Swamp Mary Semantics: A Case for Physicalism Without Gaps

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Abstract

I argue for the superiority of nongappy physicalism over gappy physicalism. While physicalists are united in denying an ontological gap between the phenomenal and the physical, the gappy affirm and the nongappy deny a relevant epistemological gap. Central to my arguments will be contemplation of Swamp Mary, a being physically intrinsically similar to post-release Mary (a physically omniscient being who has experienced red) but has not herself (the swamp being) experienced red. Swamp Mary has phenomenal knowledge of a phenomenal character not instantiated by any of her past or current mental states. I issue a challenge to gappy physicalists to account for how it is that Swamp Mary can satisfy the psychosemantic requirements on phenomenal knowledge while non-Swamp pre-release Mary cannot. I argue that gappy physicalists cannot meet this psychosemantic challenge.

1. Introduction

Physicalism is under threat, so the story goes, from an epistemic gap that exists between physical facts and phenomenal facts (Chalmers, 2003a). Many qualia-based antiphysicalisms are based on inferring an ontological gap from the epistemic gap, the latter gap variously characterized in terms of what can be known, conceived, or explained. For example, in the famous argument concerning colorblind super-
neuroscientist Mary (Jackson, 1982), it is inferred that physical facts cannot exhaust the totality of facts since Mary may be physically omniscient without thereby knowing what it is like to see red.

One line of physicalist defense, a line that it will be the main aim of the present paper to criticize, involves embracing the epistemic gap while denying the ontological gap. I shall call such physicalists gappy physicalists. One of the most prominent versions of gappy physicalism is what has been referred to as the phenomenal concept strategy (Stoljar, 2005). Advocates of this strategy include Loar (1990), Balog (forthcoming), Block (2006), Papineau (2002; 2007), Tye (2000), and Perry (2001). The gist of what phenomenal concepts are supposed to be may be conveyed in terms of Mary: What she learns upon learning what it is like to see red is constituted by the acquisition of a new concept that puts her in a position to conceive of old facts in a new way. The epistemic gap thus opens up because of a gap between two different kinds of concept—phenomenal concepts and physical concepts—not a gap between two kinds of properties or two kinds of facts.

1 The distinction I am drawing here between nongappy physicalists and gappy physicalists maps onto a distinction that Chalmers (2003b) draws between Type-A Materialists and Type-B Materialists. As I intend the distinction, the position that Chalmers labels “Type-Q Materialism” (“Q” for “Quinean”) is best included with the nongappy physicalists, although space does not permit a defense of these taxonomic decisions here. For an extended discussion and defense of Type-Q Materialism, see (Mandik & Weisberg, 2008).
Not all gappy physicalists are advocates of the phenomenal-concept strategy. For example, Prinz’s (2007) “mental pointing” account postulates nonconceptual phenomenal demonstratives to account for the gap between Mary’s pre- and post-release knowledge. Tye (2009), having terminated his allegiance to the phenomenal concepts strategy, nonetheless attempts to maintain allegiance to gappy physicalism via the postulation of a physicalistically respectable version of knowledge by acquaintance. What unites gappy physicalists (besides, of course, their physicalism) is their holding that phenomenal knowledge is a kind of factual knowledge distinguished from physical knowledge not by what facts it is knowledge of but in how various physical facts are represented.²

A physicalist thesis hinging on how facts are represented incurs an obligation to not violate physicalistic requirements on what representation can be. The purpose of the present paper is to articulate a criticism that applies to all gappy physicalists by calling into question their ability to satisfy physicalist psychosemantic strictures on phenomenal knowledge.

Central to my criticism will be drawing certain consequences of the Swamp Mary thought experiment (Alter, 2008; Dennett, 2005; Mandik, 2010). Key features of Swamp Mary are that (1) she is intrinsically physically identical to post-release Mary, (2) she knows what it’s like to see (hallucinate, afterimage, etc.) red, and (3) she has sprung into being without herself ever having had a mental state with a red quale. The core

² Thus, for an example of a position that is not a version of gappy physicalism, see physicalist defenses of the ability hypothesis such as Lewis (1990). Note, too, that Chalmers (2003a, p. 136) identifies Lewis as a Type-A materialist.
consequence of the Swamp Mary thought experiment that I will draw is that gappy
physicalists cannot account for how it is that Swamp Mary does, while pre-release Mary
does not, satisfy the psychosemantic criteria for knowing what it’s like to see red. In
previous work (Mandik, 2010) I develop a case against antiphysicalism based on
psychosemantic asymmetries between pre-release Mary and Swamp Mary. I will not
recount those arguments here and instead proceed by assuming physicalism and
developing a critique of gappy physicalism.

