whether that proposition is true or false. And it may be that we will never be able to know whether it is true or false, because we will never have evidence which settles the matter decisively.

But it is surely clear that, had we been appropriately situated, we could have known whether Surtees admired St Bernard. For instance, somebody might have put the question to Surtees, whose reply might then have been

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4   Indeed, the illustration just given of how suppositions about what is actually the case can affect our imaginative abilities relied upon an argument of that form.

recorded for posterity; and we might eventually have unearthed a report of the exchange.

Those propositions are *accessible* which are such that we could have known their truth-values, had we been appropriately situated. Here are some more accessible propositions: that Hesperus is Mars; that Henry James was Jack the Ripper; that there were 50,000 hairs on the head of Samson at the moment of his death; and that 10+10=20.

Next, some words on what it is for a proposition to be 'unshakeably imaginable'. We saw in §2 that suppositions about what *is actually the case* can affect our imaginative abilities. We saw, in particular, that suppositions about what is actually the case can cause us to lose imaginative abilities.

Some suppositions about what is actually the case are suppositions of propositions which are actually true. Such suppositions about what is actually the case are said below to be *correct*.[5] A proposition P is, then, *unshakeably imaginable* just in case it satisfies the following condition:

> (3) P is imaginable and for every correct accessible and nonmodal supposition about what is actually the case, we would be able to imagine that P under that supposition.

The basic idea behind the notion of unshakeable imaginability is simple. Unshakeably imaginable propositions are imaginable and would remain so under any correct nonmodal and accessible suppositions about what is actually the case. The next five sections defend (2), and thereby also defend its equivalent (1).

3.1 Some kinds of accessible impossibilities

An accessible (nonmodal) impossibility is an impossible (nonmodal) proposition which we could have known to be false, had we been appropriately situated. Plausible counterexamples to (2) would be plausible examples of accessible impossibilities which are unshakeably imaginable. Where might one hope to find such things?

Consider the class of *simple a posteriori refutable impossibilities*—the simplest cases of propositions which are impossible, and which we could have known to be false, had we been appropriately situated, but only through a posteriori means. The proposition that Venus is Mars is a good example of a simple a posteriori refutable impossibility. People have, though, been able

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[5] More precisely, for any possible circumstance, a supposition that P is actually the case which is made in that circumstance is correct just in case P is actually—that is, in *our* situation—the case (regardless of whether P holds in the relevant possible circumstance). For instance, it is necessary that one who supposes that Hume was actually Scottish makes a correct supposition—even though that supposition can be made in possible circumstances in which Hume was not Scottish.

to imagine that Venus is Mars. More generally, simple a posteriori refutable impossibilities provide obvious problems for those hoping to argue for a tight connection between imaginability and possibility.[6] It might be thought that some of the plausible examples of such impossibilities will be counterexamples to (2).

There are also many credible examples of *a priori impossibilities*— propositions whose impossibility could become apparent to us through a priori means, were we appropriately situated (for instance, if we had suitable concepts). Thus consider the proposition that 100+100=201, or the proposition that some barber shaves precisely those barbers who are not self-shavers. It is far from clear that all of the plausible examples of a priori impossibilities are unimaginable. And it might be suspected that plausible counterexamples to (2) will be forthcoming from among them.

Finally, a little a priori reasoning can be used to generate many further good examples of impossibilities from plausible examples of simple a posteriori refutable impossibilities and, perhaps, plausible examples of a priori impossibilities. For instance, the proposition that Venus is Mars or some barber shaves all and only those barbers who are not self-shavers is impossible because Venus cannot be Mars and no barber can shave precisely those barbers who do not shave themselves. And the proposition that Venus is Mars and the actual standard metre rod is longer than a metre is also impossible because Venus cannot be Mars (the conjunction's impossibility is a posteriori even though its falsity is a priori). One might naturally wonder whether some plausible counterexamples to (2) are to be found among cases like the ones just listed.

To prove (2) outright, I would need to demonstrate that there are no counterexamples to (2). Unfortunately, but predictably, I have no such demonstration to offer. My defence of (2) instead proceeds as follows. First, I argue that (2) will be confirmed by each credible example of a proposition falling within one of the kinds of accessible impossibilities just identified. My arguments fail to establish that *every* accessible impossibility chimes with (2). But, I shall argue, they nonetheless show that (2) is a reasonable thing to believe. The following section considers the simple a posteriori refutable impossibilities.

3.2 Simple a posteriori refutable impossibilities

The plausible examples of simple a posteriori refutable impossibilities are of two broad kinds. First, there are ones generated by the noncontingency of identities involving rigid designators. The proposition that Venus is Mars is such an impossibility, as is the proposition that Venus is not Hesperus.

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[6]   They led Putnam to conclude to "human intuition has no privileged access to metaphysical possibility" (Putnam (1975), p. 233).

