17. Idealism, or Something Near Enough

Susan Schneider
(In Pearce and Goldsmidt, OUP, in press.)

Some observations:

> 1. Mathematical entities do not come for free. There is a field, philosophy of mathematics, and it studies their nature. In this domain, many theories of the nature of mathematical entities require ontological commitments (e.g., Platonism).
>
> 2. Fundamental physics (e.g., string theory, quantum mechanics) is highly mathematical. Mathematical entities purport to be *abstract*—they purport to be non-spatial, atemporal, immutable, acausal and non-mental. (Whether they truly are abstract is a matter of debate, of course.)
>
> 3. Physicalism, to a first approximation, holds that everything is physical, or is composed of physical entities.[1] As such, physicalism is a metaphysical hypothesis about the fundamental nature of reality.

In Section 1 of this paper, I urge that it is reasonable to ask the physicalist to inquire into the nature of mathematical entities, for they are doing heavy lifting in the physicalist's approach, describing and identifying the fundamental physical entities that everything that exists is said to reduce to (supervene on, etc.). I then ask whether the physicalist in fact has the resources to provide a satisfying account of the nature of these mathematical entities, given existing work in philosophy of mathematics on nominalism and Platonism that she would likely draw from. And the answer will be: she does not. I then argue that this deflates the physicalist program, in significant ways: physicalism lacks the traditional advantages of being the most economical theory, and having a superior story about mental causation, relative to competing theories.

In Section 2, I urge that given these results, both a kind of idealism and something near enough to idealism are in better shape, overall, than physicalism. In particular, I identify panprotopsychism (or "micromonism," as I call it) as the most promising answer to the mind-body problem, in light of the considerations in Section 1, and new considerations that I introduce.

1. The Heart of Physicalism[2]

[1] Where, to a first approximation, physical entities are generally regarded as being those discovered by a completed physics.

[2] Much of this section is an updated version of Schneider (forthcoming).

Let me begin with my aformentioned observation: fundamental physics is deeply, if not exhaustively, mathematical. To illustrate with a quotidian example: Suppose you are drinking a steaming cup of cappuccino. Why does it have the properties it has, such as its bitterness and its warmth? It has these properties because it is made of atoms configured in a certain way; and atoms have the structure they do because of their configuration of fundamental particles. And according to quantum field theory, fundamental particles are merely ripples or thickenings in the quantum field, which is explained mathematically. And if, for instance, string theory is employed to explain particle natures, the particles are vibratory frequencies of strings, which is again mathematical. In short, fundamental physics is mathematized physics (Schneider forthcoming).

Elsewhere, I've argued that the mathematical nature of fundamental physical theories raises a serious problem for physicalism (Schneider forthcoming). For consider that the physicalist generally sees her ontological universe as one of concrete entities, consisting in spatiotemporal objects, events and property instantiations. But fundamental physics is highly mathematical, and mathematical entities seem to be abstract—they seem to be non-spatial, atemporal, immutable, acausal and non-mental. (Here, I am merely employing the standard definition of an abstract entity.) Consider, for instance, the Schrödinger equation. And consider the heavily mathematical approaches to quantum gravity, such as string theory and loop quantum gravity. In essence: because fundamental physics is highly mathematical, mathematical entities, which are anything but "concrete," are playing a key role in physics.

Mathematical entities do not come for free, however. As observed, physicalism holds that everything is physical, or is composed of physical entities. This is a metaphysical hypothesis about the fundamental nature of reality. It is reasonable to ask the physicalist to inquire into the nature of mathematical entities, for mathematical entities are doing major work in the physicalist's theory, describing and identifying the fundamental physical entities that everything that exists is said to reduce to (supervene on, etc.). The key question in this essay will be whether the physicalist in fact has the resources to provide a satisfying account of the nature of these mathematical entities, given existing work in philosophy of mathematics on nominalism and Platonism that she would likely draw from. And the answer will be: she does not.

Let us call a supervenience, (reductive, realization, etc.) base that contains that which is identified by a given physicalist program as fundamental a "physical base." The physicalist holds that everything is physical, being either a fundamental physical entity or depending upon fundamental physical entities in the base.[3] Now, I've observed that in the face of the aforementioned mathematical nature of fundamental physics, one could raise the following worry for physicalism (Schneider forthcoming).

[3] Depending upon the reductive, realization or supervenience thesis the "base" can be as large as all of spacetime or as small as the neural basis of a type identity claim. There are debates in the physicalism literature about these matters, but this discussion does not require a particular account of the size of the base nor a specific sort of dependency relation.

It seems that the fundamental properties and particulars in the physicalist's base—the building blocks of the physicalist's ontological universe—need to be *individuated* mathematically. That is, mathematical entities seem to make the objects and properties figuring in the physical base the types of objects and properties they are. And if something individuates something else it is generally considered to be part, or even all, of the entity's nature—unless, that is, an argument is provided to the contrary.[4] Without an argument, the presumption is that the individuative entity does, at least in part, contribute to the nature of the entity whose nature is in question. So, playing Devil's advocate, we could ask the physicalist: why is the physical base not abstract, at least in part, if fundamental physical entities seem to be individuated by abstracta?

