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Constructing life and consciousness, how hard can it be?

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Abstract: How easy is it to construct life and consciousness from the building blocks of reality? Some philosophers seem to think both are pretty easy, whilst others take consciousness to be difficult but life to be no problem. In this paper I question whether we should in fact think this, could life after all be difficult to construct? I contend that the answer to this, much like the answer to how hard consciousness is to construct, largely depends on the nature of life and the building blocks of reality. I will show that many of the considerations as to whether consciousness is hard to construct can be paralleled when thinking about the construction of life, and that given one prominent definition of life, it does in fact seem difficult to construct. I will conclude by offering a few suggestions for future research, and suggest that philosophers should be more hesitant in their affirmation that life is easy to construct.

Keywords: Life – Consciousness – Teleology – Reduction – Emergence

Resumen: ¿Qué tan fácil es construir vida y consciencia a partir de los bloques de construcción de la realidad? Algunos filósofos parecen pensar que ambas son bastante fáciles, mientras que otros consideran que la consciencia es difícil pero la vida no es un problema. En este artículo me pregunto si de hecho deberíamos pensar esto: ¿podría ser la vida, después de todo, difícil de construir? Sostengo que la respuesta a esto, al igual que la respuesta a lo difícil que es construir la consciencia, depende en gran medida de la naturaleza de la vida y de los componentes básicos de la realidad. Mostraré que muchas de las consideraciones sobre si la consciencia es difícil de construir pueden tener paralelo cuando se piensa en su construcción, y que, dada una definición prominente de la vida, de hecho parece difícil de difícil consecución. Concluiré ofreciendo algunas sugerencias para futuras investigaciones y sugeriré que los filósofos deberían ser más vacilantes en su afirmación de que la vida es fácil de construir.

Palabras clave: vida – consciencia – teleología – reducción – emergencia

I start this paper with a question: how easy is it, ontologically speaking, to take the building blocks of reality and construct life and consciousness from them?[1] Typical answers philosophers give to this question are the following. Either, it's easy to get both life and consciousness, or it's easy to get life but hard to get consciousness. But why not think it's hard to get both? In this paper I'm going to suggest that it may well be very hard to construct life and consciousness out of the building blocks of reality. But whether it ultimately is or not depends on the nature of life and consciousness and what the building blocks of reality are, and these I take to be questions that are far from settled.

Easy Life

Some philosophers seem very confident that life is easy to construct out of the building blocks of reality. I call these philosophers the 'easy lifers'.[2] Strawson is a good example of such a philosopher, writing,

> A hundred years ago it seemed obvious to many so-called 'vitalists' that life could not emerge from utterly lifeless matter … Today, however, no one seriously doubts that life emerged from matter that involved no life at all. The problem of life, that seemed insuperable, simply dissolved.[3]

[1] If you don't like the word 'construct' then use the word 'derive' as a philosophically neutral term. Note also that my use of the word construct is not meant to imply there is some conscious agent who does the constructing. I am happy to claim that natural processes, such as evolution, can construct things.

[2] Note that my use of 'easy' does not mean 'likely'. Given how I'm using the terms something can be both hard and likely. For some discussion from biologists as to how likely it was that life arose see: Kepa Ruiz-Mirazo, & Pier Luigi Luisi, «Special Issue: Workshop OQOL'09: OPEN QUESTIONS ON THE ORIGINS OF LIFE 2009». *Origins of Life and Evolution of Biospheres* 40:347-497 (2010), 356-375.

[3] Galen Strawson, *Real Materialism* (New York: Oxford University Press, 2008),

Similar comments from easy lifers can be found elsewhere, with Churchland[4] thinking that those who take life construction to be hard are much like her clearly unimaginative high school biology teacher, and Hardcastle,[5] who despite being a little more cautious says much the same.[6] Why then are easy lifers so confident that it's easy to construct life? It's because they think life can be reduced easily to other phenomena, which is why I call it easy, and that once something has been reduced there is nothing ontologically novel left to explain.[7] So, for instance Hardcastle writes, "We presume that there is some sort of identity statement for biological life. (Of course we don't actually have one yet, but for those of us who are not life-mysterians, we feel certain that one is in the offing.)"[8] Ultimately the question here will be whether such a reduction is possible, and I'll suggest that this will depend upon what one takes the nature of life

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[4] Patricia Smith Churchland, «The Hornswoggle Problem». In *Explaining Consciousness – The 'Hard Problem'*, ed. Jonathan Shear (Cambridge, MA: The MIT Press, 1997), 42-43.

[5] Valerie Gray Hardcastle, «The Why of Consciousness: A Non-issue for Materialists». In *Explaining Consciousness – The 'Hard Problem'*, ed. Jonathan Shear (Cambridge, MA: The MIT Press, 1997), 65-66.

