

Reflections on the Foundations of Russellian Physicalism

1. Introduction

Russellian monism¹ (RM) is the philosophical doctrine often described as assuming the conjunction of the following theses:

- i) *Structuralism about physics*: physical truths are truths about structures and dynamics².
- ii) *Categorical ignorance*: according to ‘i’, physics leaves us ignorant of the intrinsic nature of the fundamental reality, which is categorical³.
- iii) *Categoricalism about the physical*: the intrinsic categorical natures must exist, because an ungrounded physical world would be almost epiphenomenal, or a world of empty placeholders devoid of their causal powers⁴.
- iv) *Realism about quiddities*: according to ‘i’, ‘ii’ and ‘iii’, the intrinsic categorical natures are inscrutable, often called quiddities⁵.

The core of these theses comes from some well known passages of Russell’s 1927 *The Analysis of Matter*. In one of these passages⁶, Russell writes that:

¹ For an overview on Russellian monism, see: T. Alter - D. Pereboom, *Russellian Monism*, in «Stanford Encyclopedia of Philosophy» (2019), Online at: <https://plato.stanford.edu/entries/russellian-monism/>.

² B. Russell, *The Analysis of Matter*, Routledge, London 1927; D.J. Chalmers, *The Conscious Mind: In Search of a Fundamental Theory*, Oxford University Press, New York 1996; D.J. Chalmers, *The Character of Consciousness*, Oxford University Press, New York 2010.

³ D. Stoljar, *Ignorance and Imagination: The Epistemic Origin of the Problem of Consciousness*, Oxford University Press, Oxford 2006.

⁴ For example, see: D.J. Chalmers, *The Conscious Mind*, cit., p. 153.

⁵ See T. Alter - Y. Nagasawa, *What is Russellian Monism?*, in «Journal of Consciousness Studies» 19, 9-10 (2012), pp. 67-95.

⁶ B. Russell, *The Analysis of Matter*, cit., p. 384.

«A piece of matter is a logical structure composed of events; the causal laws of the events concerned, and the abstract logical properties of their spatio-temporal relations, are more or less known, but their intrinsic character is not known. Percepts fit into the same causal scheme as physical events, and are not known to have any intrinsic character which physical events cannot have, since we do not know of any intrinsic character which could be incompatible with the logical properties that physics assigns to physical events. There is therefore no ground for supposing that percepts cannot be physical events, or for supposing that they are never compresent with other events».

There is thus a logical compatibility between physical events and phenomenal experiences, which could be eventually translated into an ontological compatibility. But how should we characterise such compatibility? Many acknowledge that the new Russellian monism is mainly motivated by the fact that both dualism and physicalism suffer from insurmountable problems. While the exclusion argument against dualism leads to the conclusion that, were it true, phenomenal consciousness would be epiphenomenal, the conceivability argument⁷ and the knowledge argument⁸ entail that physicalism is false – there is an ideal epistemic incompatibility between physical truths P and phenomenal truths Q, the so-called epistemic gap, which entails an ontological gap (Q facts are not physical). In other words, such arguments show that there is no a priori entailment from the former to the latter. These two arguments could be formally stated as follows⁹.

The conceivability argument

1. $P \& \sim Q$ is ideally conceivable.
2. If $P \& \sim Q$ is ideally conceivable, then $P \& \sim Q$ is metaphysically possible.
3. If $P \& \sim Q$ is metaphysically possible, then physicalism is false.
4. Therefore, physicalism is false.

⁷ E.g. see D.J. Chalmers, *The Conscious Mind*, cit.

⁸ F. Jackson, *Epiphenomenal Qualia*, in «The Philosophical Quarterly» 32, 127 (1982), pp. 127-136.

⁹ See T. Alter - R.J. Howell, *The Short Slide from A Posteriori Physicalism to Russellian Monism*, in T. Alter - Y. Nagasawa (eds.), *Consciousness in a Physical World: Perspectives on Russellian Monism*, Oxford University Press, Oxford 2015, p. 278.

The knowledge argument

1. Q is not a priori deducible from P.
2. If Q is not a priori deducible from P, then P does not metaphysically necessitate Q.
3. If P does not metaphysically necessitate Q, then physicalism is false.
4. Therefore, physicalism is false.

Some have interpreted Russell's claims by arguing that if the categorical bases of physical properties are conceived as phenomenal or proto-phenomenal properties, then RM can be an effective response to the arguments against physicalism, primarily the conceivability arguments¹⁰. This is why RM has recently aroused much interest. However, there is no consensus on how the epistemic compatibility between categorical and physical properties should be conceived. This problem arises from thesis 'iii', according to which categorical properties ground physical dispositions. There are, indeed at least three different characterisations of RM.