Other enticing examples of simple a posteriori refutable impossibilities are generated by essentialism. Thus consider, for instance, the propositions that the sun is made from toenails and that Kant is nonhuman.

It seems unlikely that anything will reasonably be regarded as being *both* of one of the two kinds of propositions just described *and* unshakeably imaginable. That is, it seems unlikely that anyone will make a good case that some of the simple a posteriori refutable impossibilities contradict (2). For the phenomena which are usually cited in support of the claim that some proposition is a simple a posteriori refutable impossibility undermine the claim that the proposition is also unshakeably imaginable.

Thus consider the proposition that Venus is Mars. That proposition is impossible—it is false and 'Venus' and 'Mars' are rigid designators. We know through empirical investigation that Venus is not Mars. But why think that, say, 'Venus' is a rigid designator? Some of our reasons have to do, I think, with facts about our imaginative responses.

For instance, imagine that Venus has some given property. Then we thereby imagine that whatever is actually Venus has the relevant property. And so, we infer, if Venus is anything, it must be whatever is actually Venus; and hence 'Venus' can only refer to whatever is actually Venus. Similarly, if we imagine that Mars has some given property, we thereby imagine that whatever is actually Mars has the relevant property.

These phenomena are related to the ones which Kripke remarks when he writes that not "only is it true *of* the man Aristotle that he might not have gone into pedagogy; it is also true that we use the term 'Aristotle' in such a way that, in thinking of a counterfactual situation in which Aristotle didn't go into any of the fields and do any of the achievements we commonly attribute to him, still we would say that was a situation in which *Aristotle* did not do these things."[7]

The preceding observations can be used to show that the proposition that Venus is Mars is not unshakeably imaginable and hence confirms (2). Make the correct and accessible supposition that Venus is not actually Mars. Under that supposition, can we imagine that Venus is Mars? Well, as we just saw, if we *were* to imagine that, we would thereby imagine that whatever is actually Venus is Mars.

But, again as we just saw, if we were to imagine that whatever is actually Venus is Mars, we would thereby imagine that whatever is actually Venus is whatever is actually Mars. But for us, supposing as we do that Venus is not actually Mars, that is a manifest repugnancy. So we cannot imagine that Venus is Mars, because we suppose that Venus is actually not Mars.

There is, then, a correct and accessible nonmodal supposition—that Venus is actually not Mars—such that under that supposition we would be unable to

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[7] Kripke (1980), p. 62.

imagine that Venus is Mars. The proposition that Venus is Mars is, there-fore, not unshakeably imaginable.

Here is another example. The proposition that Venus is actually not Hes-perus is a simple a posteriori refutable impossibility. The proposition's impossibility is generated from the noncontingency of accessible identities involving rigid designators. Now consider the correct and accessible nonmodal supposition that Venus is actually Hesperus. Under that supposition, can we imagine that Venus is not Hesperus?

We cannot. For to do so under our supposition we would have to imagine that whatever is actually Venus is not Hesperus. But to imagine *that* under our supposition, we would have to imagine that whatever is actually Venus is not whatever is actually Hesperus. And we cannot, under our supposition, imagine that whatever is actually Venus is not whatever is actually Hesperus.

There is, therefore, a correct and accessible nonmodal supposition—that Venus is actually Hesperus—such that under that supposition we would be unable to imagine that Venus is not Hesperus. Hence the proposition that Venus is not Hesperus is not unshakeably imaginable, as (2) claims.

We have just considered two good examples of simple a posteriori refut-able impossibilities whose impossibility is owed to the noncontingency of accessible identities involving rigid designators. Each of them chimes with (2). Similar arguments can be used to show, I think, that (2) will be con-firmed by each plausible example of a simple a posteriori refutable impossi-bility whose modal status is owed to the noncontingency of identities involv-ing rigid designators.

What of the other plausible examples of simple a posteriori refutable impossibilities, those generated by essential truths? We need to consider the kind of reasons that people have for thinking that those examples are impos-sible. Some of the most forceful such reasons are intuitive. For instance, here is why Kripke thinks that tables cannot be made from stuff which is entirely distinct from what they are actually made from:

... though *we can imagine* making a table out of another block of wood or even from ice, iden-tical in appearance with [the relevant table], and though we could have put it in this very posi-tion in the room, it seems to me that this is *not* to imagine *this* table as made of [another block of wood] or ice, but rather it is to imagine another table, *resembling* this one in all external details, made of another block of wood, or even ice.[8]

According to Kripke, if we were to suppose, for instance, that some given wood is entirely distinct from the wood from which this table is actually made, we would be unable to imagine the table being made from that wood. More generally, we accept that a property cannot be had by a thing only if we

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8 Kripke (1980), p. 114; first bit of emphasis added.

would be unable to imagine the thing having that property under the supposition that the thing actually does not have it.