[6] Others who also think life is pretty easy to construct are: David J. Chalmers, «Facing Up to the Problem of Consciousness». In *Explaining Consciousness – The 'Hard Problem'*, ed. Jonathan Shear (Cambridge, MA: The MIT Press, 1997); David J. Chalmers, «Moving Forward on the Problem of Consciousness». In *Explaining Consciousness – The 'Hard Problem'*, ed. Jonathan Shear (Cambridge, MA: The MIT Press, 1997); Daniel C. Dennett, «Facing Backwards on the Problem of Consciousness». In *Explaining Consciousness – The 'Hard Problem'*, ed. Jonathan Shear (Cambridge, MA: The MIT Press, 1997).

[7] Even though this view of life is reductive, I still say life is 'constructed', it's just that it is not ontologically anything different from what it is constructed out of.

[8] Hardcastle, «The Why …», 65. Similar comments or thoughts are found in: Churchland, «The Hornswoggle …», 42-43; Chalmers, «Facing Up …», 12-13, 18; Chalmers, «Moving Forward …», Dennett, «Facing Backwards …», 33-35; Strawson, *Real Materialism*, 67.

to be. More of that in a moment. For present purposes note that this debate sounds very similar to one regarding consciousness.

Is consciousness easy too?

Some of the easy lifers I just referred to also think that constructing consciousness is easy, whilst other easy lifers who I've also referenced don't. In the 'consciousness is easy' camp we have the reductive materialists, such as Churchland, Hardcastle, and Dennett. They claim that consciousness ontologically reduces to matter, which they take to be the building blocks of reality. Whilst they might affirm that it's difficult, epistemologically speaking, to know how this reduction goes, it is an easy metaphysical problem to solve. On the other hand, we have Chalmers and Strawson, who both think 'consciousness is hard' and cannot be so reduced.[9] They take it that consciousness does not reduce to the building blocks of reality, at least if we assume these blocks are purely non-conscious material.[10] A reason for this, which seems similar to a concern raised by Locke,[11] is known as the explanatory gap problem, which holds that "no matter how deeply we probe into the physical structure of neurons and the chemical transactions which occur when they fire, no matter how much objective information we come to acquire, we still seem to be left with something that we cannot explain, namely, why and how such-and-such objective, physical changes, whatever

[9] Morange, who I will reference again later, also seems to think that life is easy although consciousness is not. Michel Morange, «Science and Philosophy Faced with the Question of Life in the Twentyfirst Century». In *What is Life? On Earth and Beyond*, ed. Andreas Losch (Cambridge: University of Cambridge Press, 2017).

[10] By this I mean to rule out at present panpsychist, panprotopsychist, and neutral monist views of reality.

[11] "*For unthinking Particles of Matter, however put together can have nothing thereby added to them, but a new relation of Position, which 'tis impossible should give thought and knowledge to them*." John Locke, *Essay Concerning Human Understanding*. ed. Peter H. Nidditch (New York: Clarendon Press, 1975), 627.

they might be, generate so-and-so subjective feeling, or any subjective feeling at all."[12] Whether this gap can be plugged so that constructing consciousness is easy will depend upon what the nature of consciousness actually is.[13] For instance, if you hold that consciousness possesses a phenomenal qualitive nature, with this being a widely held position,[14] you may well think that consciousness is ontologically hard to construct, if you take the building blocks of reality to be non-conscious and to have no phenomenal qualitative nature.[15] These blocks might be quantitative in ways, but this isn't qualitivity, and getting qualities from non-qualitative quantities looks a very difficult or perhaps impossible task. As such, philosophers who take this view of consciousness just claim that it doesn't reduce, and therefore in my terminology it's ontologically hard to construct.

Yet if you're a reductive materialist, you're likely to think this is the wrong way to conceive of consciousness. The nature or definition

[12] Michael Tye, «Qualia». *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta. URL: <https://plato.stanford.edu/archives/sum2018/entries/qualia/>.

[13] We could also question the fundamental nature of matter, as panpsychist, panprotopsychist, and neutral monist views do.

[14] David J. Chalmers, *A Conscious Mind* (New York: Oxford University Press, 1996) 4.

[15] Note that not everyone takes this to be consciousness's defining feature. Another feature often appealed to is, intentionality. For example, see: Franz Brentano, *Psychologie vom Empirischen Standpunkt* (Leipzig: Dunker & Humbolt, 1874); Tim Crane, *Elements of Mind* (New York: Oxford University Press, 2001). Yet there is still the problem as to whether the intentional can be reduced to the non-intentional, something many people think also cannot be done. John J. Haldane, «Naturalism and the problem of intentionality». *Inquiry* 32:305-322 (1989); George Bealer, «Materialism and the Logical Structure of Intentionality». In *Objections to Physicalism*, ed. Howard Robinson (Oxford: Clarendon Press); Laurence BonJour, «Against Materialism». In *The Waning of Materialism*, eds. Robert C. Koons, & George. Bealer (New York: Oxford University Press, 2010), 15-21.

of consciousness needs rethinking, and this is what we see reductive materialists saying.[16] For instance, Hardcastle writes,

> consciousness-mysterians need to alter their concepts. To put it bluntly: their failure to appreciate the world as it really is cuts no ice with science. Their ideas are at fault, not the scientific method. … I say materialism and mechanism entail an identity statement for consciousness … Consciousness is no more mysterious to me than the wetness of water or the aliveness of life.[17]

It may well be that those who think consciousness is easy to construct would agree that the construction of consciousness *would* be ontologically difficult if they assumed the same definition of consciousness as those who think it is difficult.[18] But they just take it that these people have a mistaken view on the nature of consciousness. Once you have the correct view in mind, you will instead see that it is easy. The debate then, as to whether consciousness is easy or hard to construct, seems to ultimately depend on what the nature of consciousness actually is.