According to one interpretation, representing the first of two horns, RM is a form of panpsychism¹¹, according to which the intrinsic nature of which physics leaves us ignorant is psychic: the inscrutables are primitive forms of consciousness or micro-subjects. According to this interpretation, ontological compatibility ultimately consists in the "reduction" of the physical to the intrinsically mental nature of reality. In this sense, there would not be two natures: what really exists are the micro-subjects and their combination gives rise to phenomenal consciousness, whereas fundamental physical truths correspond to an extrinsic, and therefore in a sense spurious, characterisation of the underlying micro-subjects. The main problem with this interpretation of RM is the so called "subject-summing problem"¹², but the main theses underpinning panpsy-

¹⁰ See D.J. Chalmers, *The Character of Consciousness*, cit.; Also see: D.J. Chalmers, *Panpsychism and Panprotopsychism*, in «Amherst Lecture in Philosophy» 8 (2013), pp. 1-35.

¹¹ W. Seager, *Panpsychism*, in A. Beckermann - B.P. McLaughlin (eds.), *The Oxford handbook of philosophy of mind*, Oxford University Press, New York 2009, pp. 206-219; P. Goff, *Galileo's Error: Foundations for a New Science of Consciousness*, Pantheon Books, New York 2019; G. Strawson, *Realistic monism: why physicalism entails panpsychism*, in A. Freeman (ed.), *Consciousness and its place in nature: does physicalism entail panpsychism?*, Imprint Academic, 2006, pp. 3-31; G. Strawson, *Mind and Being: The Primacy of Panpsychism*, in G. Brüntrup - L. Jaskolla (eds.), *Panpsychism: Contemporary Perspectives*, Oxford University Press, New York 2016, pp. 75-112.

¹² P. Goff, *Galileo's Error*, cit.; but see also: S. Coleman, *Panpsychism and Neutral Monism: How to Make up One's Mind*, in G. Brüntrup - L. Jaskolla (eds.), *Panpsychism: Contemporary Perspectives*, cit.,

chism presumably close the epistemic gap at the base. Moreover, such a doctrine is not subject to the arguments of zombie, swapped or inverted bases¹³, because what really exists is an ontology of irreducible micro-subjects. I will not go into the plausibility of this doctrine here.

According to the panprotopsychist interpretation of RM, which we might call “of intermediate compatibility”, categorical properties are protophenomenal. Chalmers, for example, has proposed the idea that protophenomenal properties are not themselves phenomenal, but that a huge number of them might constitute phenomenal experiences. It avoids the subject-summing problem, but faces other problems. The main reason can be deduced from a passage by Chalmers¹⁴.

«If these intrinsic protophenomenal properties qualify as physical properties, then the zombies we conceive of are not full physical duplicates, and any full physical duplicates will also be phenomenal duplicates. On this understanding, Russellian monism qualifies as a form of physicalism. However, because it relies on speculation about the special nature of the fundamental properties in microphysics, it is a highly distinctive form of physicalism that has much in common with property dualism and that many physicalists will want to reject».

Some, in fact, argue that RM is bound to the thesis of this dual nature of the basic properties of reality, since this is what motivated philosophers to consider RM in the first place, i.e. as a response to zombie-style arguments. This thesis, however, seems to entail an undesirable level of complexity of categorical bases that exposes RM to modified versions of the arguments that plague physicalism and dualism. Howell, for example, argues that there is enough complexity at the level of categorical bases to show that RM is exposed to the «modal separability»¹⁵ (see section II).

On the other horn, RM is characterised as a kind of physicalism¹⁶. According to this version of RM, the ontological compatibility is justified by assuming

pp. 249-282; K. Frenkish, *Panpsychism and the Depsychologization of Consciousness*, in «The Aristotelian Society», Supplementary Volume xcv (2021), pp. 51-70.

¹³ R.J. Howell, *The Russellian monist's problems with mental causation*, in «Philosophical Quarterly» 65(2015), pp. 22–39; K. Morris, *Russellian Physicalism, Bare Structure, and Swapped Inscrutables*, in «The Journal of Consciousness Studies» 23, 9-10 (2016), pp. 180-198; L.C. Chan, *Can the Russellian monist escape the epiphenomenalist's paradox?*, in «Topoi» 39, 5 (2018), pp. 1093-1102.

¹⁴ D.J. Chalmers, *The Character of Consciousness*, cit., p. 152.

¹⁵ R.J. Howell, *The Russellian monist's problems with mental causation*, cit.