Here's another way to put the issue. Consider an example of an identity condition. In the personal identity literature, the well-known psychological continuity theory offers an identity condition involving psychological continuity over time. Psychological continuity is a proposal about how to *individuate* persons, presenting an identity condition in which the survival of a person is determined by their psychological continuity over time. An entity *individuates* something else when it figures in its identity condition. The presumption is that if something individuates something else, it is part of its nature, at least without an argument to the contrary.

Prima facie, mathematical entities play a key role in the identity conditions for entities in the physical base—the conditions of sameness and difference of entities within a given metaphysical category at a given time or over time. So why aren't the entities in the physical base abstract, then, given that fundamental theories in physics are heavily mathematical?

Most physicalists will vehemently reject the idea that abstract entities are part of the nature of their base, of course. Mathematics merely describes the universe; the universe isn't mathematical. I agree. I am just pressing the physicalist to explain why the entities in the base are metaphysically distinct from mathematical entities—why all the mathematics is merely descriptive. What ontological resources are up the physicalist's sleeve? Here, the physicalist can appeal to work in philosophy of mathematics.

Platonism in philosophy of mathematics says that there are mathematical entities, that is, entities that fall in the domain of mathematics, such as numbers, sets and mathematical structures.[5] According to the Platonist, mathematical entities are abstract: they are non-physical, non-causal, immutable, non-spatiotemporal, and non-mental. *Nominalists* in philosophy of mathematics deny the truth of Platonism, holding that there are no abstract entities.[6] A natural response to our problem is to appeal to a form of nominalism, called "fictionalism."

Fictionalism agrees with Platonism that our mathematical sentences and theories purport to be about mathematical entities, but contra Platonism, fictionalism

[4] We shall consider such arguments shortly.

[5] Different Platonist theories regard different kinds of entities to be basic (e.g., numbers, structures).

[6] Herein, when I speak of "nominalism" I have in mind nominalism in philosophy of mathematics, rather than nominalism about universals.

denies that there are abstract entities. Our mathematical statements are not true. (However, fictionalists can allow that the statements are "true in the story of mathematics."[7]) Fictionalism is regarded by most philosophers of mathematics as being the most plausible form of nominalism. Further, when pressed about the nature of mathematical entities, physicalists tend to say that they suspect that fictionalism is correct.

On this view, sentences like "1+1=2" are not true for the same reason that sentences like "Commander Data was on the Enterprise" are not true—there are no such things as Data or the number two. Both are fictional (Balaguer 1998; Field 1980, 1989). What is meant by "fictional" in the context of mathematical fictionalism? In the following passage, Mark Colyvan aptly explains the sense in which mathematical entities are said to be fictional:

> fictionalism in mathematics does not mean that 'anything goes.' Authors of mathematical theories, like writers of good literary fiction, are not free to develop their fiction in any way they please. For a start, consistency is usually thought to be strongly desirable. Beyond that, there are also requirements not to introduce unnecessary items. In good mathematics, like good literary fiction, posited entities contribute to the story. But perhaps the greatest constraint on writing mathematical fiction is that the latest installment must be consistent with all previous installments. Previous generations of mathematicians introduced such 'characters' as sets, functions, natural numbers and so on. The current generation of mathematicians must develop these "characters" in ways that are consistent with what went before. It is as though current mathematicians are all contributing to a multi-authored series of books. Just as Tolkien was heavily constrained in the last book in *The Lord of the Rings* trilogy by what went before in *The Hobbit* and the previous two books in *The Lord of the Rings* series, so too modern mathematicians cannot develop the fiction of mathematics in any way they please. (2011)

The difference between sentences like "7 is odd' and "3 is even" is that the former, and not the latter, are in the story of mathematics, a story that's made up of our mathematical theories. As Colyvan explains, fictionalism has "a very straightforward epistemology: there is nothing to know beyond the human-authored story of mathematics. And coming to know the various fictional claims requires nothing more." (2011) Why do we use certain mathematical stories, and not others? Mark Balaguer notes: "The reasons are that this story is pragmatically useful, that it's

---

[7] Both Field and Leng hold that "9 is odd" and "5 is even" are both *strictly untrue*, but "9 is odd" is *true in the story of mathematics*. To be true in the story of mathematics, for them, is to follow from mathematical axioms accepted by humans. For Mark Balaguer, the story of mathematics can extend beyond the currently accepted axioms, encompassing the "full conceptions" (in his own words) that humans have of mathematical entities (Balaguer 1998; Field 1990; Leng 2010).

aesthetically pleasing, and most important, that it dovetails with our 'way of thinking.'" (1998: 13).

Fictionalism is influential, but I've argued that physicalists cannot be fictionalists (Schneider, forthcoming). Fictionalism takes mathematics to be a purely human story, and it explains mathematical discourse in terms of mental phenomena such as human pragmatic and aesthetic interests. This gives rise to three problems. First, physicalism becomes circular, for mental phenomena are being explained by reference to physical properties and particulars that are themselves individuated by mental phenomena. Second, a putative physicalist solution to the mind-body problem must employ a reductive (supervenience, realization, etc.) base that is itself *physicalistically kosher* — free of mental or otherwise nonphysical entities. And base of physical entities that is individuated by mental entities is not physically acceptable.