Turn now to those who I have characterised as thinking that consciousness is ontologically hard to construct. What options do they provide for it arising? One option is to hold a non-reductive physicalist view and say that whilst there are conscious and non-conscious properties, they aren't both fundamental, with all the

[16] Daniel C. Dennett, «Quining Qualia». In *Consciousness in Contemporary Science*, eds. Anthony J. Marcel, & Edoardo Bisiach (Oxford: Oxford University Press, 1988); Paul M. Churchland, *A Neurocomputational Perspective*. (Cambridge, MA: The MIT Press, 1989), 57.

[17] Hardcastle, «The Why …», 66.

[18] For instance, Churchland writes, "My final objection to Jackson was aimed more at breaking the grip of the ideology behind his argument than at the argument itself. That ideology includes a domain of properties-the qualia of subjective experience-that are held to be metaphysically distinct from the objective physical properties addressed by orthodox science. It is not a surprise, then, on this view, that one might know all physical facts, and yet be ignorant of some domain of these nonphysical qualia. The contrast between what is known and what is not known simply reflects an antecedent metaphysical division in the furniture of the world." Churchland, *A Neurocomputational …*, 74.

conscious properties being wholly grounded in non-conscious ones.[19] As such all the truth-makers of conscious properties strongly supervene on the truth-makers of non-conscious ones which fundamental physics informs us about. How then does consciousness arise? I suspect that most would say it has something to do with the organisation of the non-conscious properties, although I don't take this to be a case of strong emergence, something I will define shortly, since conscious properties on this account aren't fundamental but derivative.

An alternative suggestion would be that consciousness and non-consciousness relate in a dualist way, either of a substance or property variety. What is key here is that there are two distinct fundamental types of substances or properties, conscious and non-conscious. How then do these conscious substances or properties come to be? I suspect the most popular answer here would be through a type of strong emergence,[20] where strongly emergent properties/substances are understood to be those which arise from properties/substances and are yet novel and irreducible to the properties/substances that they arose from.[21]

[19] I follow Bennett and Jaworski's construal of non-reductive views, despite it differing from many other explications, such as Heil's, since it does not think of property dualism as a type of non-reductive physicalism. Karen Bennett, «Exclusion Again». In *Being Reduced*, eds. Jakob Hohwy, & Jesper Kallestrup (New York: Oxford University Press, 2008), 284-286; William Jaworski, *Philosophy of Mind* (Oxford: Wiley Blackwell, 2011), 129-179; John Heil, *Philosophy of Mind* (New York: Routledge, 2013), 183-198.

[20] For discussion of the difference between weak and strong emergence see: Jessica M. Wilson, *Metaphysical Emergence*. (New York: Oxford University Press, 2021) Chs. 2-4.

[21] Concerning the grounding relation, and so to contrast it with non-reductive physicalism, we can say that a strong emergence view says that consciousness is "*an emergent property because it is metaphysically basic, instantiated by (a part of) a body whose being has a ground, but it has no full explanation in terms of that ground*." Einar D. Bohn, «Normativity all the way down: from normative realism to pannormism». *Synthese* 195:4107-4124 (2018), 4109.

Another option would be to question the nature of the building blocks of reality, and suggest that contrary to how those who think consciousness is easy think about the building blocks, namely as non-conscious entities, they in fact have either some type of basic consciousness, as in panpsychism, or are intrinsically suited for realising consciousness, as in panprotopsychism.[22] On this type of view, ontologically constructing consciousness becomes easy.[23] Not in the same way as it was for the reductionist, for there is no reduction here, but rather because consciousness is built into the building blocks of reality and so nothing ontologically novel is needed.[24]

A final view is somewhat similar to the previous and also claims that we should reconceptualise the fundamental building blocks of reality, but this time it says we should not think of them as conscious or non-conscious. Rather they are something neutral in-between the two, with this position being known as neutral monism. On this view something still needs to happen to the building blocks in order to get consciousness, perhaps some type of degradation,[25] but the neutral monists thinks that whatever needs to happen is now possible and/or can produce consciousness more easily in virtue of the neutral monist building blocks.

Given this we have several different ways that have been proposed as to how we can construct consciousness, supposing that it cannot

[22] For a helpful discussion of both, see: Philip Goff, *Consciousness and Fundamental Reality* (New York: Oxford University Press, 2017).

[23] This isn't quite true. A construction problem does raise its head, but this time it concerns how we construct macro-consciousness, with this being known as the combination problem.