The structure of the remainder of the paper is as follows. In §2, I lay out further
preliminaries, including further relevant details of gappy physicalism and the Swamp
Mary scenario. In §3, I discuss the broad outlines of various physicalistic theories of
content that might possibly underwrite the psychosemantic requirements on phenomenal
knowledge. I then spell out how gappy physicalists are incapable of rising to the
psychosemantic challenge of explaining how it is that Swamp Mary can represent the
phenomenal facts as phenomenal without it also being the case that pre-release Mary can

The challenge I raise is much stronger than one raised recently by Levine against the
phenomenal concepts strategy (Levine, 2007). Levine argues that advocates of the
phenomenal concepts strategy fail to explain, in ways consistent with physicalism, how
the requisite representations (such as concepts that “quote” the experiences they are
concepts of) work such that they give rise to an epistemic gap. Even if gappy physicalists
were able to rise up to Levine’s challenge, they would still not yet have met mine, for
there would be further work to be done in explaining the alleged psychosemantic
asymmetry between pre-release Mary and Swamp Mary.
do so. In §4 I spell out a suggestion that physicalists abandon attempts to explain an epistemic gap (there being none) and devote their energies instead to explaining why there ever appeared to be an epistemic gap in the first place. I also present some speculations on how such explanations might best proceed.

2. Further Stage Setting

2.1. Swamp Mary

Given the trouble I claim to be raised for gappy physicalists by Swamp Mary, it is natural to consider possible grounds that gappy physicalists might have for rejecting as impossible one or more aspects of the Swamp Mary scenario.

There seems to be no basis for gappy physicalists to deny that a being can be intrinsically identical to post-release Mary and never have experienced a red quale. That such a complicated entity can spring into being fully formed by quantum accident is of course highly improbable, but it is not impossible. Further, possible events of such high improbability are the bread and butter of gappy physicalists relying, as much as they do, on the conviction that there could be a physically omniscient yet phenomenally ignorant Mary.

Someone who finds it easy to grant the possibility of a person forming Swamp-style might nonetheless resist granting the possibility of Swamp Mary lacking a red quale. A useful means for overcoming such resistance is to imagine that post-release Mary has been knocked out with a general anesthetic. It is natural to assume that a person under a general anesthetic has no experiences (otherwise, general anesthesia is misnamed). Thus, if Swamp Mary pops into existence intrinsically physically identical to
generally anesthetized post-release Mary, then Swamp Mary does not at that time have a red quale.

But would a generally anesthetized Swamp Mary, lacking a red quale, nonetheless know what it’s like to have a red quale? Prima facie, Swamp Mary does, since, despite being generally anesthetized, post-release Mary does and they are intrinsic doppelgängers. Anesthetics are not, generally, amnestics, and Mary, having learned what it’s like to see red, need not forget it, or anything else, when she’s put under.

Of course, to assume that Swamp Mary has phenomenal knowledge of a quale she’s never yet experienced is to assume that phenomenal knowledge does not supervene on historical relations to particular past events. Call such an assumption ahistoricism and its negation historicism. Might gappy physicalists dodge Swamp Mary by insisting on historicism about phenomenal knowledge? This is a difficult question to assess, but it helps to look at the relative merits of historicism as applied to other kinds of knowledge.

Probably the cases most crying out for historicism are cases wherein the knowledge in question concerns putative particular past events concerning the knower herself. It is quite strained to say of Swamp Mary that she knows what happened to Mary nine years ago even though she may have an internal state physically similar to a state that Mary is in when Mary correctly remembers what happened to her nine years ago. There is no nine years ago for Swamp Mary, and her state is a mere quasi-memory. We might summarize by saying that the case for historicism is strongest when it is applied to putative knowledge that is both historical and egocentric. Crucially, knowledge of historical egocentric facts involves knowledge of particulars—knowledge of particular past events concerning a particular person.
When we shift our attention from knowledge of particulars to knowledge of
generalities, the intuitive pull of historicism weakens considerably. While there may be a
high degree of plausibility in the claim that a newly-minted Swamp-being cannot count
as retaining first-hand knowledge of autobiographical events from nine years ago, it is
comparatively less plausible to claim that the same Swamp being can’t know that nine
years ago is five years ago plus four years ago. Pieces of knowledge that have a high
degree of generality—such as the knowledge that twice four is eight and that nothing is
both red and green all over—are harder to deny attributing to our Swamp doubles.

The question to ask, then, of phenomenal knowledge, since we are interested in
whether Swamp Mary really has any, is whether phenomenal knowledge is more
appropriate to think of as general or particular. And here I think that a stronger case can
be made for the generality rather than the particularity of phenomenal knowledge. As
pointed out in Mandik (2001), a common intuition regarding Mary is that she learns not
only what it is like for her to see red, but she is in a position to grasp what it must be like
for others to see red as well.