Third, insofar as a prediction or law in fundamental physics is couched in a mathematical vocabulary, it will turn be untrue, that is, either false or vacuous. While physicalists realize that current physics is false, for relativity theory and quantum mechanics contradict, it would be a bad result if the physicalist had to say that the claims of a completed physics will turn out to be untrue, or merely true within the fictional story of mathematics! (If you ask me, there is a general lesson here for anti-realist approaches to mathematical entities, where anti-realists deny that mathematical statements are about anything. For this reason, the physicalist should locate a viable realist theory, finding nominalistically (and physically) kosher truthmakers.)

A common objection to my remarks on fictionalism is to observe that although fictionism is mind-dependent, the fictionalist Hartry Field also proposed a promising nominalization procedure that is separable from his fictionalism, and this is what the physicalist should appeal to. Field argued that it is not necessary, in producing a physical theory, to quantify over abstract entities. Drawing from Hilbert's axiomatization of Euclidean geometry, Field provided a formalization of Newtonian gravitational theory in which the quantifiers range over space-time regions (including points) and point- particles. He provided relational predicates that, as applied to spatiotemporal intervals, allows one to mimic the operations of multiplication, addition, and so on (Field 1980). Let us call this "the spacetime response."

I quite like Field's program, but the physicalist cannot appeal to it. Theories of quantum gravity are more fundamental than quantum mechanics, seeking to unite quantum mechanics and Einstein's theory of general relativity, which are currently at odds. According to two leading theories of quantum gravity (loop quantum gravity and string theory) spacetime is not fundamental. Instead, it is emergent. (Schneider forthcoming; Seiberg 2006; Huggett and Wuthrich 2013; Swingle ms.). Physicists often use the expression "emergent" without defining it, but overall, these discussions paint a picture in which spacetime is what philosophers have called "*strongly emergent"* (Chalmers 2006), in which spatiotemporal truths are not deducible from truths at the fundamental level, even in principle.[8] Consider, for instance, holographic theories, which map all the information from a 3D structure to a 2D boundary, preserving all the same

[8] I am not claiming that advocates of the view that spacetime is emergent suggest there is downward causation, however. I am merely claiming that they hold that the spatiotemporal truths are not deducible, even in principle.

information, leading people to ponder whether the universe is a hologram. The point here is that there seems to be no unique spatiotemporal structure that is fixed by the base-level physical laws and facts.

I've observed that the situation with these theories of quantum gravity raises a problem for the spacetime objection (Schneider, forthcoming). The spacetime regions and points would be individuating the fundamental properties and substances posited by these theories, entities like strings and spin networks. But spacetime *emerges* from the fundamental entities; so it is puzzling to say that the fundamental entities are also individuated by them. If something emerges from some emergence base, it is supposed to be due to the nature of the entities in the base that the emergent entity exists, otherwise, it doesn't really emerge from the base. If macroscopic spatiotemporal features individuate fundamental microscopic entities, then, aren't these features part of the nature of the microscopic entities? If this is correct, then the features of the emergent spacetime would trace back to the configurations of microscopic entities, but then, since a given microscopic entity would have one or more spatiotemporal properties as part of its nature, spacetime would seem to emerge from itself. For spacetime is individuating that which it "emerges" from. I find this puzzling, especially since the string theorists are saying that spacetime is *not* found at the fundamental level, merely appearing "as approximate semiclassical notions in the macroscopic world." (Seiberg 2006; Schneider forthcoming)

Further, even putting aside this direction of explanation problem, it isn't even clear how spacetime, given that it is said to be an *approximation* that is not even applicable to phenomena at the microphysical level, could reasonably be said to individuate the fundamental entities in string theory. Why would a mere approximation play such a major role? In any case, it is important to bear in mind that theories of quantum gravity are under constant development. Perhaps these issues will be clarified upon a fuller elaboration of the wat in which spacetime is emergent on the part of physicists and philosophers of physics. But for now, the spacetime response faces a serious problem.

Of course, the physicalist can respond that there are many other nominalist approaches to choose from. Unfortunately, I have been unable to locate a nominalist approach which is both plausible and physicalistically kosher, although I've canvassed many (Schneider, forthcoming). One problem is that mind-dependency seems rife in the nominalism literature in philosophy of mathematics. Any mind-dependent approach will not work for the same reason fictionalism does not. For instance, *psychologism* claims that mathematics is about mental objects. E.g., "2+2=4" is about the ideas of 2 and 4. C*onventionalism* holds that mathematical sentences are analytically true, e.g., "2+2=4" holds solely in virtue of the meanings of the expressions. Notice that this would not yield a physicalist answer to the mind-body problem because mental phenomena would be supervenient upon (or reducible to, etc.) physical entities individuated by intentional properties. *Game formalism* holds that mathematics is a symbol manipulation game. Again, this is mind-dependent, as these "games" are human creations, and, as an anti-realist theory, much of even a future physics would turn out to be false.

What about an approach that takes the truthmakers for mathematical statements to be properties or objects? Let us now turn to a familiar object-based approach to see

what the problem is.

Object and Property-Based Approaches to Abstracta

According J.S. Mill, mathematics is the most general of the sciences, giving us laws about physical objects. For example, "2+2=4" tells us that whenever we add two objects to a pile of two objects, we will end up with four objects (Mill 1973). Let us call these objects "Millian objects." Notice that according to physicalism the entities in the physical base are supposed to be the building blocks for everything that exists. Because the physicalist is looking to individuate these building blocks, the individuative entities cannot be macroscopic physical objects, for the fundamental building blocks are supposed to compose macroscopic objects (Schneider, forthcoming). If the physicalist appeals to macroscopic objects to serve as truthmakers for statements in mathematized physics, his approach would be circular.