[24] I say this, but depending how one answers the combination problem, this may not be the case.

[25] This is akin to Koons's "disaggregation and splintering", which as he notes has metaphysical advantages over emergence. Robert C. Koons, «Against Emergent Individualism». In *The Blackwell Companion to Substance Dualism*, eds. Jonathan J. Loose, Angus J. L. Menuge, J. P. Moreland (Oxford: Wiley-Blackwell, 2018) 384.

be reduced. Note also that a primary reason these views are postulated is precisely because these theorists take it that consciousness cannot be reduced. If proponents thought consciousness could be reduced to non-conscious building blocks it seems there would be no reason to postulate them. Whilst there are questions to be raised against each of these suggestions, such as whether complex arrangement is sufficient to bring about consciousness in non-reductive physicalism, if strong emergence should be accepted in dualism,[26] how panpsychists can overcome incredulous stares,[27] and whether panprotopsychists and neutral monists actually provide satisfying answers to our question,[28] they will have to await another time. For now, it is time to leave consciousness and turn to life.

Hard Life?

Easy lifers mirror those who think consciousness is easy. They think life is easy to construct because it can be reduced to that which is non-living. As we saw above, the main reason for having multiple models as to how consciousness arose is because there are people who don't think that constructing consciousness is ontologically easy, rather it's hard. If it were an easy case of ontological reduction, we might come up with different epistemological stories as to how consciousness is reduced, but the metaphysics would ultimately be the same. Some reductive story. Similar things can be said for life. That is, an easy lifer should think that if everyone, or at least most people, thought life was easy to construct there wouldn't be any models, or at least very few of them, which don't ultimately end up

[26] Bohn, «Normativity all…»; Strawson, *Real Materialism*, 60-67; Koons, «Against Emergent …».

[27] David Chalmers, «The Combination Problem for Panpsychism». In *Panpsychism: Contemporary Perspectives*, eds. Godehard Brüntrup, & Ludwig Jaskolla (New York: Oxford University Press, 2016), 179.

[28] Goff, *Consciousness and* …, 167.

in being just easy reduction.[29] The debate would therefore look quite dissimilar to the consciousness debate. Unfortunately for easy lifers, when one looks at the literature on life this doesn't appear to be the case.

Here's one option that has been proposed when thinking about how to construct life. Deny that anything is living, and instead claim that everything is non-living.[30] If everything is non-living then the construction problem for life would disappear since there is in fact no life at all. Yet why would anyone pose this as an option if life were easily reducible to the non-living, as many philosophers claim? Another, seemingly more frequent, suggestion is to think of life as an emergent phenomenon, with Hazen writing, "The origin of life may be modelled as a sequence of so-called "emergent" events … From vast collections of interacting lifeless molecules emerged the first living cell."[31] This seems similar to the emergent view of consciousness mentioned above, but as I noted there, there's no need to postulate emergence if it's clear that consciousness can be reduced.[32] Here's a final suggestion that has been made, namely that

[29] Although, as I said above of consciousness, the details as to how this would reduce may well be very difficult to ascertain.

[30] Morange, «Science and …», 98; Editorial, «Meaning of 'life'». *Nature* 447:1031-1032 (2007).

[31] Robert M. Hazen, «Emergence and the Experimental Pursuit of the Origin of Life». In *Exploring the Origin, Extent, and Future of Life*, ed. Constance M. Bertka (New York: Cambridge University Press, 2009), 21-22; Iris Fry, «Philosophical Aspects of the origin-of-life problem». In *Exploring the Origin, Extent, and Future of Life*, ed. Constance M. Bertka (New York: Cambridge University Press, 2009), 75. For some discussion by various biologists on emergence and the origin of life see: Ruiz-Mirazo, «Special Issue …», 375-391.

[32] Note that one question to be asked here is how we should understand the type of emergence being appealed to here. Is it a form of 'strong' emergence or 'weak' emergence? This is relevant for if it's a form of weak emergence and one thinks weak emergence is compatible with reduction, then life can still be thought reducible. For some discussion as to whether weak emergence is compatible with reduction see: Wilson, *Metaphysical Emergence*, 84-94.

we remove "the imposed hard boundary between non-life and life".[33] We might think of this option as similar to the type of view that a panpsychist, panprotopsychist, or neutral monist might suggest about consciousness. Yet as I mentioned previously, these types of options are also only postulated because it is thought that consciousness cannot be reduced to non-conscious building blocks. Much the same can be said here.

From this it seems clear that many researchers on life and its origin are far from confident that life reduces, as easy lifers would have it. As Hazen notes, "the greatest gap in understanding life's origin lies in the transition from a more-or-less static geochemical world with an abundance of interesting organic molecules, to an evolving biochemical world."[34] So more bluntly, how to get from non-life to life.[35] As a result of this some, such as Benner, have gone so far as to suggest "a real potential exists that current theory will never solve the problem at hand, keeping open the possibility for a true revolution in the related and surrounding sciences."[36] Philosopher of biology Godfrey-Smith says much the same writing, "We still know very little about how life began, and it is hard to assess whether this problem will eventually yield to 'normal science' or whether a more dramatic innovation is needed."[37] It is perhaps

[33] Sara I. Walker, Norman Packard, & George D. Cody, «Re-conceptualizing the origins of life». *Philosophical Transactions of the Royal Society A* 375:1-11 (2017), 6.