Of course, it is not unheard of for philosophers to take a very hard line on Swamp
beings. Dretske (1995), for instance, defends an etiological teleosemantic version of
representationalism about qualia wherein it’s a requirement on having any conscious
experiential content that a creature have a certain evolutionary history. On a Dretskean
account, Swamp Mary, even unanesthetized and staring at a red rose, wouldn’t have any
red qualia and, a fortiori, wouldn’t know what it’s like to have red qualia.

Might a gappy physicalist adopt a strong historicism to protect against the threat
of Swamp Mary? A problem that arises here seems to be that very strong externalism
such as the one that leads to Dretske’s historicism is likely to be inconsistent with Mary’s prerelease phenomenal ignorance (see Dretske (1995, pp. 81-95)) On Dretske’s view, what it’s like to experience red is to be in a state that bears certain historico-evolutionary relations to red surfaces. If Mary knows what surface properties a color-sighted person is historico-evolutionarily related to, then the fact that Mary has never herself entered into such relations is no bar to her knowing what it’s like for a color-sighted person to see red. On Dretske’s view, Mary may lack *experiential* representations of red surfaces, but this is no bar to her having representations of such surfaces in *thought*, and it is her thought representations that underwrite her knowing what it is like to have experiences that she has not herself had.

While these remarks about Dretske have been brief, I take them to cast doubt on the prospects of gappy physicalists blocking the threat of Swamp Mary by denying her very possibility.

2.2 Gappy Physicalism

I’ve already said what is *gappy* about gappy physicalism. I turn now to say a few key remarks about the *physicalism* of gappy physicalism. It is difficult to give a satisfactory, full account of what physicalism is supposed to consist in. (This has been pointed out by several authors. See, for example, Montero & Papineau (2005).) Fortunately we can make do in the current discussion by identifying a few key features. There are two, and both concern qualia. Crucial aspects for the current paper are the ontological complexity and causal efficacy of qualia.
According to physicalism, only ontological complexes are phenomenal—no ontological simples are phenomenal. If there are ontological simples—that is, if it isn't complexes all the way down—they are nonphenomenal. This sketch of physicalism allows us to bypass the vexing question of what exactly it is that makes something physical. It will serve the purposes of the present paper to contrast physicalists with antiphysicalist opponents such as dualists to characterize one of the core doctrines of physicalism as the view that everything phenomenal is ontologically complex and that these complexes ultimately resolve into comparative simples that are nonphenomenal.

The second core doctrine of physicalism of note for the current discussion is that no qualia lack physical effects. The physicalist holds that one and the same property that is a mental state’s being such that there's something it’s like to have it is also one of the causal powers of the mental state. Physicalists, then, deny qualia epiphenomenalism.

3. The Psychosemantic Challenge

For ease of exposition, I will be discussing psychosemantic approaches as falling into four categories. Following the discussion in (Mandik, 2010), they are Quotation, Actual cause, Nomological, and Descriptive-isomorphism. I will argue that none of the four allow nongappy physicalists to rise to the psychosemantic challenge. Quotation and Actual cause are quite easy to see as totally doomed to fail to account for the psychosemantics of Swamp Mary’s phenomenal knowledge. Nomological and Descriptive-isomorphism are not as obviously problematic for the nongappy physicalists, but they are insurmountably problematic nonetheless.
**Quotation** imposes as a necessary condition on phenomenal representation (the representation of phenomenal properties) that it involve a kind of quotation or exemplification whereby, for instance, the concept of a red quale is partially constituted by a red quale. One proponent is Papineau (2002), although he retreats somewhat from the view in his (2007). On such a view, just as a carpet sample of a red carpet must exemplify the same color and texture of the carpet it samples, so must the phenomenal concept have the same phenomenal character as the experience it is a concept of. The notion of representation by exemplification here is the same as the one discussed by Goodman (1976, pp. 52-67). It should be quite clear that such a notion is ill-suited to account for how it is that Swamp Mary has states that represent a red quale: since she lacks states that exemplify a red quale, her representation of a red quale cannot be due to exemplification. Thus does **Quotation** fail as an account of the psychosemantic grounding of Swamp Mary’s phenomenal knowledge.

There’s an alleged defense of **Quotation** against the above line of thought that I’ve encountered frequently enough in personal conversations to merit mention here. According to this defense, Swamp Mary need not currently exemplify a red quale to represent a red quale, since it suffices that she be in a certain kind of disposition now to have a red quale at some time in the future. My main response to this line of defense is that it really isn’t a defense of the view that I am here calling “**Quotation**.” As defined, **Quotation** requires the current exemplification of a red quale for current phenomenal knowledge to serve as a “quotation” of it. It’s no defense of **Quotation** to offer a dispositional analysis of phenomenal knowledge. To do so is instead to offer a different
psychosemantics. In particular, this distinct kind of psychosemantics, what I will call **Nomological**, is one that I will present separate criticisms of later in this section.