The plausible examples of simple a posteriori refutable impossibilities generated by essential truths aren't, therefore, going to provide (2) with any problems. For instance, the sun could not be made of toenails. Now make the correct and accessible nonmodal supposition that the sun is actually not made of toenails. Under that supposition, we cannot imagine that the sun is made from toenails—and so the putative accessible impossibility that the sun is made from toenails is not unshakeably imaginable, as (2) claims.

Another example. Kant was, it is plausible to claim, essentially human. Make the correct and accessible nonmodal supposition that Kant was actually human. Under that supposition, we cannot imagine that Kant was nonhuman. So the proposition that Kant is nonhuman, a plausible example of a simple a posteriori refutable impossibility generated by an essential truth, is not unshakeably imaginable.

Putting together the above remarks on the plausible instances of simple a posteriori refutable impossibilities, we get that nothing will plausibly be viewed as a simple a posteriori refutable impossibility which is unshakeably imaginable. We get, that is, that (2) will be confirmed by each credible example of a simple a posteriori refutable impossibility. The next section considers a priori impossibilities.

3.3 A priori impossibilities

The proposition that Bob is a nonmale bachelor is clearly an a priori impossibility. That proposition chimes with (2) if it is not unshakeably imaginable. And, like all of the really obvious a priori impossibilities, it is not unshakeably imaginable—for it isn't imaginable. But besides such easy cases, there are harder ones, namely, examples of a priori impossibilities in which some fairly complex reasoning is needed to show that they are impossible.

Consider, for instance, the proposition that some barber shaves precisely those barbers who are not self-shavers. That proposition is impossible, as the following argument shows:

(4) No barber both shaves and does not shave himself, but any barber either shaves or does not shave himself. So if some barber shaves precisely those barbers who are not self-shavers, he either shaves or does not shave himself. But if such a barber shaves himself, he does not shave himself—so if there is such a barber, he does not shave himself. And if such a barber does not shave himself, he shaves himself—so if there is such a barber, he shaves himself. If there is such a barber, therefore, he both shaves and does not shave himself.

So there is no such barber, i.e. no barber shaves precisely those bar-
bers who are not self-shavers.

I'll now argue that the proposition that some barber shaves precisely those
barbers who are not self-shavers isn't unshakeably imaginable. My arguments
generalise to arguments that no plausible examples of a priori impossibilities
will be unshakeably imaginable.

Suppose that there is actually an argument that no barber shaves precisely
those barbers who are not self-shavers which uses argument (4)'s premises
and inferences. Then, under that correct nonmodal and accessible supposition,
we cannot imagine that some barber shaves precisely those barbers who are
not self-shavers. For under our supposition, we can only imagine that some
barber shaves precisely those barbers who are not self-shavers by imagining
that either one of the premises of argument (4) is false or one of the infer-
ences used in that argument leads from truth to falsity.[9] And we could never
imagine that. So the proposition that some barber shaves precisely those
barbers who are not self-shavers is not unshakeably imaginable, which fits
with (2).

In the case just considered, it was argued that a compelling example of an
a priori impossibility is not unshakeably imaginable because correct nonmo-
dal and accessible suppositions about *what arguments there are* will prevent
us from being able to imagine the relevant impossibility. That move forms
the basis of my way of arguing that each plausible example of an a priori
impossibility will conform to (2).[10]

Argument (4), which demonstrates that there cannot be a barber who
shaves precisely those barbers who are not self-shavers, starts from nonmodal
premises whose truth is a priori obvious and uses nonmodal inferences (that

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[9] That is, under our supposition and where the *P*s are the premises of argument (4) while
the *I*s are its inferences, we can only imagine that some barber shaves precisely those
barbers who are not self-shavers by imagining that either one of the *P*s is false or one of
the *I*s leads from truth to falsity. Similarly wide-scope readings should be employed for
all of sentences below which are like the one in the text.

[10] I am, obviously, assuming a Platonic view of arguments. Others will reject such a view
and will instead prefer to construe "there is a convincing demonstration that such-and-
such" as stating that arguments of a certain kind are *constructible*. If such a view is
taken, the consequence of (8) relied upon in my argument (see below) is modal, and so a
supposition that it is actually the case cannot be used to show that *P* is not unshakeably
imaginable. For *P* is not unshakeably imaginable only if it is either not imaginable or some
correct and accessible *nonmodal* supposition would prevent us from being able to imag-
ine that *P*. If the Platonic view of arguments assumed here is incorrect, however, and my
arguments fail to defend (2), they may still be used to defend the claim that every non-
modal impossibility *P* is such that either (a) we cannot imagine that *P* or (b) there are
either correct and accessible nonmodal suppositions *or suppositions about what arguments
are constructible* such that, under those suppositions, we would not be able to imagine that
P. That result would be interesting; and it could, I think, be used instead of (2) in the sub-
sequent parts of this paper.

is, inferences from nonmodal premises to nonmodal conclusions) such that it is a priori obvious that they will not lead from truth to falsity. Or, as we can put it, the argument is a *convincing demonstration*.