[34] Hazen, «Emergence and …», 40.

[35] Hazen is not alone in expressing this attitude, in fact it seems ubiquitous amongst those discussing origin of life, although their attitudes towards how difficult the problems are differ. Jeffrey L. Bada «How life Began on Earth: a status report». *Earth and Planetary Science Letters* 226:1-15 (2004), 12; Herrick Baltscheffsky, et al. «On the Origin and Evolution of Life: An Introduction», *Journal of Theoretical Biology* 187:453-459 (1997), 458; Walker, Packard, & Cody, «Re-conceptualizing the …»; Fry, «Philosophical Aspects», 75.

[36] Steven A. Benner. *Life, the Universe and the Scientific Method* (Gainesville, FL: FfAME Press, 2008), 287.

[37] Peter Godfrey-Smith, «Not Sufficiently Reassuring». *London Review of Books*

partly because of this that new directions have begun to be explored by scientists in this area, with some of this being showcased in a recent themed publication by The Royal Society, on "Re-conceptualizing the origins of life".[38] It seems then we have some *prima facie* reason to think that easy lifers may be mistaken in their analysis that life is easy to construct.[39]

However, it's open for easy-lifers to dig their heels in and say that life will in fact be reduced but we just haven't found out how as of yet. The suggestions above, such as postulating no hard boundary between life and non-life, are just mistakes. Life will reduce. Yet, this sounds rather similar to what a 'consciousness is easy' person would say about consciousness when confronting a 'consciousness is hard' person. However, as we saw above, whether consciousness does reduce seems to come down to a disagreement about what consciousness is, that is consciousness's nature. I suggest something similar will also be the case here regarding life. So, what is the nature of life?

35:20-21 (2013).

[38] See Volume 375 of *Philosophical Transactions of the Royal Society A* published in 2017.

[39] I offer one final quote from scientists in support of this: "Our ignorance about the origin of life is profound—not just some simple missing mechanistic detail... This ignorance stems not only from our experimental difficulties with prebiotic chemistry, but is also conceptual, as we are not yet able to conceive on paper how all these things came about. ... we, chemists and biologists, and scientists at large, after more than 50 years of intelligent effort, do not see any way of making life in the laboratory should be a clear demonstration that life does not form so easily and spontaneously. Otherwise, we would have found it by now. ... Under this perspective, the idea that the formation of life on Earth is a spontaneous, easy process, which had to occur sic et simpliciter, appears rather extravagant." Ruiz-Mirazo, «Special Issue …», 353.

Life's Nature

As with the nature or definition of consciousness, much ink has been spilled over what we should think life is, with some being sceptical that anything like a definition can be provided. For instance, Machery writes, "the project of defining life is either impossible or pointless",[40] whilst Cleland and Chyba pose a number of objections against formulating an adequate account of life.[41] Much like I did with the definition of consciousness, I'm going to assume worries concerning definitions can be overcome without argument. A contrasting suggestion is made by Beisbart who thinks that the problem when thinking about life is that we "face an embarrassment of riches' as to what life is, and as such we can give a 'useful and unifying account … as a Carnapian explication."[42] For the purpose of this paper, I'm going to look in particular at one view of the nature of life which has numerous adherents, however If one prefers another view, they are encouraged to see if what I go on to say here can be paralleled with their favoured account.

That living things are teleological has once again been gaining adherents within the philosophy of biology.[43] This is vital for the

[40] Edouard Machery, «Why I stopped worrying about the definition of life... and why you should as well». *Synthese* 185:145-164 (2012), 145.

[41] Carol E. Cleland, «Life without definitions». *Synthese*, 185:125-144 (2012); Carol E. Cleland, & Christopher F. Chyba, «Defining 'life». *Origins of Life and Evolution of the Biosphere* 32:387-393 (2002); Carol E. Cleland, & Christopher F. Chyba, «Does 'life' have a definition?». In *Planets and life*, eds. Woodruff T. Sullivan, & John A. Baross (Cambridge: Cambridge University Press, 2007).

[42] Claus Beisbart, «What is Life? And Why is the Question Still Open». In *What Is Life? On Earth and Beyond*, ed. Andreas Losch (Cambridge: Cambridge University Press, 2017), 127-128.