I turn now to discuss the second of the two psychosemantic approaches previously mentioned. **Actual cause** grounds phenomenal representation in a causal relation to some actual past occurrence of a red quale. It is quite clear that such a causation approach must fail. Since Swamp Mary need not have any actual past, her phenomenal knowledge cannot be grounded in causal relations to past qualia occurrences. Perhaps a philosopher attracted to the general idea of grounding representation in causation may try to defend this approach by appealing to counterfactual instead of actual causal relations. However, to do this is not to offer a defense of **Actual cause**, but instead to offer a different psychosemantics, a psychosemantics that I will discuss under the heading of **Nomological**.

Let us turn, then, to examine further the approaches that seem more plausible than **Quotation** and **Actual cause**. **Nomological** and **Descriptive-isomorphism** relate rather directly to the two key features of physicalism—efficacy and complexity—described in the previous section. Efficacy plays a central role in **Nomological** and complexity plays a central role in **Descriptive-isomorphism**.

The core of **Nomological** is to ground Swamp Mary’s phenomenal knowledge in some kind of nomic or counterfactual relation to qualia, qualia that she need not actually have had. Such a psychosemantics may be modeled on the sort of nomological approach favored by Fodor (1987). Since the physicalists affirm the causal efficacy of qualia, it’s open to posit that there are counterfactual supporting laws that subsume qualia. Such laws may very well relate qualia to concepts of qualia (as well as nonconceptual
representations of qualia). So, even though Swamp Mary has never had a red quale, she is in a state that *would* be causally related to red qualia in certain counterfactual scenarios. She would, for instance, go into a state of recognition if she later were appropriately causally related to a red quale. Further, the state she is in is of a type such that tokens of it can be caused by red qualia. Alternately, one might consider her knowledge state to be a type such that its tokens can *cause* red qualia, and thus regard her knowledge state as a disposition to engage in certain kinds of mental imagery, where the mental image itself has a red quale. This latter construal works hand-in-hand with the sort of dispositional/quotational view I discussed as an alleged attempt at saving Quotation.

The core of Descriptive-isomorphism is to ground Swamp Mary’s phenomenal knowledge in terms of some kind of structural commonality between her knowledge state and red qualia. Instances of this general psychosemantic approach include description theories, e.g., (Russell, 1905); isomorphism-based theories, e.g., (Cummins, 1996); and conceptual-role semantics, e.g. (Block, 1986; Sellars, 1953). An approach of this sort is available to the physicalist, since the physicalist affirms the ontological complexity of qualia. For certain antiphysicalists, the ontological simplicity of qualia leads directly to their ineffability and recalcitrance to analysis. However, for physicalists it is open to exploit the ontological complexity of qualia and explain Swamp Mary’s phenomenal representations as being descriptions of defining structural features of a red quale.

Nomological and Descriptive-isomorphism show some initial promise for underwriting Swamp Mary’s phenomenal knowledge. They are consistent with the physicalist part of gappy physicalism. However, to be consistent with the *gappy* part of gappy physicalism, these approaches have to also be consistent with the claim of Mary’s
prerelease ignorance. And this is where the trouble arises for gappy physicalism. I argue that neither Nomological nor Descriptive-isomorphism is compatible with Mary’s prerelease ignorance.

I will raise two problems for Nomological. The first is a problem specifically for versions of Nomological that seek to ground Swamp Mary’s phenomenal knowledge in a disposition. The second problem that I raise is a problem for all versions of Nomological.

The problem that arises for dispositional accounts of Swamp Mary’s phenomenal knowledge is that they will need to specify a disposition that Swamp Mary has that prerelease Mary lacks, and it is not at all clear that the requisite specification can be supplied. Note that it won’t do simply to say that Swamp Mary is in a state that disposes her to imagine a red quale, since, arguably, pre-release Mary is in a state that disposes her to imagine a red quale.4 Perhaps the gappy physicalist will likely want to distinguish Swamp Mary’s quale-related disposition from pre-release Mary’s quale-related disposition on the grounds that their respective dispositions have different triggering conditions. Perhaps the gappy physicalist will be tempted to say that Swamp Mary’s disposition can be triggered “at will” and that pre-release Mary’s disposition cannot be so triggered. But a question remains of why there is this difference. It may be tempting to say that the difference is due to one but not the other knowing what it’s like to see red. However, this would beg the question against the nongappy physicalist. The gappy physicalist needs to supply an explanation of the alleged asymmetry between pre-release

4 I am grateful to Michal Klincewicz for discussion of this point.
Mary and Swamp Mary that does not simply beg the question against the nongappy physicalist who denies that there is any relevant asymmetry.