¹⁶ See: B.G. Montero, *Russellian Physicalism*, in T. Alter - Y. Nagasawa (eds.), *Consciousness in the Physical World: Perspectives on Russellian Monism*, Oxford University Press, New York 2015, pp.

that physical properties may have their essentially physical categorical counterparts, that is that even if physics is only about structures and dynamics, under an expansive notion of the physical¹⁷ we could recognise categorical bases to be intrinsic physical properties, the absolutely intrinsic properties¹⁸ of which physics leaves us ignorant at the present stage of its progress. Thus the ontological compatibility presupposes the ability to show that the epistemic gap could be a posteriori closed. If so, RM implies the thesis that phenomenal truths are ultimately grounded in such physical truths. In this perspective, RM is a kind of a posteriori physicalism, or Type-B physicalism¹⁹. Moreover, from this point of view, protophenomenal properties are not experience-specific, they qualify as essentially physical non-structural properties, and their combination – guaranteed by their structural causally efficacious components – results in phenomenal truths, only a posteriori recognisable to be physical truths. I am sympathetic to this perspective, and will propose a version of it that offers a different perspective on the concept of grounding.

Now, my work will be structured as follows. First, I will show that panprotopsychism ultimately collapses into Russellian physicalism. Secondly, I will defend the thesis that Russellian physicalism is able to justify the ontological compatibility of phenomenal and physical truths, and thereby resist the criticism to RM in its panprotopsychist version. Finally, I will support my claims with some scientific investigations that are compatible with the metaphysical commitments of this work.

2. Panprotopsychism and its dilemmas

What primarily motivates criticisms of Russellian monism in its panprotopsychist version is that, as many argue, RM is affected by the contingency thesis²⁰, according to which the relation between categorical properties and physical

209-223; T. Alter - S. Coleman, *Russellian Physicalism and Protophenomenal Properties*, in «Analysis» 80, 3 (2020), pp. 409-417.

¹⁷ D. Stoljar, *The conceivability argument and two conceptions of the physical*, in «Philosophical Perspectives» 15 (2001), pp. 393-413; D. Stoljar, *Four kinds of Russellian monism*, in U. Kriegel (ed.), *Current controversies in philosophy of mind*, Routledge, New York 2014, pp. 17-39.

¹⁸ D. Pereboom, *Consciousness, Physicalism, and Absolutely Intrinsic Properties*, in T. Alter - Y. Nagasawa (eds.), *Consciousness in the Physical World*, cit., pp. 300-323; D. Pereboom, *Illusionism and anti-functionalism about phenomenal consciousness*, in «Journal of Consciousness Studies» 23, 11-12 (2016), pp. 172-85.

¹⁹ See T. Alter - R.J. Howell, *The Short Slide from A Posteriori Physicalism to Russellian Monism*, cit.

²⁰ T. Alter - S. Coleman, *Russellian monism and mental causation*, in «Nous» (2019), pp. 1-17.

dispositions is contingent. But the contingency thesis is related to the fact that this version of RM, as Chalmers notes, is more akin to property dualism than to physicalism in the first place – because there seems to be a commitment to speculations on certain special properties, that is to the above thesis ‘iv’. Thus, as noted, the panprotopsychoist version, if understood as concerning the relationship between two aspects or natures of the basic facts, exposes RM to criticism. Howell, for example, presents an argument that undermines the causal efficacy of RM quiddistic natures²¹. By assuming realism about the phenomenal nature of these inscrutables, Howell shows that a version of the modal argument affects RM. Howell presents his argument as follows.

«Consider a world w_1 in which R, phenomenal redness, grounds the property of negative charge given the causal laws governing R in w_1 . Now consider world w_2 where G, phenomenal greenness, is covered by those same laws so that G grounds the causal powers associated with negative charge and R instead grounds the powers associated with negative spin. Finally, consider a third world, w_3 , in which the laws are such that either R or G can ground the powers of negative charge – R and G are governed by exactly the same laws in exactly the same ways. Compare R in w_1 and R in w_2 ».

Accordingly, Howell concludes that the phenomenal “part” of categorical properties makes no unique contribution to the physical world. Howell’s argument presupposes that there is enough complexity in the quiddistic natures to allow for such modal separability. Similarly, Chan argues²² that such modal separability allows us to imagine a possible world in which categorical properties are devoid of their phenomenal component/nature, i.e. a world composed of zombie bases. Accordingly, if such zombie bases are conceivable, then epiphenomenalism goes back out the window, and thus “our phenomenal judgements cannot be responses to and cannot be explained by qualia”. In this way the two arguments would show that Russellian monism is affected by modified versions of the arguments directed at competing doctrines. On the other hand, one may argue, if Howell and Chan are right, then, ultimately, it would seem that RM, in its panprotopsychoist version, consists of nothing more than an inversion of the parties in play as originally presented by the property dualist in order to falsify physicalism. But, if this is true, then the RMist would be primarily driven by the idea of attributing to protophenomenal properties the causal powers of which

²¹ R.J. Howell, *The Russellian monist’s problems with mental causation*, cit., p. 28.

²² See: L.C. Chan, *Can the Russellian monist escape the epiphenomenalist’s paradox?*, cit.

they are deprived by the exclusion argument against property dualism, without thereby being able to recognise that this version of RM does not at all imply that phenomenal facts are anything above or beyond physical facts.