Perhaps Millian objects should be fundamental physical objects like particles and strings, rather than macroscopic ones. This broadly Millian approach will not suffice for several reasons, however. First, if the physical base contains physical substances, then the Millian approach will turn out to be circular. One cannot individuate fundamental objects by reference to themselves. Second, I've mentioned that physicalists often have property ontologies, taking a spatiotemporal mosaic of properties as basic (where such can have causal natures or be entirely categorical or non-nomic, as with Humean supervenience theses). Pure property ontologies need to take physical objects as metaphysically derivative, even objects that physics itself regards as being fundamental. Objects are instead bundled out of properties or they are properties, together with a substratum or thin particular (see Armstrong 1997; Schneider 2012, 2013a). Bearing this in mind, the Millian approach puts the ontological cart before the horse. For objects, not physical properties, would be basic. And the nature of the physical properties would depend upon the Millian objects. So substances (including minds) could not be bundles of tropes or propertied substrata. Third and finally, this view presupposes the very concepts of number and addition—notice the objects are already numbered, and they are added together—so upon reflection, it doesn't really explain the nature of number (Schneider forthcoming). And because this position presupposes the concepts of units and addition, it makes covert appeal to human classifications and concepts. The physicalist needs to avoid mentalistic approaches to the nature of mathematical entities, as discussed.

For further discussion see (Schneider forthcoming), where I also respond to a related approach by Keith Campbell, which explain numbers in terms of properties (as tropes), rather than objects (Campbell 1990). Having discarded a variety of nominalisms in pursuit of a nominalist answer to our problem, let us turn to a different approach entirely. What about Platonism?

Platonistic Physicalism

Notice that Platonistic physicalism is *not monistic.* It is a dualism of the abstract and concrete. Platonism in philosophy of mathematics does not entail that there are concrete entities, but our Platonist is a physicalist, so she will surely include *concreta*

in her ontology, although she will face problems concerning their nature, as we'll see. It is a form of dualism because there is, on the one hand, a realm of abstract mathematical entities, as per Platonism, and on the other, a realm of concrete entities, such as ordinary objects and their dispositions, as per physicalism. We can contrast *physicalist monism*, which repudiates abstracta, from *physicalist dualism,* which quantifies over both abstract and concrete entities.

Elsewhere, I've urged that Platonistic physicalism is not really a physicalist position, and further, that it faces deep epistemological and metaphysical problems (Schneider, forthcoming). I will confine myself to a few remarks here: if physicalism must appeal to this view, then it loses two of its major advantages.

(1) Perhaps the strongest consideration in favor of physicalism is that it promises to be the most parsimonious account of reality. According to the physicalist, competing views of the nature of mentality, such as property dualism, substance dualism, and panpsychism posit extra ingredients to reality, above and beyond those posited by science, and are less economical than physicalism.[9] But Platonistic Physicalism cannot deliver on this promise, for it posits extra ingredients outside of spacetime that are not part of physics itself, but which are arrived at on the basis of philosophical reflection about the nature of mathematical entities. Indeed, this form of physicalism is a kind of dualism; there is, on the one hand, the concrete realm of objects and their properties, and on the other, an abstract realm of Platonistic entities.

(2) Insofar as the nature of the entities in the physical base seems abstract, both mental and physical causation becomes a mystery, for how do abstracta enter into causal relations? Abstracta are by definition immutable, acausal, and outside of space and time. While the physicalist has traditionally had an advantage over property dualism in the domain of mental causation, claiming that mental properties are epiphenomenal if property dualism is true, the physicalist's situation is even *worse* than the epiphenomenalism of the mental. For the physicalist cannot explain physical causation, insofar as the base seems abstract. Further, because the physicalist holds that the mental is just the physical, mental causation will be mysterious as well.[10]

Where does all this leave us? Thus far, it seems that the physicalist faces a dilemma. On the one hand, it is natural for the physicalist to turn to nominalism to answer the problem of the base. But even well-received nominalist theories, like fictionalism, introduce severe direction-of-explanation worries into the physicalist's program. On the other hand, Platonistic physicalism is dualist: it holds that immutable, non-spatiotemporal entities exist, and play an important role in physical theories. And it faces serious problems.

2. Mind, Matter, and Mathematics

---

[9] Of course, it may be that positing an extra ingredient is justified because doing so provides the best explanation of consciousness.

[10] The physicalist will likely want to deny this. To do this effectively, she must provide an account of the nature of the entities in the base, one in which the basic entities are clearly concrete. I've ruled out various nominalist approaches to making the base concrete. In Schneider (forthcoming), I show how the Platonistic physicalist might try to render the base concrete as well and respond to these attempts.

Now let us ask: How does all this inform the debate over the nature of consciousness? Does it improve the case for idealism, for instance? I believe it does, although I suspect that a different position is superior, a position is still admittedly close to idealism. I will consider idealism shortly, but it is instructive to begin with a discussion of a well-known alternative to physicalism, naturalistic property dualism. *Naturalistic property dualism* holds that qualia and physical properties are both fundamental, and futher, qualia are macroscopic properties that emerge from brains, and perhaps other complex systems (Chalmers 1996). The property dualist believes she has the best explanation for the explanatory gap between mental and physical properties. Physicalists dispute this, of course, and they contend that physicalism is more economical than dualist theories. Property dualists counter this, saying that the addition of qualia to one's fundamental ontology is justified, for it is the best explanation for the phenomenon of conscious experience. Physicalists then counter that the dualist is merely taking qualia as fundamental, and doing this is not really explaining qualia but taking it as basic. And the debate continues (Schneider forthcoming).