I turn now to discuss a problem that arises for all versions of **Nomological**. To see why all versions of **Nomological** are incompatible with Mary’s pre-release ignorance, it helps to first notice a very natural account that **Nomological** is able to give for knowledge of unobservables. Unobservable entities such as electrons and radio waves are not detectable by the unaided senses. We may just as well state this fact by saying that there’s no law that directly relates sensory states to unobservables. However, some unobservables are detectable via the use of instruments. This later fact may just as well be stated by saying that there’s a law that relates instrument states to unobservables and another law that relates sensory states to instrument states. Electrons are not nomically related to tokenings of my **ELECTRON** concept in as direct a way as horses are to tokenings of **HORSE**. However, via mediating tokenings of instrument states, my **ELECTRON** concept is nonetheless psychosemantically grounded in electrons. Or at least, that is the story available to adherents of **Nomological**.

The trouble that arises for the gappy physicalists is that just as Mary may think about electrons that she’s never directly perceived but detected via instrumentation, so may Mary exploit Swamp Mary (or anyone else who knows what its like to see red) to think about a red quale. A person who has phenomenal knowledge is nomically related, so says **Nomological**, to a red quale, and Mary, being physically omniscient, is nomically related to every physical state of a person who has phenomenal knowledge.
The trouble that *Nomological* presents to gappy physicalists is that Mary may utilize anyone who has phenomenal knowledge in much the same way as she uses measuring instruments. Prerelease Mary may even use Swamp Mary as an instrument.

It is no objection that Mary cannot calibrate such an “instrument” herself. Such an objection would say that since prerelease Mary doesn’t know what its like to see red, Mary is in no position to know that her instruments are detecting phenomenal redness instead of phenomenal greenness (or nothing at all). There are two main reasons why such an objection is quite poor. The first is that the objection simply begs the question against nongappy physicalism, since nongappy physicalists deny that prerelease Mary is phenomenally ignorant. The second reason is that it is quite natural to suppose that, for many of us, our capacity to think about unobservables is mediated by causal chains involving instruments that we are not ourselves in a position to calibrate. I have no idea how to calibrate a machine for the detection of electrons. However, if *Nomological* is correct, then as long as some such device is so calibrated, it can serve as a link in the nomic chain relating my electron tokenings to electrons.  

Let us turn, then, to examine the availability, or lack thereof, to gappy physicalists of a psychosemantics along the lines of *Descriptive-isomorphism*. To my knowledge, no gappy physicalists have seemed to be attracted to *Descriptive-isomorphism*. The following discussion can then be read as spelling out why they would be correct to shy away from it.

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*Nomological* is thus well poised to serve as an implementation of the kind of deferential phenomenal concepts that Tye (2009) argues for.
To grasp how this psychosemantic approach might be supposed to work, it helps to first begin by examining a clear case to which Descriptive-isomorphism is most likely to apply. Suppose that someone, let us call him George, is an otherwise normal human who has never before seen the Japanese flag. Let us suppose that George has normal color vision, and has had a typical range of color experiences including having seen red and white before. Suppose further that George has seen various shapes before, including circles and rectangles. George just has never seen a Japanese flag before. Without showing him one, how can we augment his knowledge to include knowledge of what it would be like to see one? Here the answer seems quite simple. We convey to George a description along the lines of “red circle centered on a white rectangular background.”

The adequacy of such a description, according to Descriptive-isomorphism is due chiefly to two factors. The first factor—content complexity—is the flag’s being a structured complex (with the relative simples being redness, circularity, etc. and structural relations being the having of redness by the circle, the centering of the circle on the rectangle, etc.). The second factor—vehicle complexity—is the description’s being a structured complex allowing it to pick out the parts of the complex and their structural relations to each other.

Given the way Descriptive-isomorphism works for George, it is quite difficult to see why it wouldn’t work just as well for Mary. One of the key suppositions of physicalism is that qualia are ontological complexes of non-phenomenal relative-simples. Qualia are therefore in a position to satisfy the first key factor of Descriptive-isomorphism, content complexity. Further, since Mary is physically omniscient, there
would be no non-phenomenal entity or non-phenomenal relations between entities that would exceed her grasp. States of Mary are therefore in a position to satisfy the second key factor of Descriptive-isomorphism, vehicle complexity. I am aware of no third factor essential to Descriptive-isomorphism, so I’m aware of no basis for the gappy physicalist to embrace Descriptive-isomorphism as the psychosemantics of Swamp Mary’s phenomenal knowledge while maintaining prerelease Mary’s phenomenal ignorance.