[43] André Ariew, «Teleology». In *The Cambridge Companion to the Philosophy of Biology*, eds. David L. Hull, & Michael Ruse (New York: Cambridge University Press, 2007); Christopher J. Austin, *Essence in the Age of Evolution* (New York: Routledge, 2019); Mark Perlman, «Traits Have Evolved to Function the Way They Do Because of a Past Advantage». In *Contemporary Debates in Philosophy of*

definition of life I am interested in here since it claims that the difference between the living and non-living is that the living exhibits a distinctive type of teleology,[44] what is sometimes called immanent causation.[45]

Before I continue let me pre-empt a potential response that may have come to mind to the perceptive reader, what I will call the challenge of teleological reduction. The thought will be that whilst life's nature may well be teleological, teleology itself can be reduced

Biology, eds. Francisco J. Ayala, & Robert Arp (Oxford: Wiley-Blackwell, 2010); Georg Toepfer, «Teleology and its constitutive role for biology as the science of organized systems in nature». *Studies in History and Philosophy of Biological and Biomedical Sciences* 43:113-119 (2012); Denis M. Walsh, «Teleology». In *The Oxford Handbook of Philosophy of Biology*, eds. Michael Ruse (New York: Oxford University Press, 2008); Denis M. Walsh, *Organisms* (Cambridge: Cambridge University Press, 2015); Simona Ginsburg, & Eva Jablonka (2019) *The Evolution of the Sensitive Soul*. Cambridge, MA: MIT Press.

Walsh, D. M. (2015) *Organisms*. Cambridge: Cambridge University Press.

[44] David S. Oderberg, *Real Essentialism* (New York: Routledge, 2007); David S. Oderberg, «Synthetic Life and the Bruteness of Immanent Causation». In *Aristotle on Method and Metaphysics*, ed. Edward Feser (Basingstoke: Palgrave Macmillan, 2013); David S. Oderberg, «The Great Unifier». In *Neo-Aristotelian Perspectives on Contemporary Science*, eds. William M. R. Simpson, Robert C. Koons, & Nicholas J. Teh (New York: Routledge, 2017); Christopher Shields, «The dialectic of life». *Synthese* 185:103-124 (2012); Edward Feser, *Aristotle's Revenge: The Metaphysical Foundations of Physical and Biological Science* (Heusenstamm: editiones scholasticae, 2019), 375-342; Gary S. Rosenkrantz, «Animate Beings: Their Nature and Identity». *Ratio* 25:442-462 (2012); Mark Okrent, *Nature and Normativity* (New York: Routledge, 2017), Ch. 2; Dennis Des Chene, *Life's Forms* (New York: Cornell University Press, 2000), 57-63.

[45] Others may also subscribe to a view like this, given what they say, but they are not explicit in doing so: Christopher J. Austin, & Anna Marmodoro, (2017) «Structural Powers and the Homeodynamic Unity of Organisms». In *Neo-Aristotelian Perspectives on Contemporary Science*, eds. William M. R. Simpson, Robert C. Koons, & Nicholas. J. Teh (New York: Routledge, 2017), 172; James Barham, «Normativity, agency, and life». *Studies in History and Philosophy of Biological and Biomedical Sciences* 43:92-103 (2012); Matteo Mossio, & Leonardo Bich, «What makes biological organisation teleological?». *Synthese* 194:1089-1114 (2017).

to the non-teleological. But if teleology can be reduced then so too can life. Let me briefly comment on this. There have been several different attempts to give reductive explanations of teleological phenomena, such as etiological and causal role accounts.[46] That they have provided a successful reduction is highly controversial, and I suggest there are good grounds for thinking they haven't been successful.[47] At the very least I agree with Stove, that "it has turned out, in fact, to be far harder to translate teleological into non-teleological language than had been anticipated by philosophers … Whether such translation is possible at all, is more than anyone knows."[48] For my purposes here, I can acknowledge that it may be the case that some types of teleology can be reduced to the non-teleological. Yet the thought of those who adopt an immanent causation analysis of life is that this type of teleology is such that it cannot be reduced. Let me explain why.

Immanent causation, as Oderberg defines it, "is causation that originates with an agent and terminates in that agent *for the sake of its self-perfection*."[49] This contrasts with what he calls transient causation, where the "activity terminates in something distinct from the agent".[50] In terms of an example, a transient causal sequence is exemplified when one ball bounces into another to bring about its

[46] For a short overview of these accounts see: Patrick Forber, «Contemporary Teleology». In *Teleology: A History*, ed. Jeffrey K. McDonough (New York: Oxford University Press, 2020).

[47] For example, see: Michael C. Rea, *World Without Design* (New York: Oxford University Press, 2002), 108-127; Alvin Plantinga, *Warrant and Proper Function* (New York: Oxford University Press, 1993), 194-211; Robert C. Koons, & Alexander Pruss, «Must Functionalists be Aristotelians». In *Causal Powers*, ed. Jonathan D. Jacobs (New York: Oxford University Press, 2017), 199-203; David S. Oderberg, «Finality Revived: powers and intentionality». *Synthese* 194:2387-2425 (2017).

[48] David Stove, *Darwinian Fairytales* (Aldershot: Avebury, 1995), 192.

[49] Italics added for emphasis on a key aspect of this definition. Oderberg, «Synthetic Life …», 213.