However, contrary to what Howell and Chan conclude, i.e., that RM brings no explanatory advantage with respect to the epistemic compatibility between physical and phenomenal truths, I think their arguments only show that panprotopsychism should ultimately collapse into Russellian physicalism, according to a yet to be specified expansive notion of the physical. Indeed, as specified by Chalmers, protophenomenal properties are not mental *per se*²³, which leaves open the question of how we should characterise them in the first place. If these properties qualify as physical absolutely intrinsic properties²⁴ (see section III), then panprotopsychism – contrary to what many suppose – is better understood as Russellian physicalism.

According to a well known statement made by Leibniz, that «there is no denomination so extrinsic that it does not have an intrinsic denomination at its basis»²⁵, one may argue that *if quiddities qualify not as properties, but as physical entities having intrinsic natures*, then the above speculations on the special nature of the fundamental properties in microphysics should lead us to reconsider physical discourse in the first place. Here I wonder whether structuralism about physics is true in the first place. Let us therefore see if it is true in the first place that physical science speaks exclusively of structural/dynamic properties and if, thus, we need grounding relations between basic properties.

3. *Physics and structuralism about physics*

If structuralism about physics is true, then there is no way to explain non-structural properties, such as the redness of a fact of experience, in physical terms. Remember that, according to this thesis, physics speaks to us only of charges, masses, etc., and that each property, such as a negative charge, is defined on the basis of what it does and not by reference to what it is²⁶. Moreover, as Goff²⁷ argues:

²³ D.J. Chalmers, *Panpsychism and Panprotopsychism*, cit.

²⁴ D. Pereboom, *Consciousness, Physicalism, and Absolutely Intrinsic Properties*, cit.

²⁵ Leibniz to De Volder, April 1702, in L.E. Loemker (tr. and ed.), *Gottfried Wilhelm Leibniz: Philosophical Papers and Letters*, second edition, D. Reidel, Dordrecht 1969, pp. 526-527.

²⁶ See: D.J. Chalmers, *The Conscious Mind*, cit.; D.J. Chalmers, *The Character of Consciousness*, cit.; P. Goff, *Galileo's Error*, cit.

²⁷ P. Goff, *Galileo's Error*, cit., p. 180.

«The concepts of physical science are not primitive, but *inter-defined*: mass is characterized in terms of distance and force, distance and force are characterized in terms of other phenomena, and so on until we get back to mass. Our concepts of consciousness, by contrast, are primitive in the required sense: a feeling is not defined in terms of anything other than itself»²⁸.

But if this is true, the world, as presented to us by physics, would be composed only of properties, without any reference to the fundamental entities of which those properties would be predicated. I must confess that the reason for thinking of physics in these terms completely escapes me. After all, even in the language of formal logic, logical constants²⁹ play a role analogous to that of the real entities of which the various sciences speak: planets, cells, elements of the periodic table.

So, as a first step, let us take the standard model of quantum mechanics. According to this model, the world is made up of elementary particles, divided into classes – quarks, leptons, gauge vector bosons, scalar bosons – according to the role they play in constituting the universe as we know it. Each elementary particle in each class has certain properties, such as mass, charge, spin, and these properties explain how these particles behave as constituents of physical phenomena. Photons, for example, are gauge bosons: they play the role of mediators of the electromagnetic interaction and have no mass or charge. But a photon is a quantum of light as well, and light is a categorical property, the one of which we have experience. Moreover, “particle” is not synonymous with “property”, hence charge, mass, and spin are ascribable to fundamental entities, not to further properties. Consequently, an elementary particle as a photon is a paradigmatic entity within physical science – an element of its ontology. Thus the semantic category of “elementary particle” refers to the class of all the basic entities characterised within a certain physical model. The ontology of basic physical entities is thus characterised by photons, electrons, etc., and “photon” and “electron” can be considered as proper names (or rigid designators) of these theoretical entities, described according to the structural/dynamic properties

²⁸ This is, in fact, Kripke’s diagnosis of qualia: a phenomenal concept picks-out the essence of phenomenal experience. What appears to the subject is what really exists. But what is that something that exists? Here I will argue that if reality is all physical, and if we conceive fundamental physical entities as the bearers of protophenomenal properties, then such physical entities could play a constitutive role in what appears to the subject. If so, we can go beyond by defining a feeling in terms of something other than itself, i.e. by placing categorical properties in microphysics.