It’s natural here for the gappy physicalist to try to claim that Mary cannot actually satisfy the vehicle-complexity factor of Descriptive-isomorphism. The maneuver I have in mind is to affirm that while Mary is able to represent the phenomenal facts under one description, there is some other description that prerelease Mary is not able to represent the facts under. One way in which this might be put is to say that prerelease Mary knows the facts under a physical description but not under a phenomenal description. It is hard to see, however, what is to distinguish kinds of description here in a way that is also going to be consistent with key tenets of both Descriptive-isomorphism and gappy physicalism.

Suppose that the relevant difference between the descriptions is thought of as analogous to differences between inter-translatable descriptions from distinct languages. Compare the difference between, for example, the English phrase “white rectangle” and the Pig Latin phrase “itewhay ectangleray”. According to Descriptive-isomorphism, their inter-translatability is due to structural commonalities between the descriptions (or between structures such as languages or language games that the descriptions are embedded in). What makes them different descriptions isn’t going to be any difference in
what they are descriptions of, that is, differences in semantic content, but instead
differences in the representational vehicles. (The vehicular differences may, of course, be
relational as well as intrinsic.)

How can such vehicular differences suffice for prerelease Mary’s phenomenal ignorance? The suggestion along such lines has to be something like that Mary may be able to get into one kind of state, but not be able to get into another. But note now what the key features of this account of Mary’s prerelease omniscience and ignorance amounts to: Her omniscience is due to her having a representation, under some description, of every fact, and her ignorance is due to there being states that she is nonetheless unable to get into. But this is just to give a version of the ability response (Lewis, 1990). And the ability response is a defense of physicalism that is not a gappy physicalism. It is crucial to gappy physicalism to hold that what Mary lacks prerelease is a kind of knowing-that, as opposed to a kind of knowing-how.

The gappy physicalist may reply at this point that they are not simply identifying knowing what it’s like with knowing how and that they still maintain that knowing what it’s like is a kind of knowing-that. But the problem remains that if the gappy physicalist is going to embrace Descriptive-isomorphism, then they need to account for the alleged psychosemantic asymmetry between Swamp Mary and pre-release Mary and it is not clear that they have adequately risen to the challenge.

The gappy physicalist might object that the discussion so far, hinging as it does on a distinction between content and vehicle, is too coarse grained, and needs to be supplemented. One such supplement is the notion of a mode of presentation of a content. However, it is not clear that there is a way to flesh out the notion of mode of presentation
that adequately serves their purposes. What is the mode of presentation of a red quale that Swamp Mary has but pre-release Mary lacks? Is the mode of presentation a property that is present to Swamp Mary but not to pre-release Mary? If so, then the suggestion is obscure. It’s particularly obscure what the relevant notion of presentation could possibly be. Not ever having had a red quale, how is it that one can be presented to Swamp Mary?

Worries about presentation set aside, the suggestion that a mode of presentation is a property gives rise to worries that about its being a physically respectable property. One way one might try to explicate modes of presentation in ways acceptable to physicalism is to assimilate modes of presentation to inferential roles (Block, 1986). While such a move may be acceptable to a physicalist, it is not entirely clear that it will be available to the gappy physicalist. If the asymmetry between Swamp Mary and pre-release Mary is to be explicated in terms of inferential role, then, presumably, there needs

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6 One way of illustrating the suggestion that a mode of presentation is a property is the following: Thinking about Venus on one occasion as the brightest item in the sky in the morning and, on another occasion, as the brightest item in the evening is to attribute two different properties, one property concerning being bright in the morning and one concerning being bright in the evening. Thus, Venus is thought about under two different modes of presentation in virtue of two different properties being attributed to Venus (Block, 2006).

7 See (Evans, 1982) for a classic source of worries about the obscurity of applying a notion of mode of presentation to absent items such as inexistente objects and uninstatiated properties.
to be some *inference* that Swamp Mary is capable of making that pre-release Mary cannot make. But what could that plausibly be? It won’t do for the gappy physicalist to say that Swamp Mary can and pre-release Mary cannot infer *what it’s like to see red*, for this is to beg the core question defining the dispute between the gappy and nongappy physicalists. Nongappy physicalists are quite happy saying that Mary *can*, pre-release, infer what it’s like to see red, and in the present dialectic, the burden is on the gappy physicalist (who also accepts *Descriptive-isomorphism* and the phenomenal knowledge of Swamp Mary) to explain why it is that Mary *cannot* infer what it’s like. I do not see that any recourse to the notion of *mode of presentation* is going to help the gappy physicalist here.