[50] Oderberg, «Synthetic Life …», 213.

motion, since the activity of the first ball terminates in something distinct, namely the motion of the second ball. By contrast we can see immanent causation in causal sequences such as metabolism, since "it appropriates ambient sources of nutrition for its own flourishing."[51] Another example is "generative robustness, where the constituents of an organism are diachronically redirected toward the reproduction of a particular morphological structure in response to perturbation."[52] Finally we can think of adaptive flexibility as a type of immanent causal sequence, since "the organism flexibly adapts to its environment and changes internal condition for the sake of its growth, development, and proper functioning."[53] In fact many of the features typically appealed to by biologists as those which characterise living systems are immanent causes. It may not be that each living being exhibits all these features, but if they exhibit some type of immanent cause then we can think of them as living.[54] Oderberg puts it nicely writing, "being alive is about what a living thing *does*".[55]

Given this introduction to immanent causation, why think it cannot be reduced ontologically? Here I will employ an argument that Oderberg has given in detail elsewhere,[56] which we can think of as another type of explanatory gap argument. I shall formulate it in terms of a 'construction problem', being of the form, you can't construct X from Y, a form of argument which appears to be employed in reductive debates about consciousness. Recall the distinction made between transient and immanent causes. Oderberg suggests that every type of cause will either be of the transient or immanent variety. This doesn't mean that every cause will be the

[51] Shields, «The dialectic …», 117.

[52] Austin & Marmodoro, «Structural Powers …», 172.

[53] Oderberg, «Synthetic Life …», 215.

[54] For some discussion of hard cases concerning whether some entity is a living organism see: Oderberg, «The Great …».

[55] Oderberg, «Synthetic Life …», 212.

[56] Oderberg, «Synthetic Life …».

same in every respect, as there may be transient and immanent causes that have other features, but only that every cause will be either of the transient or immanent type. The construction problem goes as follows: transient causes cannot produce immanent ones. Oderberg reasons,

> Start with some transient causation of the simplest kind: A doing F to B. Add to it: A doing G to B; A doing F, G, H...to C; C acting on A and B; all of these acting jointly on D, E, F.... At some point, if the right transient causal chains are in operation, there will come into being a substance consisting wholly, exclusively, of parts engaged in transient causal relations, but which itself engages in immanent causation – doing F, G, H...to itself for itself. At what point? No one knows, of course; but my claim is that no one *could* know. For immanent causation just is causation of a *wholly different kind* from transient causation.[57]

If this argument is right and that transient causes cannot produce immanent ones, then this gives us a strong reason to think that immanent causes cannot be reduced to transient ones. My aim here isn't to defend this argument, just as I've not defended any arguments concerning consciousness that also take this form. Rather what I hope to show is that what we take the nature of consciousness or life to be will largely determine whether consciousness or life are reducible or not. In both cases, if they are non-reducible then both consciousness and life will be what I call ontologically hard. By contrast if they can be reduced, then they are ontologically easy.

Interestingly, Chalmers, an easy lifer, seems to accept much of what I've said. He writes, "to explain life, we ultimately need to explain how a system can reproduce, adapt to its environment, metabolise, and so on",[58] with this mirroring some of the features of life I previously mentioned. He also notes that these features of life are to do with functions,[59] or in my terminology, they are teleological. Yet Chalmers takes it that "questions about the performance of

[57] Oderberg, «Synthetic Life …», 217.

[58] Chalmers, «Facing Up …», 12; Chalmers, *A Conscious* …, 109.

[59] Chalmers, *A Conscious* …, 109; Chalmers, «Facing Up …», 12.

functions … are well-suited to reductive explanation."[60] As I've said, perhaps it's the case that some types of teleology are suited to reduction, but it seems that if immanent causation, which is a type of teleological causation, characterises life then it isn't well suited to reductive explanation, assuming that Oderberg's reasoning is sound. Chalmers also dismisses life as being strongly emergent, even though he thinks consciousness could be.[61] Yet again, the reason he thinks this arises from the fact that he thinks the nature of life is such that it can be reduced. But if life's nature is characterised by immanent causation and cannot be reduced, then the only type of emergence that could bring about this immanent type of causation from transient causes is strong emergence, since it is this type of emergence that brings about novel and irreducible properties.[62] Chalmers then may just be mistaken in what he says, in that given what he affirms life is, it is far from clear that he should actually think life is easy to construct.

What then should we think of 'easy lifers'? Are they right in thinking that life is easy to construct? This ultimately seems to me to depend upon what the nature of life is. For on some views, such as the immanent causal account, it's far from clear that constructing life is ontologically easy. In fact, it seems difficult. Yet this conclusion shouldn't be all that surprising, since much the same can be said about the question as to whether consciousness is easy to construct. As such in order to determine the answer to these questions, we have to determine what the nature or definition of consciousness and life is, with the answers to these questions being hotly debated.[63] Note

[60] Chalmers, «Facing Up …», 12; Chalmers, *A Conscious* …, 109.

[61] Chalmers, *A Conscious* …, 129. Chalmers suggests instead that if this is emergent, it is only weakly emergent. Also note that Chalmers doesn't explicitly speak of life, but rather features that seem to describe the living, such as "self-organisation in biological systems". Chalmers, *A Conscious* …, 129.