²⁹ A logical constant of a language L is a symbol that has the same semantic value under any interpretation of L. Within a realist interpretation, such logical constants are symbols that stand for abstract entities of some kind.

they possess. Thus, physics, it may be objected, is founded on an ontology that, although epistemically incomplete, is self-grounded: reality is composed of particles that cannot be further reduced to other entities, at least within a given standard model. Now, if Leibniz is right, then such basic entities must necessarily be something in themselves, and the truths of physics must be such by virtue of the nature of such entities. To put it differently: *if there is something of which physics leaves us ignorant, it is properly what these fundamental entities are in themselves, beyond their physically quantified behavior*. One can then speculate on whether or not the intrinsic nature of these basic physical entities is knowable. However, one cannot a priori exclude that these self-grounded entities, being something in themselves, possess absolutely intrinsic properties, that is, properties whose primitive essence grounds their *protophenomenal eigenvalues*. Moreover, it is far from obvious that any future model of physics can be explanatorily effective irrespective of the observability of the entities it might discuss. We know, for example, that String theory has its own logical internal consistency, but that it cannot be corroborated, because the entities postulated by it have properties whose description goes beyond the possibility of observing them, or of observing their effects in a consistent manner. This means that it is the theory that must adapt to reality and not vice versa. By this we can say that, for example, Hempel's Dilemma is outweighed by the robustness of many parts of the standard model of physics³⁰, and that the epistemic incompleteness of this model could hardly call into question the fact that the known part of quantum reality can be subject to total conceptual revision in terms of the basic ontology, or even that the known and robust part of this hard science would not be enough to explain consciousness. In fact, I suspect that a part of neuroscience that has recourse to quantum mechanics to explain this "special" phenomenon is already on the right track, at least from the point of view of a Russellian physicalist (see section IV).

The next step is to recognise that not only physics has a proper ontology of entities, but that it also has a strong empirical attitude towards the role these entities play in various physical processes, or in the supervenient chemical and biological processes. As for logical constants, these entities retain their identity irrespective of the semantic context in which they play a role, i.e. irrespective of

³⁰ See: P. Bokulich, *Hempel's Dilemma and domains of physics*, in «Analysis» 71, 4 (2011), pp. 646-651. Bokulich (p. 646) presents Hempel's dilemma as follows: «Hempel (1980) famously argued that physicalism is an ill-formed thesis because it has no legitimate account of the physics in question. On the one hand, we cannot rely on current physics, because we have every reason to believe that future research will overturn our present physical theories. On the other hand, if we appeal to some future finalized physics, then our ignorance of this future theory translates to an ignorance of the ontology of physicalism. This is Hempel's Dilemma».

the type of natural science in which they play an explanatory role. All this seems to strongly justify the realist metaphysical attitude of understanding such entities as intrinsic unities, i.e. endowed with intrinsic properties. In scientific discourse these basic unities are the building blocks of reality, i.e. they play a strictly constitutive role of any other object in the world that can be reduced to them.

At this point, what we need to understand is whether this metaphysical attitude to the truths of microphysics has any bearing on Russell's understanding of physicalism. With respect to this question, we can keep in mind both Leibniz's metaphysical statement and the quoted Russell's passage in this way: there is no a priori reason to think that such intrinsic entities couldn't play a constitutive role in consciousness or, as Russell states, «There is therefore no ground for supposing that percepts cannot be physical events».

4. Russellian physicalism as a posteriori physicalism

Here I want to argue that the kind of epistemological compatibility between physical and phenomenal truths that we are investigating must presuppose some degree of convergence between the scientific and philosophical attitudes towards reality. What we need to overcome, in other words, is the introspective-extrospective limit theorised by Colin McGinn³¹, so that we can come to an awareness of the kind of ontological compatibility implicitly suggested by Russell.

McGinn's argument³² goes as follows:

- 1) We can have introspective access to consciousness but not to the brain;
 - 2) We can have extrospective access to the brain but not to consciousness;
 - 3) We have no accessing method that is both introspective and extrospective; therefore,
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- 4) We have no method that can give us access to both consciousness and the brain.

³¹ Colin McGinn, *Can We Solve the Mind-Body Problem?*, in «Mind» 98, 391 (1989), pp. 349-366.

³² See: U. Kriegel, *Philosophical Theories of Consciousness: Contemporary Western Perspectives*, in P.D. Zelazo - M. Moscovitch - E. Thompson (eds.), *The Cambridge Handbook of Consciousness*, Cambridge University Press, Cambridge (MA) 2007, pp. 36-38.

This kind of knowledge argument can be traced back to Leibniz, who in his *Monadology* presented the problem of consciousness by means of the well-known mill analogy. If, to paraphrase Leibniz, we enlarged a person's brain to the point of being able to enter it like a mill, we could see its constituent parts, but we would not see the mind "hosted" by the body. Phenomenal properties (or percepts) can only be investigated introspectively, while brain properties only from the outside and, following McGinn, we are affected by a chronic ignorance of a method that could give us access to both. While I think that 1 is true, premise 2 is questionable, because it largely depends on the hypothesis about the type of brain phenomena of theoretical relevance, and not trivially on the fact that we cannot see someone's consciousness by looking at their brain.

Here I claim that there is a deep reason, quite different from that of panpsychism, for why phenomenal truths are only accessible introspectively. This reason, from the perspective of Russellian physicalism, goes as follows.