In my experience, when it comes to intuitions about qualia, philosophers tend to not change their minds. Instead of debating warring intuitions about consciousness, I've adopted a different sort of strategy, one that claims that physicalism rests on weak metaphysical foundations: physicalism doesn't mesh with well-respected positions on properties and particularity in the fields of metaphysics, and, as we've seen, with theories of the nature of mathematical entities in philosophy of mathematics. It thereby lacks a solid metaphysical framework (Schneider 2012, 2013a, 2013b, forthcoming).[11]

I've noted that physicalists have long claimed that their approach is more economical than dualism. They further hold that they have the upper hand *vis a vis* mental causation, for they claim that a complete account of the causation of thought and behavior can be provided by appealing to the physical properties of the brain. Qualia, being non-identical to physical properties, are epiphenomenal. I've observed that the Problem of the Base strips physicalism of these two traditional advantages, however. For if the physical base threatens to be abstract, physicalism is in worse shape, overall, than property dualism with respect to causation, as she now has a problem with *both* physical and mental causation. For how can physical objects and properties, including entities built up out of these (such as mental properties) enter into causal relations if their natures are even partly abstract? Further, physicalism is not more economical than property dualism: an ontology of physical and abstract entities is just another form of dualism, and this is no more economical than traditional property dualism, at least if the property dualist does not add abstracta to her ontology (Schneider forthcoming).

But can the property dualist really avoid abstracta? If not, she would not be a dualist, but a pluralist, so her position would be less economical than physicalism, after all. There is indeed a sense in which the traditional property dualist faces the Problem of the Base. For the property dualist quantifies over both mental and physical

[11] This is not to say that computationalism about the brain is also problematic. Although many computationalists are physicalists—they tend to be non-reductive physicalists, in particular—one can be a computationalist while rejecting physicalism.

properties, and perhaps over physical particulars, and given that physics is highly mathematical, it may seem, at least at first blush, that physical entities are abstract. Having naturalistic inclinations, the property dualist should explain why this is not the case. After all, we've noted that if physical entities have (even partly) abstract natures then causation would be mysterious. Further, the dualist may want to specify the nature of fundamental physical entities in order to provide a well-defined conception of the physical, and relatedly, to better demarcate the difference between physical and non-physical properties.

The dualist could be a Platonist, of course, although in this case, technically, she is a pluralist, not a dualist. Indeed, perhaps the dualist should be a Platonist, for again, Platonism may be correct. But importantly, *the property dualist need not be a Platonist*, for she can regard mathematics as a system of human classifications without falling prey to circularity. For the mental phenomena can serve as truthmakers for statements in mathematized physics (Schneider, forthcoming). For according to property dualism, mental phenomena are fundamental in any case.

Appealing to mentalistic truthmakers changes the shape of property dualism, however. Here, there are at least two routes the dualist can take. (i) If mathematical entities are explained in terms of phenomena like human classifications, or aesthetic concerns, as with fictionalism, for instance, then the property dualist can claim that macroscopic mental properties, such as concept or belief types, individuate the fundamental physical entities. Although naturalistic property dualism has not been framed herein as a version of panpsychism, this modified dualist position is similar to panpsychism in that mental phenomena are metaphysical constituents of microphysical entities. However, the view features fundamental mental entities that are macroscopic, rather than microscopic. The macroscopic mental entities serve to individuate the fundamental physical properties (Schneider forthcoming).

This is probably too much to swallow for traditional property dualists. Still, if one is willing to live with this feature of the view, there are benefits. This brand of property dualism is no less economical than physicalism, as I've noted. Further, there is a sense in which mental entities are causal. Because mental properties individuate the physical properties, the mental is part of the nature of the physical. (Part, but not all, for presumably the property dualist will want the physical properties to be something more than just mental properties.) If the physical depends on the mental and the physical realm is causal, one can devise at least a derivative sense in which mental properties are causal.

(ii) The following strikes me as a better option. Notice that the dualist can avoid macrophysical truthmakers altogether by turning to panpsychism or panprotopsychism, and thereby putting mental (or protomental) phenomena into the micro-level itself. (According to panprotopsychism, the fundamental entities identified by physics have properties that are precursors to consciousness and can collectively constitute consciousness in certain sophisticated computational systems, such as brains.)[12] Because, in this case, the truthmakers for mathematical statements would supervene upon a supervenience base of micro-level mentalistic or protomentalistic

[12] Although I use "micro" here, strictly speaking, these fundamental entities need not be subatomic.

entities, macroscopic properties are not required to individuate fundamental physical properties and objects. The micro-level properties can do all the work (Schneider, forthcoming).

It is important to bear in mind that there are both monistic and property dualist versions of panpsychism and panprotopsychism (Alter and Nagasawa 2015; Chalmers 2014; Goff 2015; Strawson 2006). *Ceteris paribus*, a monistic version of either view that repudiates Platonism would be *more* parsimonious than physicalism, and a property dualist/nominalist version of either view stands to be equally parsimonious. Panpsychism and panprotopsychism both tend to fare well with respect to mental causation as well, for the phenomenal properties are at the micro-level.