[62] Wilson, *Metaphysical Emergence*, 49-51.

[63] Note that whilst Ginsburg and Jablonka also think life is teleological (chapter 1), they don't see its arrival as having the difficulties Oderberg presents. They think

also that this conclusion allows for there to be further similarities between consciousness and life,[64] but also differences between them. What is key is that they are similar in this way, namely that whether they are easy or hard to construct is determined by what their nature is.

How then do we work out what the correct view of the nature of life is? All I can say here is that this will require the work of both scientists and philosophers. Some may think my insistence on philosophers being engaged in this task is a mistake, in the same way as others may think it's a mistake to involve philosophers in providing an analysis of consciousness. However, I suggest we take Ruse's advice that history suggests that studies to do with life often involve more than pure science, where this 'more' aspect may well be metaphysical.[65] As such, just as there has been an increase in

much the same concerning consciousness since they take consciousness to be teleological in various ways and that it is subject to no hard problem, claiming this is a problem that should be dissolved rather than one needing to be solved. Ginsburg, *The Evolution* …, 482. Whether they are right in thinking both these things is not something I discuss here.

[64] For example, both consciousness (Sehon) and life have been thought to exhibit a type of teleology, with this being more evident in the consciousness case if one thinks of intentionality as a type of teleology (Haldane; Okrent; Koons). Both life (Shields) and consciousness (Bayne) are widely taken to exhibit a privileged form of unity. Finally, both have been likened to machines, the machine analogy, with this being questioned in both cases, for example by (Searle) regarding consciousness and (Walsh) concerning life. Scott Sehon, *Teleological Realism: Mind, Agency, and Explanation* (Cambridge, MA: MIT Press, 2005); John J. Haldane, «Insight, Inference, and Intellection». *American Catholic Philosophical Association Proceedings* 73:31-45 (2000); Mark Okrent, *Rational Animals: The Teleological Roots of Intentionality* (Ohio: Ohio University Press, 2007); Robert C. Koons, (2017) «The ontological and epistemological superiority of hylomorphism». *Synthese* 198 (Suppl 3):S885-S903 (2021), S900; Shields, «The dialectic …», 112; Tim Bayne, *The Unity of Consciousness* (Oxford: Oxford University Press, 2010); John R. Searle, «Minds, brains, and programs». *Behavioural and Brain Sciences* 3:417-457 (1980); Walsh, *Organisms*.

[65] Michael Ruse, «The Origin of Life: Philosophical Perspectives». *Journal of*

interdisciplinary between scientists and philosophers on the nature of consciousness, so too there should be similar work undertaken on the nature of life.

Conclusion

Let me conclude by suggesting a few things that we can learn from this discussion. The first is that it seems to me that the question concerning whether life is easily constructed is far from settled. It could be that hard lifers are correct. As such, philosophers should be much less hasty in adopting easy life, tempting as it is. Second, since we have seen that the reasons for thinking that consciousness and life are hard to construct can parallel each other, we might also think there will be parallel accounts as to how consciousness and life are brought about. Constructing and investigating accounts is an area in which discussions concerning consciousness have an upper hand, since philosophers have been thinking about this for some time.[66] It may well be that many of the positions formulated concerning consciousness can be paralleled when thinking about life, for instance by thinking about strong emergence, postulating different types of fundamental building blocks, etc.[67] Additionally, it seems the time is right to explore these possibilities, given the recent scientific interest in rethinking questions concerning life. Yet in exploring these different possibilities, it will also likely be that theoretical considerations in determining one's choice of theory will

Theoretical Biology 187:473-482 (1997), 474, 482.

[66] Interestingly I suspect many scientists may take the opposite route, starting with the origin of life and working towards the origin of consciousness, since the former has undergone more scientific investigation than the latter. Ginsburg and Jablonka are an example of this approach. Ginsburg, *The Evolution* …, 1-2.

[67] I have implied/suggested some parallel accounts above, but I think it's fairly easy to see how parallel accounts of life can be given for eliminativist, reductvist, non-reductivist, dualist, panspsychist, panprotospychist and neutral monist views of consciousness.

cut the same way when thinking about consciousness and life. For instance, if you don't like strong emergence views regarding consciousness, you probably shouldn't think they are good when it comes to life. Equally, if you aren't put off by incredulous stares when thinking about panpsychism, perhaps you shouldn't think incredulous stares are good responses to those who postulate a type of panlife. If these considerations don't cut both ways, it will be interesting for philosophers to discover why this is the case.

How then do I answer the question posed in my title: constructing life and consciousness, how hard can it be? It seems to me that it *could* be pretty hard on both counts. Nevertheless, I'm still open to the possibility that both will turn out easy. Ultimately, I take it that the answer depends upon what the nature of both consciousness and life actually are, and since I'm not totally sure on that, the most honest answer to my question is that I don't really know how hard it is. But it could be very hard indeed!

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