- If consciousness is constituted by qualia, and if qualia are constituted by quiddities, then the access to phenomenal truths entails the access to absolutely intrinsic properties of some basic physical entities.

This argument suggests that the introspective-extrospective bound could be overcome by assuming that some basic physical entities have the kind of absolutely intrinsic properties that we would qualify as protophenomenal properties, and that the kind of psychophysical identifications we are looking for are a posteriori, and therefore necessary.

Let p be the proposition (as complex as you like) describing certain basic physical entities, by assigning structural/dynamic properties to these entities.

Let q be the proposition describing a basic phenomenal truth, such as seeing a certain sample of red.

Let $p \rightarrow q$ be the proposition which states that q is true by virtue of the nature of p , and let p be a set of fundamental physical entities.

It is a posteriori that we may determine whether the relation between p and q is identity. However, the two propositions p and q , as they are formulated, do not seem to prescribe any kind of compatibility between physical and phenomenal truths. So, we need to replace p with p^* :

Let p^* be the proposition (as complex as you like) describing certain basic physical entities, by assigning both structural/dynamic and intrinsic properties to these entities, the latter being categorical properties.

According to the above argument, p^* conforms to the kind of Russellian physicalism that reflects the kind of expansive notion of the physical. This

means that p^* presupposes a change of perspective on what is to be considered physical with respect to the basic ontology.

In order to give content to the epistemological compatibility we are looking for, we should first observe whether and how certain basic entities might play a constitutive role in phenomenal truths, such as the fact of experiencing coloured objects. We should also consider whether there is any kind of positive scientific attitude towards the proposition «being true by virtue of the nature of X »³³. Now, the proposition “being true by virtue of...” can be interpreted in two senses. The first is the kind of interpretation that we can give according to p , while the second is slightly different according to p^* .

Let p be the proposition that “photons with a frequency between 400 and 484 THz and a wavelength between 625 and 740 nm are in the red spectrum of the visible light”.

Let p^* be the proposition that “photons with a frequency between 400 and 484 THz and a wavelength between 625 and 740 nm *constitute* the red spectrum of the visible light”.

It is clear that while p characterises extrinsically the relationship between being a certain type of entity and being at a certain position in the visible spectrum, p^* presents us a form of commitment to the ontology of the basic facts, because it states that *there is a set of entities that constitutes the red light*, that is the phenomenon of redness of which we have experience, and thus brings us closer to the kind of intrinsic characterisation of physical entities that might play a constitutive role for phenomenal truths concerning visual qualia. In other words, this could lead us to the conclusion that “phenomenal redness is such by virtue of the nature of X ”, where X is the kind of entities recognised by p^* . So, if $p^* \rightarrow q$, then $\Box p^* \rightarrow q$ by virtue of the nature of p^* . This means that p^* , the set of physical entities so conceived, could be ontologically better understood as quiddities, the real “whatnesses” of the “red feel”. Thus, a quiddity could be better characterised as a primitive unity manifesting both kinds of properties, that is, the structural/dynamic properties recognised by natural sciences, and phenomenal properties introspectively recognised when a great amount of these same entities is somehow coherently distributed and integrated in brain, without any commitment to the logic of property dualism.

³³ Here I am appealing to Bob Hale’s 2015 work on necessary beings. See: B. Hale, *Necessary Beings: An Essay on Ontology, Modality, and the Relations Between Them*, Oxford University Press, Oxford 2015.

We can now check whether natural sciences present this sort of epistemic commitment to entities which could constitute phenomenal truths. This requirement stems from the fact that a posteriori truths are subject to empirical research³⁴, and it is not a priori that we could not qualify certain physical entities as the constituents of phenomenal truths. In other words, as Stoljar puts it, «It is not a priori that dualism is true or false, after all»³⁵, so there is room for new empirical approaches.

Fortunately, we have a good empirical basis for arguing that at least visual qualia might consist of quiddities (that is fundamental physical entities whose intrinsic natures qualify as protophenomenal properties). Here I will consider three recent works. Bókkon and colleagues argue³⁶ that biophotons in the visible spectrum may play a central role in our phenomenal visual experiences, matching qualia to the intrinsic bioluminescence generated by neurons in the visual area of the brain. Biophotons are simply photons of non-thermal origin, generated by organisms, which constitute the phenomenon of bioluminescence manifested by organisms as fireflies. This hypothesis has found a confirmation in an experiment by Dotta and colleagues³⁷, who observed that when a subject imagines something in a dark room, his or her brain shows an increase of biophotonic activity in the visible spectrum. The second work is by Hameroff and Penrose³⁸, who famously argue that consciousness is a product of the synchronisation of neuronal activity at the level of microtubules, which are polymers of tubulins (i.e. proteins) that form part of the cytoskeleton and provide structure to neurons. Hameroff and Penrose assume that microtubules may be structured in a fractal pattern that would allow quantum processes to occur. A fractal is a structure with a fractional value intermediate between one and two, or between two and three dimensions, and are self-similar objects (i.e. such that they are exactly or approximately similar to one of their parts). The third study is by

³⁴ S.A. Kripke, *Naming and Necessity*, Harvard University Press, Cambridge 1980.