Now let us ask: Is a monistic panpsychism, in particular, a form of idealism? (We shall return to panprotopsychism shortly.) Unlike leading solutions to the mind-body problem, contemporary philosophers of mind have paid little attention to idealism. This volume reflects the beginning of a new dialogue, so it is important to bear in mind that it is currently unclear what a fully refined definition of idealism will look like. But given our current understanding of what idealism is, it seems that a monistic panpsychism may indeed be a form of idealism, or something near enough.

In their introduction to this volume, Tyron Goldschmidt and Kenneth Pearce characterize idealism as the family of views that give priority to the mental. Daniel Greco, in his essay in this volume, provides an account of idealism in terms of grounding. According to him, idealism is the view that all grounding chains end in mental facts. In his own essay in this volume, Pearce defines "fundamental idealism" as the view that all of fundamental reality is mind-like, but he distinguishes this position from weaker idealist theses, (e.g., the mereological idealism he defends).

These views of idealism all seem to allow that some versions of panpsychism could be forms of idealism. Of course, it is important to look at the details of a particular version of panpsychism in order to understand the relation between the mental properties (events, substances) and the physical properties (events, substances), and to see whether the panpsychism in question is even monistic to begin with, at least about concreta (more on concreta shortly). For instance, a view that is sometimes called "panpsychism" but in which only *some* of the fundamental properties are experiential, would not be a form of idealism, but a form of dualism or pluralism, because other, non-mental, properties are also fundamental ingredients of reality. A candidate panpsychist idealism would be a "pure panpsychism", if you will—one in which all the fundamental entities are mental.

A word on "all the fundamental entities" in the above sentence. We might think the following situation should be compatible with idealism: consider a possible world in which (i), Platonism is correct and (ii), all the fundamental spatiotemporal entities fully depend upon mentalistic entities. This is a kind of dualism of the abstract and concrete (where concreta are mental), but it is not unreasonable to believe that this is a world in which idealism holds, or at least something near enough.

It is interesting to ponder whether panpsychism would be as popular as it currently is if more philosophers noticed that it is a form of idealism, or at least verges on idealism. For in the eyes of many, idealism simply gets the facts wrong: the world isn't solely mental. In light of this, it is reasonable to ask: Are there ways to stop short of idealism? One way is to say that some quiddities instantiated in the spatiotemporal world are non-mental. This leaves one with a property dualism of mental and non-mental (i.e.,

physical) quiddities, a view that is less economical than a monistic position. This view has other drawbacks as well: As with all dualisms, one wonders how the mental and physical realms interact causally; in this case, it is unclear how the microproperties that are experiential can interact with those that are not. Further, one wonders whether the experiential properties are genuinely causal, or whether is it in virtue of an object's having physical properties that it has the causal powers it has.

A better way to stop short of full-blooded idealism can be appreciated by considering the following approach.

Monistic Panprotopsychism: a Minimalist Approach

We've seen that panpsychism, like emergent property dualism, treats experience as a basic feature of the universe. Panpsychism has an important advantage over emergent property dualism, in addition to the aforementioned advantage that in its monistic form, it is more economical. (I will henceforth concentrate on monistic panpsychism, calling it, simply, "panpsychism.") Emergent property dualism faces the serious concern that its mental properties are epiphenomenal. Panpsychism does not face this problem, at least insofar as it is monistic, for it puts experience at the ground level of physics, and experience thereby turns out to be causal.

Still, panpsychism faces two serious problems. First, it is implausible that fundamental particles (strings, branes, etc.) have experiential properties. There is simply no evidence for this. In contrast, it is clear that certain macroscopic systems have experience, for each of us can tell, via introspection, that we have experience, and we infer from other's behaviors and neurophysiological similarity with us that others experience the world too. Why would there be clear evidence for macroexperience, but not for microexperience? (By "macroexperience" I mean the sort of experience that humans, and at least some nonhuman animals, experience.) I suspect that the panpsychist would respond that microexperience is a minimal kind of experience –- it is the "what it's like to be a microphysical entity." This level of experience is so minimal that we shouldn't expect it to be detectible.

This response is problematic. Why is this "microexperience" still a form of experience—that is, why is it an experiential property at all, given that it is so minimal that it can inhere in something like a quark or string? For consider Saul Kripke's well-received claim that the essential property of pain is its phenomenal feel: as Kripke observed, we cannot really conceive of a pain that lacks its phenomenal feel (Kripke 1980). Put more generally, the essential feature of a particular experience is that there is something it feels like for a subject to have it from the inside. But now consider that, in contrast, we can easily imagine fundamental physical properties lacking any experiential properties. *Being experiential* does not seem to be essential to any of these properties, contra panpsychism. So why are the panpsychist's putative "experiential" micro-level properties even the same kind of properties that are said to be essential to conscious experiences in macroscopic subjects? A commonly accepted feature of experiential properties—that they have their phenomenal feel essentially—does not seem present.