Now consider the following convincing demonstrations:

(5) Grass is green iff grass is actually green. Hence it is not the case that grass is not green and grass is actually green.

(6) There are two apples only if there are two apples. So *if* there are two apples only if there are two apples, *then* grass is green iff grass is actually green.

We do not think that (5) demonstrates that the denial of its conclusion is impossible. Similarly, we do not think that (6) demonstrates that the denial of its conclusion is impossible. (5) and (6) thus contrast with (4). Wherefore the contrast?

Argument (4) has an interesting feature which is not shared by arguments (5) and (6): we could never imagine that one of (4)'s premises is false or one of the inferences employed in the argument leads from truth to falsity. We can, though, imagine that (5)'s premiss fails by imagining that grass is not green although grass is actually green. And we can imagine that (6)'s inference leads from truth to falsity, by imagining both that there are two apples only if there are two apples and that grass is not green although grass is actually green.

Generalising from the contrast just remarked we get the following principle:

(7) We regard a convincing demonstration as demonstrating that the denial of its conclusion is impossible only if we could never imagine that either one of the demonstration's premises fails or one of *its inferences leads from truth to falsity.*

(7) seems like an accurate description of our responses—at least, I can only identify examples which agree with it.

Our a priori nonmodal knowledge is built upon convincing demonstrations: it starts from a priori obvious nonmodal truths and moves forward using a priori obviously acceptable nonmodal inferences. And our a priori beliefs about impossibility are built upon convincing demonstrations which, like (4), we regard as demonstrating impossibilities. Hence a proposition will be a plausible example of an a priori impossibility only if a convincing demonstration of the proposition's falsity is available to us, which we regard as

demonstrating its impossibility.[11] That observation combines with (7) to yield the following:

> (8) For each plausible example of an a priori impossibility P, a convincing demonstration that not-P is available to us such that we could never imagine that either one of the demonstration's premises fails or one of its inferences leads from truth to falsity.

Like (7), (8) seems reasonable.

To conclude this section, I need a rather complex principle whose essence is very simple. For each plausible example of an a priori impossibility P, (8) says that there is available to us a convincing demonstration of a special kind having not-P as its conclusion. The next principle formulated ensures that, for each such P, we cannot imagine that P under the correct nonmodal and accessible supposition that a given one of the demonstrations generated by (8) exists. It follows that P is not unshakeably imaginable. We met an instance of the principle earlier on, when I argued that the proposition that some barber shaves precisely those barbers who are not self-shavers is not unshakeably imaginable.

Take some proposition—for instance, the proposition that no barber shaves precisely those barbers who are not self-shavers. Now take some premises and inferences which meet the following conditions—the premises and inferences used in argument (4) will do. First, the premises are a priori obvious. Second, it is a priori obvious that the inferences will not lead from truth to falsity. And third, we could never imagine that either one of the chosen premises fails or one of the chosen inferences leads from truth to falsity.

Next, make the supposition that there is actually an argument for the denial of our proposition, the proposition that no barber shaves precisely those barbers who are not self-shavers, whose premises and inferences are the ones just identified. That supposition is correct—for argument (4) is just such an argument. Under our supposition, can we imagine that some barber shaves precisely those barbers who are not self-shavers?

We saw earlier that under our supposition, we can only imagine that some barber shaves precisely those barbers who are not self-shavers by imagining that either one of the premises of argument (4) is false or one of that argument's inferences leads from truth to falsity. But we could never imagine that. So under our supposition, we cannot imagine that some barber shaves precisely those barbers who are not self-shavers.

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[11]   The 'availability to us' of convincing demonstrations needs to be interpreted fairly generously, to allow for such phenomena as the use of computers in generating mathematical results. In fact, it is enough for what follows that a proof P that Q is available to us just in case it is an accessible fact that there is a proof that Q using P's premises and inferences.

Generalising from that case gives the following principle:

(9) Let the *Q*s be some a priori obviously true propositions and the *I*s be some inferences which it is a priori obvious will not lead from truth to falsity. And let the *Q*s and *I*s be such that we could never imagine that either one of the *Q*s is false or one of the *I*s leads from truth to falsity. Then under the supposition that there is actually an argument that not-*P* whose premises are the *Q*s and whose inferences are the *I*s, we cannot imagine that *P*.

I can finally formulate an argument that each plausible example of an a priori impossibility will conform to (2). Suppose, then, that *P* is reasonably regarded as being an a priori impossibility. By (8), it is an accessible fact that there is a convincing demonstration that not-*P*, whose premises and inferences are such that we cannot imagine that either one of the premises fails or one of the inferences leads from truth to falsity.

