

Swamp Mary Semantics: A Case for Physicalism Without Gaps

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Abstract

I argue for the superiority of *non-gappy physicalism* over *gappy physicalism*. While physicalists are united in denying an *ontological* gap between the phenomenal and the physical, the gappy affirm and the non-gappy 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, 2003). 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.

Not all gappy physicalists are advocates of the phenomenal concept strategy. For example, Prinz's (2007) "mental pointing" account postulates *non-conceptual* phenomenal demonstratives to account for the gap between Mary's pre- and post-release knowledge. Tye (2009), having terminating his allegiance to the phenomenal concepts strategy, nonetheless attempts to maintain allegiance to gappy physicalism via the postulation of 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 certain physical facts are represented.¹

A *physicalist* thesis hinging on how certain facts are *represented* incurs an obligation to, if not give a physicalistic explanation of representation, at least 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; P. Mandik, in press). 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 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.² In

¹ 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 (2003, p. 136) identifies Lewis as a Type-A materialist.

² 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 cannot explain, or at least have not explained, in ways

previous work (P. Mandik, in press) 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 do so as well. 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 as how such explanations might best proceed.

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 phenomenal concepts advocates and other 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.

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 a being physically intrinsically identical to post-release Mary who, the Swamp being, lacks 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. 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 it may have a high degree of plausibility to 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, like that twice four is eight and that everything is self-identical, 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), the common intuition regarding Mary is that she learns not only what it is like for *her* to see red, but she is also 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 un-anesthetized 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, e.g., 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, no ontological simples are phenomenal. If there are ontological simples, that is, if it isn't complexes all the way down, they are non-phenomenal. This sketch 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 from anti-physicalist 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 non-phenomenal.

The second core doctrine of physicalism of note for the current discussion is that, according to physicalism, 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 also is one of the causal powers of the mental state. Physicalists, then, deny qualia epiphenomenalism.

3. The Psychosemantic Challenge

There are two general approaches to the psychosemantics of phenomenal knowledge in normal subjects that are quite easy to see as totally doomed to fail to account for the psychosemantics of Swamp Mary's phenomenal knowledge. The first approach imposes as a necessary condition 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 (as in Papineau (2002), though 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). The second approach grounds phenomenal representation in a causal relation to some actual past occurrence of a red quale. The quotation approach fails for the following reason. Since Swamp Mary lacks a red quale, her phenomenal knowledge cannot be

grounded in quoting or exemplifying a red quale. The causation approach likewise fails. Since Swamp Mary need not have any actual past, her phenomenal knowledge cannot be grounded in causal relations to past qualia occurrences.

Let us turn, then, to look elsewhere for a psychosemantics to ground Swamp Mary's phenomenal knowledge. There are two worth investigating, promising, each of which relate rather directly to the two key features of physicalism described in the previous section.

The first line for exploration is to ground Swamp Mary's phenomenal knowledge in some kind of nomic or counter-factual 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 (Fodor, 1987). Since the physicalists affirm the causal efficacy of qualia, it's open to posit that there are counter-factual-supporting laws that subsume qualia. Such laws may very well relate qualia to concepts of qualia (as well as non-conceptual 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 counter-factual 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 tokens of which can be caused by red qualia.

The second line for exploration 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. (N. 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 anti-physicalists, 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 account for Swamp Mary's phenomenal representations as, e.g., descriptions that capture defining structural features of a red quale.

Let us call the two approaches just sketched **Nomological** and **Descriptive-isomorphism**, respectively. They 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.

To see why **Nomological** is incompatible with Mary's prerelease ignorance, it helps to first notice a very natural account that **Nomological** is able to give for knowledge of unobservables. Unobservable entities like 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, thus 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 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 is in no position to herself calibrate such an "instrument." 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 gappy physicalism, since non-gappy 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 chains including 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.³

Let us turn, then, to examine the availability, or lack thereof, to gappy physicalists of a psychosemantics along the lines of **Descriptive-isomorphism**. 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, if not exclusively, to two factors. The first factor is the flag’s being a structured complex (with the comparative 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 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. It may perhaps ease

³ Thus may **Nomological** serve as an implementation of the kind of deferential phenomenal concepts that Tye (2009) argues for.

subsequent exposition to label these two factors “content complexity” and “vehicle complexity,” respectively.

Given how **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. Thus are qualia in a position to satisfy the first key factor of **Descriptive-isomorphism**, the content complexity factor. And Mary is physically omniscient, so there would be no non-phenomenal entity or non-phenomenal relations between entities that would exceed her grasp. Thus are states of Mary in a position to satisfy the second key factor of **Descriptive-isomorphism**, the vehicle complexity factor. 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 commonalities between structures such as languages or language games that the descriptions are respectively 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*.

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 truth of an intuition can't suffice to explain its *intuitiveness*. 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 (P. Mandik, in press), 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 an earlier time, classical empiricism 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 neuroscientific scrutiny. Though I think Weiskopf (2007) makes a convincing case against the neurophysiological plausibility of this kind of concept empiricism, I will not 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? When we look to scientific estimates concerning, for example, the bandwidth of human color vision, we find the basis for the following two lines of thought. The first is that we can explain why people may have found the Experience Requirement *plausible*. The second is that considerations concerning neural bandwidth and storage do not suffice to ground the Experience Requirement’s *truth*.

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 volume percentage of PFC to the whole brain is 12.51 (McBride, Arnold, & Gur, 1999) and thus we arrive at a reduced 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 4.32×10^7 bits/sec (Jacobson, 1950, 1951). A more recent estimate is 10^6 bits/sec (Koch et al., 2006) *aka* a megabyte per second (1MB/sec). The computer-savvy reader may already have an intuitive grasp of 1MB/sec. The Wikipedia entry for “megabyte” (accessed July 24, 2008) tells us that a megabyte of data is roughly equivalent to a 1024x1024 pixel bitmap image with 256 colors (8 bpp color depth), 1 minute of 128 kbit/s MP3 compressed music, or a typical book volume in text format (500 pages \times 2000 characters).

Assuming 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 to know what it’s like.

So, from an information-theoretic perspective, Mary’s memory capacity is easily large enough for phenomenal knowledge to be conceptual. But the information has to get in there somehow and maybe color vision is the only pipeline fat enough to do the trick.

Unfortunately for the defender of the Experience Requirement, there's no purely information theoretic basis for her position.

Jacobson (1950, 1951) gives a bandwidth estimate of 4.32×10^6 bits/sec for the eye for black and white vision and an estimate of 9,900 bits/sec for the bandwidth of the human ear. 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 color blind 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 a tenth of a second means that the color blind 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. The information acquired about red may enter 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 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 large 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.⁴ 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.

⁴ 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.

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 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 mistaken experiences 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 relatively rough grasp 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 a 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 physicalist 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 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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