³⁵ D. Stoljar, *Ignorance and Imagination*, cit., p. 46.

³⁶ I. Bókkon - V. Salari - J.A. Tuszyński - I. Antal, *Estimation of the number of biophotons involved in the visual perception of a single-object image: Biophoton intensity can be considerably higher inside cells than outside*, in «Journal of Photochemistry and Photobiology B: Biology» 100, 3 (2010), pp. 160-166.

³⁷ B.T. Dotta - K.S. Saroka - M.A. Persinger, *Increased photon emission from the head while imagining light in the dark is correlated with changes in electroencephalographic power: Support for Bókkon's biophoton hypothesis*, in «Neuroscience Letters» 513, 2 (2012), pp. 151-154.

³⁸ S.R. Hameroff - R. Penrose, *Consciousness in the Universe: A review of the 'Orch OR' Theory*, in «Physics of Life Reviews» 11 (2014), pp. 39-78; Also see: S. Hameroff - R. Penrose, *Orchestrated Objective Reduction of Quantum Coherence in Brain Microtubules: The "Orch OR" Model for Consciousness*, in S.R. Hameroff - A.W. Kaszniak - A.C. Scott, *Toward a Science of Consciousness - The First Tucson Discussions and Debates*, MIT Press, Cambridge (MA) 1996, pp. 507-540.

Xiao-Yun Xu and colleagues³⁹. They conducted a very promising experiment in quantum physics. They created quantum fractals composed of electrons with a Sierpiński triangle pattern, which is a fractional value structure between one and two dimensions, and others with a square pattern. They then introduced photons into the structures, and observed that they diffuse into the structures according to a process called “quantum transport”. In practice, once injected into one initial site of a quantum fractal, the photons behave like walkers and evolve in the lattices, performing “quantum walks”. Without going into detail, we can combine the results of these three works by hypothesising that mental images are biophotonic replicas of external objects, images that are created by the brain at the quantum level when large amounts of biophotons in the visible spectrum are generated by mitochondria and injected into the fractal structures hypothesised by Hameroff and Penrose, thus evolving according to quantum behavior observed by Xiao-Yun Xu and colleagues. The synchrony between neurons, caused by patterns of retinal activation, would thus have the effect of generating coherent images consisting of biophotons in the visible spectrum constantly injected into the fractal structures inside the neurons’ microtubules⁴⁰, probably behaving as a Bose-Einstein condensate (polariton superfluid) at room temperature⁴¹. These are only speculations, but they are speculations that give us a different (coherent) idea of how to think about the relationship between physical and phenomenal truths.

From a philosophical point of view, however, these studies and the final hypothesis converge towards a scientific explanation of phenomenal consciousness only if we admit that biophotons are primitive entities (or existents), that is, that they are something in themselves, and thus have intrinsic values. That they have, in other words, such natures as to necessitate the phenomenal truths of our interest. As noted, structuralism about physics does not seem to present any obstacle to the kind of ultimate ontological compatibility we are interested in.

³⁹ XY. Xu - XW. Wang - DY. Chen et al., *Quantum transport in fractal networks*, in «Nature Photonics», (2021), <https://doi.org/10.1038/s41566-021-00845-4>.

⁴⁰ For some remarkable properties of microtubules, e.g. see: S. Sahu - S. Ghosh - B. Ghosh - K. Aswani - K. Hirata - D. Fujita - A. Bandyopadhyay, *Atomic water channel controlling remarkable properties of a single brain microtubule: Correlating single protein to its supramolecular assembly*, in «Biosensors & Bioelectronics» 47 (2013), pp. 141-148, <https://doi.org/10.1016/j.bios.2013.02.050>

⁴¹ A polariton is a hybrid quasi-particle that results from the combination of light and organic matter. Recently, polariton condensates have been realised at room temperature, «by using an organic microcavity supporting stable Frenkel exciton-polaritons at room temperature». See: G. Lerario - A. Fieramosca - F. Barachati - D. Ballarini - K.S. Daskalakis - L. Dominici - M. De Giorgi - S.A. Maier - G. Gigli - S. Kéna-Cohen - D. Sanvitto, *Room-temperature superfluidity in a polariton condensate*, in «Nature Physics» 13 (2017), pp. 837-841, <https://www.nature.com/articles/nphys4147>.