But by (9), there is thus an accessible nonmodal fact—to wit, the consequence of (8) just stated—such that, were we to suppose that fact actually to hold, we would be unable to imagine that *P*. And so *P* is not unshakeably imaginable. Generalising, we get that each credible example of an a priori impossibility will agree with (2).[12] The next section completes the main part of my defence of (2) by considering the final source of putative counterexamples mooted earlier, the class of propositions whose impossibility follows from that of simple a posteriori refutable impossibilities and, perhaps, a priori impossibilities.

3.4 Other cases

The following argument shows us that it is impossible that either Venus is Mars or some barber shaves all and only those barbers who are not self-shavers:

(10) No barber shaves precisely those barbers who are not self-shavers; Venus is not Mars; therefore it is not the case that either Venus is Mars or some barber shaves precisely those barbers who are not self-shavers.

And the following argument shows us that the proposition that Venus is Mars and the actual standard metre rod is longer than a metre is impossible:

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[12] The preceding arguments allow me to deal with a class of cases which have plagued those who want to use the imagination in modal epistemology, namely the impossible situations represented in pictures like some of those owed to Escher. (For instance, Tidman (1994) cites—correctly, I think—some of Escher's drawings as showing that imaginability does not imply possibility.)

Venus is not Mars; so it is not the case that both Venus is Mars and the actual standard metre rod is longer than a metre.

In both of the cases just identified, then, our acknowledgement of impossibility is based upon the availability of an argument meeting the following conditions:

(11) Each of the argument's premisses is a plausible example of the denial of either a simple a posteriori refutable impossibility or an a priori impossibility. The argument only uses nonmodal inferences which it is a priori obvious will not lead from truth to falsity, and which we could never imagine leading from truth to falsity.

Does the point generalise? That is, suppose that we regard a proposition's impossibility as following from that of simple a posteriori refutable impossibilities and, perhaps, a priori impossibilities. Will it follow that an argument meeting the conditions stated in (11) is available to us?

As far as I can tell, that is indeed the pattern taken by our attitudes towards putative impossibilities of the kind currently being considered. Thus consider some proposition which is, we think, neither a simple a posteriori refutable impossibility nor an a priori impossibility—for instance, the proposition that every small village is quaint. Now suppose—what holds, I take it, of the proposition just suggested—that no argument for the denial of the chosen proposition is available to us which meets the conditions stated in (11). Then we surely would *not* be inclined to regard the chosen proposition as impossible, because we cannot track its impossibility down to a convincing source.

Reconsider the proposition that either Venus is Mars or some barber shaves precisely those barbers who are not self-shavers. Let's make the supposition that there is an argument for the denial of that proposition whose premisses and inferences are those of argument (10). That nonmodal and accessible supposition is correct, as (10) is just such an argument. Under our supposition, can we imagine that either Venus is Mars or some barber shaves precisely those barbers who are not self-shavers?

Well, it is a priori obvious that (10)'s inference will not lead from truth to falsity. And we could never imagine that inference leading from truth to falsity. Our supposition thus has the consequence that we can only imagine that either Venus is Mars or some barber shaves precisely those barbers who are not self-shavers by imagining that one of (10)'s premisses ('no barber shaves precisely those barbers who are not self-shavers' and 'Venus is not Mars') fails.

Next, make the correct and accessible nonmodal supposition that there is actually an argument that no barber shaves exactly the barbers who are not self-shavers which uses argument (4)'s premisses and inferences. We saw in the last section that under that supposition, we cannot imagine that (10)'s

first premiss ('no barber shaves precisely those barbers who are not self-shavers') fails. That additional supposition thus combines with our earlier supposition, with the consequence that we can only imagine that either Venus is Mars or some barber shaves precisely those barbers who are not self-shavers holds by imagining that (10)'s second premiss ('Venus is not Mars') fails.

Finally, make the correct and accessible nonmodal supposition that Venus is actually not Mars. Then as we saw earlier, under that supposition we cannot imagine that (10)'s second premiss fails. Our most recent correct and accessible nonmodal supposition hence combines with our previous two correct and accessible nonmodal suppositions, and their net effect is that we cannot imagine that either Venus is Mars or some barber shaves precisely those barbers who are not self-shavers. So the proposition that either Venus is Mars or some barber shaves precisely those barbers who are not self-shavers is not unshakeably imaginable.

The preceding discussion evidently shrouds a general strategy for dealing with the kind of cases being considered in this section. The strategy, laid bare, goes like this. Let P be a plausible example of a proposition whose impossibility is owed to that of some a posteriori refutable impossibilities and, perhaps, some a priori impossibilities. Then, as we saw above, there will be available to us an argument that not-P meeting the following two conditions, specified by (11). First, each of the argument's premisses—the Qs—is a plausible example of the denial of either a simple a posteriori refutable impossibility or an a priori impossibility. And second, it is a priori obvious that each of the argument's inferences—the Is—will not lead from truth to falsity, and we could never imagine that one of the Is leads from truth to falsity.