Second, the panpsychist generally holds that the bearers of the putative microexperiential properties are mini-subjects ("microsubjects," if you will). Perhaps they feel they must defend this because that which has experience must be some kind of a

subject, e.g., a mind, self or person. Particles are nothing like subjects, however. Particles lack the key ingredients that many associate with subjectivity—psychological continuity, brains, personhood, narratives, unified conscious experience, and so on. It is best to avoid this category mistake altogether and not use of the expressions "experience" and "subject" in the context of fundamental microphysical entities. At best, we have panprotopsychism—the microproperties, instantiated by fundamental microphysical entities, *give rise* to experiences. Like transparency, experience is a macroscopic phenomenon that depends upon the arrangements of fundamental particles. But these basic ingredients are not themselves subjects. Nor do they have experiences.

Indeed, panprotopsychism is fairly palatable from the vantage point of physicalism itself. For the physicalist holds that consciousness arises from a configuration of fundamental properties. Like the panprotopsychist, the physicalist believes that her fundamental entities have properties that are the nonexperiential precursors to consciousness and which collectively constitute consciousness in certain sophisticated systems. The physicalist, like the panprotopsychist, thinks the microproperties do this.

Given this, why isn't panprotopsychism just a form of physicalism? It is not physicalism for two reasons. First, we have seen that the problem of the base leads one to rethink the traditional advantages of physicalism, viewing mentalistic monisms, in particular, as having a dialectical advantage. While it is open to the panprotopsychist to appeal to Platonism to explain the nature of mathematical entities, as discussed, she can instead be a nominalist, and this would give her the most economical theory—her view would be a genuine monism, avoiding the dualism of the abstract and concrete that the Platonistic physicalist commits to. But if mental entities are the truthmakers for statements in fundamental physics, the fundamental entities in physics are themselves *mentalistic*. On a reasonable construal of physicalism, this is not a scenario in which physicalism holds; and if one insists on calling this view "physicalism", it is a mentalistic physicalism indeed. More specifically, the protoexperiential properties that the panprotophysist says underlie everything would serve as the truthmakers for statements in fundamental physics.

Second, as Galen Strawson has aptly observed, the physicalist's (nonmentalistic) microproperties seem to be the wrong sort of ingredients to serve as truthmakers here. For the physicalist claims that experience in macroscopic systems fully depends upon the configuration of the microingredients. So the experience must have been there, in the microingredients, all the time. But if this is the case, at least some of the microingredients must be mentalistic to begin with. So (nonpanpsychist) physicalism is false.[13] From this conclusion, Strawson urges that what is needed is a view that puts mentality in the microingredients. I concur, but this does not mean that panpsychism follows, for some form of panprotophysicism could be true.

3. Conclusion

[13] I am taking liberties with Strawson's argument, for Strawson believes that panpsychism is a form of *physicalism*. So on his view, physicalism is not false because panpsychism is true. But I will use a more conventional notion of physicalism here, according to which panpsychism is not physicalism.

The mathematical nature of fundamental physics was my point of departure, and I've argued that it undermines physicalism. Physics is not physicalistic, it would seem. At the end of the day, I've arrived at panprotopsychism, although idealism has not fared poorly. According to panprotopsychism, the fundamental entities identified by physics have properties that are precursors to consciousness and can collectively constitute consciousness in certain sophisticated computational systems, such as brains. Panprotopsychism firmly rejects panpsychism. There are not microsubjects having experiences, even low-level ones; there is not something it is like to be a quark or a photon. At best, physically fundamental entities have the ingredients that can constitute mental states in certain complex systems.

"Panprotopsychism" is an ugly name. We might instead call the view "micro-monism", as it puts quasi-mentalistic ingredients at the fundamental layer of reality—the level of the fundamental physical properties characterized by a completed physics.[14] This is a non-physicalist monism, for the fundamental ontology is not purged of anything mental, as the physicalist would have it. Indeed, as we saw, we needed mentalistic entities at the fundamental level to serve as truthmakers for statements in fundamental physics. This is not idealism either, for these truthmakers are not full-blown mental properties. But the view is close to idealism, as the fundamental ingredients are protomental.[15]

References

Alter, Torin and Nagasawa, Yujin. 2015. *Consciousness in the Physical World: Perspectives on Russellian Monism*. (Oxford: Oxford University Press).

Armstrong, David M. 1978. *A Theory of Universals*. (Cambridge University Press, Cambridge).

_____. 1989. *A Combinatorial Theory of Possibility*. (Cambridge: Cambridge University Press).

_____. 1997. *A World of States of Affairs*. (Cambridge: Cambridge University Press).

_____. 1989. *Universals: An Opinionated Introduction*. (New York: Westview Press).

Balaguer, Mark. 1998. *Platonism and Anti-Platonism in Mathematics*. (Oxford: Oxford University Press).

_____. 2014. 'Platonism in Metaphysics'. In *The Stanford Encyclopedia of Philosophy* (Spring 2014 Edition), Edward N. Zalta, ed, URL = <http://plato.stanford.edu/archives/spr2014/entries/platonism/>.

Benacerraf, Paul. 1973. 'Mathematical Truth', *The Journal of Philosophy*, 70: 661-79.

Bostrom, Nick. 2003. 'Are we Living in a Computer Simulation?', *The Philosophical Quarterly* 53 (211): 243–55.

Burgess, John and Rosen, Gideon. 1999. *A Subject With No Object: Strategies for Nominalistic Interpretation of Mathematics.* (Oxford: Oxford University Press).

[14] Although I use "micro" here, strictly speaking, these fundamental entities need not be subatomic.

[15] Thanks to Kenny Pearce, Tyron Goldschmidt and Jerry Vision for their helpful comments on this paper.