4. Explaining the Appearance of a Gap

In this section I address a question that I think is not addressed frequently enough in the literature. *Why* do people suppose that there is an epistemic gap? Asked in the context of discussions of Mary, the relevant question to ask is: *Why* do people suppose that prerelease Mary is phenomenally ignorant?

It is no answer to such a question to say that it is *intuitive* that prerelease Mary doesn’t know what it’s like to see red. For the next question to raise is: *Why* is that intuitive? And it is no answer to that question to credit the intuition as being true. The mere truth of an intuition can’t suffice to explain its *intuitiveness*. (There are, after all, many unintuitive truths and intuitive falsehoods.) Further, if the above arguments concerning Swamp Mary are sound, the intuition in question is *false*. I think that in general, if an intuition retains its intuitive pull despite being shown to be false, it helps to
have an explanation of the source of the intuitive pull. It is toward such an explanation that the current section is directed.

The intuition under question is a thesis that I will, following an earlier work (Mandik, 2010, pp. 233-234), call the *Experience Requirement*, “the thesis that, for some experiences at least, and red experiences in particular, knowledge of what it’s like to have such an experience requires that the knower has had or is currently having such an experience.”

In classical empiricism, the sensory theory of ideas was the grounds for a defense of the Experience Requirement. We see expressions of something very close to the Experience Requirement in the work of Locke and Hume. Here’s Locke from *An Essay Concerning Human Understanding*: “…we see nobody gets the relish of a pineapple, till he goes to the Indies, where it is, and tastes it.” Here’s Hume from *An Enquiry Concerning Human Understanding*: “A blind man can form no notion of colours; a deaf man of sounds. …A Laplander or Negro has no notion of the relish of wine.” Locke and Hume offer the Experience Requirement as a piece of common sense that is supposed to help build their case for their theory of ideas. The thought seems to be that their empiricistic theory of ideas is supported by how well it is able to *explain* the Experience Requirement: if ideas are made of sensory impressions or copies thereof, then *of course* “a blind man can form no notion of colour.”

I have serious doubts about whether the account whereby concepts are composed of sensory impressions or copies thereof will stand up to scientific scrutiny. Weiskopf (2007) makes a convincing case (largely involving neuroscientific considerations) against plausibility of this kind of concept empiricism. I will not here recount the case or pursue
this line further here. Instead, I present considerations that directly target the Experience Requirement.

One way of formulating a question about the truth of the Experience Requirement is as follows: Is it possible that the informational channels that put normally sighted persons in contact with redness are more capacious than either any other sensory input channels or the human memory systems that constitute our objective conceptual grasp of our inner and outer worlds? If the informational capacity of color vision far outstrips the memory capacity underlying conceptual thought, then that might account for something like the Experience Requirement. The Experience Requirement would then be explained by the fact that human memory just is not vast enough to store any description that captures the information obtained in a glance at something red by a color-sighted person. And if the informational capacity of color vision far outstrips non-color vision or non-visual sensory modalities, then that might account for something like the Experience Requirement too: sensory channels other than color vision are insufficiently fat “pipes” through which can flow all of the information easily gleaned in a color-sighted glance at something red.

I think, however, that when we attend to the relevant scientific details, we will see that a case for the literal truth of the Experience Requirement is not forthcoming. When we look to scientific estimates concerning, for example, the bandwidth of human color vision, we find that considerations concerning neural bandwidth and storage do not suffice to ground the Experience Requirement’s truth. However, we do find therein the basis for an explanation for why people may have found the Experience Requirement plausible.
One ballpark estimate of the memory capacity of the human brain is that it is in the range of $10^{13} - 10^{17}$ bits (Tipler, 1995). These numbers are much too large for current purposes if we assume that not all of the brain’s memory is in the service of concepts. A smaller number may be arrived at by assuming that concepts are restricted to pre-frontal cortex (PFC). The percentage of the volume of PFC relative to the whole brain is 12.51 (McBride, Arnold, & Gur, 1999). On this basis we can offer a memory capacity estimate in the ballpark of $10^{12}$ bits.

Is what Mary knows while staring at red for the first time simply too much information than can be squeezed into a memory store of $10^{12}$ bits? It seems not. An early estimate of the bandwidth of the human eye for color vision is $4.32 \times 10^7$ bits/sec (Jacobson, 1950, 1951). A more recent estimate is $10^6$ bits/sec (Koch et al., 2006). Assuming that Mary has to stare at a red object for a full second to know what it’s like to see red, our lowest estimate of human memory capacity is still an order of magnitude higher than what comes into her eye during that second. And that’s assuming that Mary has a normal-sized human PFC. Physically omniscient Mary may likely have a bigger brain than normal. From a purely information-theoretic perspective, giving her bigger lobes would make it even easier for pre-release Mary to know what it’s like. Considered from an information-theoretic perspective, Mary’s memory capacity is easily large enough for phenomenal knowledge to be conceptual.