A correct and accessible nonmodal supposition is thus to hand, *viz.* the supposition that there is actually an argument that not-P whose premisses are the Qs and whose inferences are the Is. But it is a priori obvious that none of the Is will lead from truth to falsity, and we could never imagine that one of them leads from truth to falsity. So under the supposition just identified we can only imagine that P by imagining that one of the Qs fails.

But there are additional correct and accessible nonmodal suppositions about what is actually the case which will prevent us from being able to imagine that one of the Qs fails. For each of the Qs is the denial of a plausible example of either a simple a posteriori refutable impossibility or an a priori impossibility. And we saw in the previous two sections that no plausible example of either a simple a posteriori refutable impossibility or an a priori impossibility is unshakeably imaginable.

The above paragraphs have identified a range of correct and accessible nonmodal suppositions about what is actually the case. If we were to make

all of those suppositions at once, we would be unable to imagine that *P*. That is, *P* is not unshakeably imaginable. The preceding strategy thus justifies a general conclusion: no unshakeably imaginable proposition will be a plausible example of a proposition whose impossibility is owed to that of simple *a posteriori refutable* impossibilities and, perhaps, a priori impossibilities. That is, each plausible example of an impossibility of the kind just specified will conform to (2).

3.5 The final step

The last three sections have considered the most likely sources of credible counterexamples to (2). Their outcome is that no plausible counterexamples to (2) will be found, as each credible example of an accessible impossibility will accord with (2). But that conclusion does not state there are *no* counterexamples to (2). The above sections thus fail to establish that (2) is true. Have my efforts been in vain?

Proof is one thing, credibility another. My intention is merely to argue that (2) is a reasonable thing to believe. And I think that the above sections have supported that conclusion. Thus consider our current situation. On the one hand, we have a thesis stating that no *F* is *G*. And on the other hand, we have the conclusion that each plausible example of an *F* will be not-*G*. In those circumstances, why should Reason boggle at our choosing to believe that no *F* is *G*?

She might cry foul if our beliefs about which things are plausible examples of *F*s were grossly inappropriate. But we cannot, I take it, easily entertain the view that our ascriptions of impossibility are helplessly added. Many of those ascriptions seem as certain as any of the judgments which we make. Hence we can hardly be blamed for standing by our putatively impossible propositions.

Of course, my defence of (2) will be spurned by those who relentlessly doubt that we can have any modal knowledge. For they will be relaxed with the idea that our putatively impossible propositions may really be possible. But that needn't faze those of us who are made of softer stuff. Modal epistemology has got to start somewhere—so why not from our modal beliefs?

The remainder of this paper assumes that (2) and its equivalent (1) are reasonable things to believe. It considers various ways in which those principles might be put to work in modal epistemology. The following section attempts to relate the principles to ascriptions of possibility.

4. Justifying beliefs about what is possible

(1) states that the unshakeable imaginability of accessible propositions implies their possibility. If we can justifiably believe that propositions are

unshakeably imaginable and accessible, therefore, we can use (1) to arrive at justified beliefs about what is possible.

Can we ever justifiably believe that a proposition is unshakeably imaginable? Consider an example. It is plausible that the proposition that there are striped elephants in Barmby Moor is unshakeably imaginable. Here is one natural way for us to justify that claim.

First, we identify a nonmodal and perhaps accessible proposition, like that expressed by 'there are no striped elephants in Barmby Moor', which might plausibly be true. Second, we suppose that the proposition is actually true. Third, under our supposition we try to imagine that Barmby Moor contains striped elephants. Our efforts are rewarded. We then repeat the preceding process until we feel safe to infer inductively—as we surely eventually will—that striped elephants in Barmby Moor are unshakeably imaginable.

We cannot yet, of course, use (2) to form a justified belief that there might have been striped elephants in Barmby Moor. To do that, we need good reason to think that the proposition that there are striped elephants in Barmby Moor is accessible. And those reasons obviously must not rely on the *possibility* of striped elephants in Barmby Moor. Are such reasons available?

They certainly are. For instance, we might think that the proposition that there are striped elephants in Barmby Moor is accessible because we know it to be false. Or we might think that that proposition is accessible because it is similar in every relevant respect to another proposition whose truth-value we know; for instance, because it is suitably similar to the proposition that there are striped elephants in the fridge.

We can, therefore, use (1) to form the justified belief that there might have been striped elephants in Barmby Moor. And the preceding, partially inductive, method of using (1) to form beliefs about what is possible obviously generalises. We can often be confident, I think, that the results which it yields are accurate. But the method will sometimes break down. In particular, it will sometimes do so if we have misplaced confidence in our beliefs.