The real strength of Russellian physicalism consists, then, in combining realism about quiddities with the thesis that at least some ultimate constituents of reality have intrinsic spectral values, capable of justifying a posteriori the epistemological and, a fortiori, ontological compatibility between physical and phenomenal truths. Even if this form of monism has as an a priori element the postulate about the intrinsic nature of physical truths, this postulate can conceivably overlap with a future scientific hypothesis towards the best explanation of consciousness. It is worth noting that this kind of naturalism calling into question the intrinsic nature of physical truths is not foreign to scientific discourse⁴².

5. Back to the criticisms to Russellian panprotopsychism

Now we can ask ourselves whether the criticism of thesis 'iii' still holds. The answer seems clear. If, as suggested by Chalmers, these intrinsic protophenomenal properties qualify as physical properties, and if these properties are absolutely intrinsic to the basic entities, which are conceived as paradigmatic unities within physics, then the modal separability, which seems to afflict panprotopsychism, stems from a misunderstanding of thesis 'iii'. There is no grounding relation between properties ascribable to fundamental stuffs, which are metaphysically self-grounded and defined by the properties we ascribe to them. From this perspective, there are no parts or natures that can be the object of some conceivability argument. If truths of the form " $\Box p^* \rightarrow q$ by virtue of the nature of p^* " are admitted, they just introduce identities of constitution, which are a posteriori and analogue to those usually recognised as being necessary, as "water is H_2O " or "lightning is an electrical discharge". The misconception, then, would stem from the fact that we have just a priori failed to recognise that the coincidence between appearance and reality with regard to phenomenal states is necessitated by being qualia physically constituted by entities having intrinsic values⁴³. If so, zombie-style arguments are

⁴² E.g. see: L.A. Cacha - R.R. Poznanski, *Genomic instantiation of consciousness in neurons through a biophoton field theory*, in «Journal of Integrative Neuroscience» 13, 2 (2014), pp. 253-292.

⁴³ This seems to have consequences for the Cartesian illusion. Kripke, in *Naming and Necessity* (cit., p. 150), argues that the identity theorist would refute the Cartesian if he could show that «while the Cartesian argument, given its premise of the contingency of the identification, is granted to yield its conclusion, the premise is to be exposed as superficially plausible but false». Now, according to the approach I have adopted here, a visual (phenomenal) experience is conceived as a constitutive quantum effect realised by a great amount of microphysical entities that are quiddistic in nature. This is something we can recognise a posteriori, attributing to quiddities the functional role of constituents of phenomenal experiences in brain processes. If this is so, then the Cartesian argument has its superficial

a posteriori ruled out, because it is a posteriori that we can assign intrinsic values to facts in microphysics⁴⁴.

6. Conclusions

What I have wanted to show in this paper is that Russellian physicalism, if properly defined as an expanded version of a posteriori physicalism, is a very promising doctrine, not only because it admits a radical solution to the hard problem of consciousness, but because it seems to shed light on how we might come to recognise its true nature, revealing the central and irreducible role of the conscious subject in recognising the intrinsic character of the microphysical truths that constitute our nature. In other words, it shows that we can have an accessing method to consciousness that is both introspective and extrospective, by introducing a simple claim on the nature of fundamental physical kinds.

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ABSTRACT

Russellian monism is the doctrine according to which physical properties, usually described as structural and dynamic, are grounded in categorical properties, often characterised as phenomenal or proto-phenomenal properties, of which physics

plausibility, because the simultaneous and asymmetrical constitutive relationship between relata, i.e. between the phenomenal quality and its protophenomenal constituents (here biophotons, hypothetically), renders the latter transparent and the former introspectively present. The appearance of contingency is dispelled by recognising that the effect (the phenomenal experience as such) has its condition of possibility in its constitutive causes, the fundamental entities recognised by physics, attributing more to the nature of these entities than physics, whose epistemological limitations are bound up with its own aims and methods, can do. In the specific case of visual experience, I have found nothing in the scientific literature that forces me to rationally rule out this possibility, namely that photons can be the bearers of the properties of colour and brightness, and that these properties can therefore be physical in a broader (not strictly Pythagorean) sense.

⁴⁴ It has been pointed out to me that the theses expressed in this paper would require a theoretical comparison between Russellian physicalism and the European Neo-Kantian tradition of thought, which advocates a certain notion of idealism about natural science, and the thesis of the radical conceptual change in ontology, in particular with the entry of new a priori principles into natural science. However, for reasons of space, these and other issues cannot be addressed here and deserve a separate discussion.

leaves us ignorant, and therefore often called inscrutables or quiddities. Several authors claim that this doctrine derives its raison d'être from an attempt to overcome the insuperable difficulties posed to physicalism by the conceivability and knowledge arguments. There are several versions of this doctrine, the best known of which is panprotopsychism, but which has turned out to be affected by modified versions of the arguments against the competing doctrines. In this paper, after having introduced some main themes related to Russellian monism, I will discuss the reasons for understanding it as a form of physicalism.

Keywords: *Russellian Physicalism, Panprotopsychism, Quiddities, Consciousness, Biophotons*