Information in memory has to get in there somehow. Maybe color vision is the only pipeline fat enough to do the trick. Can this serve as a basis for a defense of the Experience Requirement? I think not. Jacobson (1950, 1951) estimates the bandwidth of black and white vision to be $4.32 \times 10^6$ and estimates the bandwidth of the human ear to
be 9,900 bits/sec. Continuing with our assumption that Mary would require a full second
to gain, via color vision, knowledge of what it’s like to see red, then the very same
amount of information can be acquired by a colorblind person in 10 seconds and a blind
person acquiring the information auditorially would need a full 73 minutes. Reducing our
estimate of how long Mary needs to stare at red to a tenth of a second means that the
colorblind could acquire that information in about a second and the fully blind in seven
minutes.

(Of course, none of this is to say that, for example, the blind person would be
hearing red. But it is to say that she is learning whatever is to be learned by the sighted
when they see red. Perhaps the information acquired about red enters sensory systems
without giving rise to conscious experience.)

The above considerations about bandwidth help us to see why the Experience
Requirement may strike so many people as plausible. There is a marked difference
between what you can learn in a second and what you can learn in 73 minutes. And it is
reasonable to assume that people have an at least rough grasp of the informational
capacities of their various sensory systems.

Nonetheless, regardless of whether we interpret Hume’s assertion about what the
blind can know about color as a claim about nomological, metaphysical, or logical
possibility, the claim receives no support from these information-theoretic considerations.
From the information-theoretic perspective it is nowhere near impossible for the blind to
acquire information of the presence of redness. They just need a longer time than the
sighted to do so.
Another possible source of the intuitiveness of the Experience Requirement is that it arises when we compare the relatively sparse information content of occurrent thought to the content of occurrent visual experience. Occurrent thought arguably is limited by the capacity of working memory, and it is well known that working memory constitutes a comparative bottleneck in the larger context of human information processing (Sperling, 1960). Could this disparity between thought and experience (in terms of, for instance, complexity or informational content) even serve as a basis for the truth of the Experience Requirement? DeLancey (2007) and Schier (2008) have pursued defenses similar to the one just suggested. However, I think that such a line of thought is ultimately mistaken. The mistake arises in treating phenomenal knowledge as a kind of occurrent thought. Phenomenal knowledge, like knowledge generally, is abeyant or standing. This fact about phenomenal knowledge is what allows us to retain our knowledge even under general

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8 Both DeLancey and Schier seek to lend support (consistent with physicalism) to the intuition that Mary learns something upon seeing red. Central to both of their cases are comparisons between, on the one hand, visual experience, and, on the other hand, scientific theoretical understanding. DeLancey suggests that scientific understanding has a relatively low informational content (measured as Kolmogorov complexity). Schier suggests that scientific understanding is relatively impoverished for being, in her words, “fragmented.” It seems, however, from various examples discussed by both authors, that they are comparing visual experiences to the wrong sorts of mental entities: relatively impoverished occurrent states of working memory or language processing instead of vastly more capacious states of standing knowledge.
anesthesia when we, presumably, have no occurrent mental states. Our standing conceptual knowledge, as argued above, is, from an information-theoretic point of view, enormously capacious and more than adequate to the task of capturing the content of visual experience.

While it is mistaken to draw conclusions about what Mary can know from comparisons of occurrent thought and experience, if such inappropriate comparisons are widespread, then this fact can help to explain the widespread intuitiveness of the Experience Requirement. If, on the other hand, such comparisons are not widespread, we still have the previously discussed explanation at our disposal. People are drawn to the Experience Requirement because of a rough grasp that they have of the enormous bandwidth difference between vision and the other sensory modalities.

5. Conclusions

In this paper I have assumed physicalism and argued against gappy physicalism. The basis of my complaint is that, if it is possible for Swamp Mary to have knowledge of phenomenal redness without herself having experienced red, then gappy physicalists have to supply an explanation of why it is that prerelease Mary would be phenomenally ignorant. I have argued further that, upon examining the various psychosemantic strategies for accounting for Swamp Mary’s knowledge, there is no basis for also maintaining prerelease Mary’s ignorance. Gappy physicalists may want to contemplate responding to my arguments by denying the possibility of Swamp Mary, but I am aware of no principled basis available for them to do so. I have offered that physicalists are better off just abandoning the intuition that prerelease Mary is phenomenally ignorant. In
the service of making such an abandonment strategy more palatable, I have offered
information-theoretic considerations designed to show why the key intuition behind the
Mary thought experiment may have seemed plausible while nonetheless being false.

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References