Chalmers, David. 1996. *The Conscious Mind: In Search of a Fundamental Theory*. (Oxford: Oxford University Press).
_____. 2006. 'Varieties of Emergence, ' In P. Davies & P. Clayton, eds. *The Re-Emergence of Emergence*. (Oxford: Oxford University Press), 244-54.
_____. 2015. 'Panpsychism and Panprotopsychism', In T. Alter and Y. Nagasawa, eds. *Consciousness in the Physical World: Perspectives on Russellian Monism*, (Oxford: Oxford University Press), 246-76.
Campbell, Keith. 1990. *Abstract Particulars*. (Oxford: Oxford University Press).
Colyvan, Mark. 2011. 'Fictionalism in Philosophy of Mathematics'. In E. J. Craig, ed, *Routledge Encyclopedia of Philosophy*. (New York: Routledge).
Davies, Paul and Gribbon, John. 1992. *The Matter Myth*. (New York: Norton).
Field, Hartry. 1980. *Science Without Numbers*. (Princeton: Princeton University Press).
_____. 1989. *Realism, Mathematics and Modality*. (Cambridge, Mass: Blackwell).
Goff, Philip. (2015). 'Against constitutive forms of Russellian monism'. In T. Alter and Y. Nagasawa, eds. *Consciousness in the Physical World: Perspectives on Russellian Monism*, (Oxford: Oxford University Press), 370-400.
_____. forthcoming. 'The Phenomenal Bonding Solution to the Combination Problem'. In G. Bruntrop and L. Jaskolla, eds. *Panpsychism* (Oxford: Oxford University Press).
Heil, John. 2012, *The Universe as we Find It*. (Oxford: Oxford University Press).
Huggett, Nick and Wuthrich, Christian. 2013. 'The Emergence of Spacetime in Quantum Theories of Gravity', *Studies in History and Philosophy of Science* 44 (3): 273–5.
Kripke, Saul 1980. *Naming and Necessity*. (Cambridge, Mass: Harvard University Press).
Leng, Mary. 2010. *Mathematics and Reality*. (Oxford: Oxford University Press).
Lewis, David. 1983. 'New Work for a Theory of Universals', *Australasian Journal of Philosophy* 61: 343–77.
_____. 1986. *On the Plurality of Worlds*. (Oxford: Basil Blackwell).
Melnyk, Andrew. 2003. *A Physicalist Manifesto: Thoroughly Modern Materialism*. (Cambridge: Cambridge University Press).
Montero, Barbara. 2009. 'What is the Physical? ' In B. McLaughlin and A. Beckermann, eds. *Oxford Handbook in the Philosophy of Mind.* (Oxford: Oxford University Press), 173-88.
Mill, J.S. 1973. *A System of Logic: The Collected Works of John Stuart Mill* (Vol. 7). J.M. Robinson, ed. (Toronto: University of Toronto Press).
Ney, Alyssa. 2008. 'Defining Physicalism ', *Philosophy Compass* 3 (5), 1033–48.
Papineau, David and Montero, Barbara. 2005. 'The Via-Negativa Argument for Physicalism', *Analysis* 65 (3): 233-7.
Putnam, Hilary. 1979. 'What is Mathematical Truth'. In *Mathematics Matter and Method: Philosophical Papers, Volume 1* (2nd Ed). (Cambridge: Cambridge University Press), 60–78.
Quine, W.V.O. 1969. *Ontological Relativity and Other Essays*. (New York: Columbia University Press).
_____. 1976. 'Carnap and Logical Truth'. In his *The Ways of Paradox and Other Essays* (Rev. Ed) (Cambridge, MA: Harvard University Press), 107–32.

Russell, Bertrand. 1927. *The Analysis of Matter*. (New York: Dover).
Schneider, Susan. 2003. 'Alien Individuals, Alien Universals, and Armstrong's Combinatorial Theory of Possibility', *The Southern Journal of Philosophy*
_____. 2007. 'What is the Significance of the Intuition that Laws of Nature Govern?', *Australasian Journal of Philosophy*, 85 (2): 307-24.
_____. 2012. 'Why Property Dualists Must Reject Substance Physicalism', *Philosophical Studies* 157 (1:, 61-76.
_____. 2013a. 'Non-reductive Physicalism and the Mind Problem', *Nous* 47 (1): 135-53.
_____. 2013b. 'Non-reductive Physicalism Cannot Accept Token Identity', *Philosophy and Phenomenological Research* 85 (3): 719-28.
Shapiro, Stewart. 2008. 'Identity, Indiscernibility, and *ante rem* Structuralism: The Tale of i and –i', *Philosophia Mathematica* 16 (3): 285-309.
Seiberg, Nathan. 2006. 'Emergent Spacetime'. Rapporteur talk at the 23rd Solvay Conference in Physics, December.
Strawson, Galen. 2006. 'Realistic Monism: Why Physicalism Entails Panpsychism', *Journal of Consciousness Studies* 13 (10–11), 3-31.
Swingle, Brian. manuscript. 'Constructing Holographic Spacetimes Using Entanglement Renormalization'.
Tegmark, Max. 2014. *The Mathematical Universe.* (New York: Random House).
Van Inwagen, Peter. manuscript. 'Against Ontological Structure'.
Williamson, Timothy. 2011. 'What is Naturalism? ' *New York Times*, September.