For instance, one who firmly believes that Venus is Mars could use the method just described to infer that Venus might have been Mars. For, when applying the method, we are encouraged only to consider the effects of those suppositions which we think might plausibly be correct. And so one who firmly believes that Venus is Mars would not consider the effects of supposing that Venus actually isn't Mars.

The method earlier described may also lead to mistaken ascriptions of unshakeable imaginability if we take the final inductive step too quickly. That is, we may sometimes mistakenly infer that a proposition is unshakeably imaginable, because we have failed to consider some accessible nonmodal supposition about what is actually the case which might plausibly be correct and under which we would be unable to imagine the relevant proposition.

The last two paragraphs show, then, that the above inductive method of identifying unshakeably imaginable propositions is not foolproof. But they hardly show that it is useless. We can guard against the first problem by being pessimistic about our chances of believing correctly. And the second point merely points up a need for caution when making inductive inferences.

The above points about the limitations to the suggested method of arriving at beliefs about what is possible do teach a salutary lesson, however. We tend unthinkingly to infer possibility from imaginability. But we need to be much more careful when ascribing unshakeable imaginability than when ascribing mere imaginability. If we are to use the method described to justify beliefs about what is possible, we must take more trouble in our modal reasoning than we currently like to take.

5. Justifying beliefs about what is impossible

If (1) holds, the imagination is capable is being a faultless guide to possibility. That is good news. But things could be better. For we tend also to infer *impossibility from unimaginability*. And (2), which says only that the imaginability of an impossible claim can always be overturned, does not imply that unimaginable claims are always impossible.

Nor should it. Possible claims are sometimes unimaginable. For instance, I cannot imagine parallel lines meeting but parallel lines can meet. Or consider somebody who supposes that Hesperus is actually Mars rather than Venus. Under that supposition, such a person cannot imagine that Hesperus is Venus although it is possible that Hesperus is Venus.

Should we regard our tendency to infer impossibility from unimaginability as merely regrettable? That would be a mistake. Our imaginations have blindspots, but we should only reluctantly concede that the limits to our imaginative abilities have nothing to do with the limits of possibility. I shall now sketch a way in which (2) can perhaps be used to justify inferences from unimaginability to impossibility.

Consider the claim that Venus is Mars. Make the correct nonmodal and accessible supposition that Venus and Mars are actually distinct. Then we cannot imagine that Venus is Mars. And so the claim that Venus is Mars is not unshakeably imaginable (as *P* is unshakeably imaginable just in case *P* is imaginable and there are no correct and accessible nonmodal suppositions under which we would not be able to imagine that *P*).

But that is precisely what (2) would lead us to expect, if we were to assume that Venus and Mars are necessarily distinct. We might, accordingly, hope to *explain* why the claim that Venus is Mars is not unshakeably imaginable in terms of the necessary distinctness of Venus and Mars. If the resulting explanation were good enough, we could then infer abductively that

Venus and Mars are necessarily distinct. And we would thereby have justified our belief that Venus and Mars cannot be identical.[13]

The above case obviously generalises. (2), therefore, promises to help justify abductively lots of inferences from failures of unshakeable imaginability to impossibility. There is, of course, no guarantee that beliefs about impossibility justified in the above manner will be correct—but such is the fate of abductively justified beliefs in general.

Whether (2) can really deliver justified beliefs about impossibility is unclear. For there are obvious objections to the abductive inferences involved. First, consider somebody who firmly believes—and hence supposes—that Hesperus is actually Mars. She cannot imagine that Hesperus is Venus. She might then infer, in the above manner, that Hesperus is necessarily distinct from Venus. If the method suggested can lead her to that belief, surely it cannot be acceptable?

That is a bit quick. The person just described cannot imagine that Hesperus is Venus because she mistakenly supposes that Hesperus is actually Mars rather than Venus. If we are often in a similar position when we find ourselves unable to imagine things, the method suggested will perhaps often lead us astray. But our inferences may still be justified. Good reasoning only guards against error if one starts from true premises.

Second, some might think that the suggested method is poor because the explanations involved are hopeless, for the following reason. It might be thought that all of the limits upon our imaginations are merely human ones. If that is right, our inability to imagine that, say, Venus is Mars can be sufficiently explained by mere limitations upon our powers; there is no need to cite the necessary distinctness of Venus and Mars.

As it stands, that objection is not hugely impressive. How plausible is it, for instance, that merely human limitations prevent us from imagining that Venus is Mars while we correctly suppose that Venus is not actually Mars? We cannot, I think, easily make sense of the idea that some being imagines that Venus is Mars while supposing that those planets are actually distinct.

The objection points to something important, however. If someone hopes to argue abductively in the manner sketched above, he has work to do. For he must argue that the proffered explanation of why the relevant claim fails to be unshakeably imaginable is good enough to justify an abductive inference.

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[13]   The idea being mooted—that a natural justification of our tendency to infer impossibility from unimaginability is abductive—has surfaced before. For instance, Hale writes: "it is not clear that our inability to imagine something is always *just a fact about us*...—that there is always available, in principle at least, a correct explanation of it in terms of the limited character of our (respectable) perceptual and cognitive capacities.... The thought—very crudely—is that the cognitivist [about modal discourse] will want to insist upon some such distinction, between imaginative incapacities which merely reflect our own limitations and those which are due rather to some impossibility inherent in what we are trying to imagine" (Hale (1989), pp. 201–2).

And that is no trivial task. In many cases, failures of unshakeable imaginability will be satisfactorily explicable in terms of merely human limitations. For instance, our inability to imagine worlds containing hundreds of dimensions is adequately explained like that. It is no good to move unthinkingly, as we tend to do, from unimaginability to impossibility.

It is harder, I think, to justify inferences from unimaginability to impossibility in the way just described than it is to justify inferences from imaginability to possibility in the way explored in the preceding section. Those differences are fitting. Possibility is a much weaker property than necessity. It ought therefore to be harder to justify beliefs about impossibility than beliefs about possibility.

6. Conclusion

The imagination is a familiar player in philosophical dramas. Consider, for instance, Cartesian arguments for dualism, Hume's arguments concerning causation and induction, Putnam's thought experiments involving Twin Earth and Kripke's intuitive arguments for semantic theses. Assuming that (1) and (2) have been justified, what morals can be drawn?

Plenty of arguments involving imaginative exercises are acceptable. Thus those arguments which infer the possibility of some nonmodal and accessible proposition from its imaginability are acceptable, when the imaginability of the relevant proposition seems clearly to extend to its unshakeable imaginability.

So we can agree with Hume when he writes when he writes in §IV of part I of the *Inquiry concerning Human Understanding* that *"That the sun will not rise tomorrow* is no less intelligible a proposition, and implies no more contradiction than the affirmation, *it will rise"*. For it is plausible that the proposition that the sun will not rise tomorrow is unshakeably imaginable. Those arguments which infer impossibility from unimaginability remain *sub judice*, however.

The worth of some well-known arguments involving inferences from imaginability to possibility also remains undecided. Cartesian arguments against token-identity materialism aim to establish that there are mental phenomena which are not identical to physical phenomena.[14] Such arguments rely upon our ability to imagine situations which are physically indiscernible from our own but which lack certain actually existing mental phenomena.

Consider the following Cartesian argument. We can imagine a world—a *zombie world*—which is physically identical to ours but which is without

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[14]   I should note that the comments which follow are irrelevant to some well-known Cartesian arguments in the recent literature, because those arguments are not aimed at token identity theses. So, for instance, the main argument of Chalmers (1996) focuses on the view that mental phenomena supervene upon physical ones, rather than on token identity claims.

the purely phenomenal bits of our conscious lives; that is, a world which is free of the painfulness of pains and the rest. A zombie world is therefore possible. And so, the argument goes, the purely phenomenal aspects of mentality are not physical.

The problem with using (1) to buttress the inference in that argument from the imaginability of zombie worlds to their possibility is obvious. Propositions about the identity of mental and physical phenomena are, we may assume, accessible (if they are not, there is certainly no hope of using (1) to help justify the inference from imaginability to possibility which occurs in our Cartesian argument). But such propositions are also nonmodal.

Now suppose that the purely phenomenal aspects of consciousness are actually identical with physical phenomena. Under that supposition, can we still imagine a zombie world? Surely not.[15] So we cannot noncircularly use (1) in justifying the inference from the imaginability of zombie worlds to their possibility. For we are justified in thinking that zombie worlds are unshakeably imaginable only if we are justified in thinking that the purely phenomenal bits of consciousness are not identical with physical phenomena. But the Cartesian argument is supposed to show—not assume—that those identities do not hold.

Principles (1) and (2), then, promise to illuminate not only our everyday modal inferences but also philosophical arguments which employ imaginative resources. Some significant tasks remain, however. For instance, this paper has made no attempt to explain how our imaginations have the powers attributed to them in (1) and (2). And we will eventually need a theory of the imagination which explains why our imaginative abilities interact with suppositions about what is actually the case in the ways relied upon throughout §§3.1–5. But even without those explanations, we can, I think, acknowledge that our imaginations are only fallible guides to possibility while looking to them for modal knowledge.

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[15]   I am assuming that the relevant identity claims employ terms which refer rigidly to their referents. This is fair; the Cartesian argument is supposed to show that *these very phenomena* (namely, the purely phenomenal bits of consciousness) are distinct from *these other phenomena* (namely, all the physical phenomena that there are).

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