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Teleology: Old Wine in New Skins

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The Metaphysics of Spooky Teleology*

Teleology is dead – it was killed by modern science. Indeed, its demise was already announced by the founders of modern philosophy. "The whole category of causes that people are in the habit of seeking by considering the purposes of things is of no use in the study of physics," Descartes wrote (1641/2008. 40), while Bacon famously opined that "inquiry into final causes is sterile, and, like a virgin consecrated to God, produces nothing" (*De Augmentis Scientiarum* bk. iii ch. 5; quoted by Woodfield 1976. 3). Hobbes likewise ridiculed explanation from final causes: "If you desire to know why some kind of bodies sink naturally downwards toward the earth, and others go naturally from it; the Schools will tell you out of Aristotle, that [...] the cause why things sink downward, is an endeavour to be below: [...] as if stones and metals had a desire, or could discern the place they would be at, as man does; or loved rest, as man does not" (Hobbes 1651/1998. 450f). The idea of robust goal-directedness ("spooky teleology",[1] as I'll call it) disappeared from our conception of nature. Science and philosophy got rid of it once and for all. It may enjoy a vestigial presence in folk metaphysics (Kelemen et al. 2013, Rose–Schaffer 2017), while some Thomists, far away from the philosophical mainstream, desperately hold onto an obscure Aristotelian version of it, but teleology is really just a relic of the past. Or so we are told.

But what is it, exactly, that modern science exorcised? Since robust teleology is an extremely unfashionable topic, it is virtually never discussed in contemporary analytic metaphysics. It is missing from the metaphysician's conceptual toolkit, even as a logical possibility. My goal is to put it back there.

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[1] "Spooky" is term of art in analytic metaphysics for posits that fly in the face of materialism (see e.g. Dupré 2012 for such a use of the word). The term probably originates in Einstein's description of quantum entanglement as "spooky action at a distance" (*spukhafte Fernwirkung*, Einstein et al. 1971. 158).

This is an exercise in conceptual engineering, not an attempt at historical interpretation. I would like to find a definition of spooky teleology that satisfies the following desiderata: (i) it is built from concepts that contemporary metaphysicians understand (it is ***idiomatic***), (ii) it captures goal-directedness (it is ***adequate***), and (iii) it is ***spooky*** in the sense that mainstream physicalists are likely to deny that anything answers to it in reality. In Section 1, I present a handful of potential definitions culled from the literature, and in Section 2, I develop my own proposal which is based on Braithwaite's (1947) concept of plasticity.

This is what I'm selling, nothing more and nothing less. Why should anyone buy it? I believe that a clear understanding of spooky teleology is important for three reasons.

First and most important reason: You cannot disagree with something that you don't understand. If you think that modern science killed spooky teleology, you should have a reasonably clear idea of what spooky teleology would be if it existed. Otherwise you are not entitled to assert its demise.

Let me offer a quick case study to drive this point home. A recent paper about teaching methodology draws attention to the fact that biology students instinctively think of functions as the causes of functional traits. Students display a bias for what the authors of the paper call "ontological teleology" – an allegedly unscientific notion that, in the authors' view, should be carefully eradicated. Here is how they explain the concept in question:

> Ontological teleology assumes that an explanandum came into existence because of its function within the organism or ecosystem. Some instances of ontological teleology do not specify how exactly the formation of the explanandum became directed towards the function, but other instances of ontological teleology attribute the striving towards function to the intention of a force that sets functionality as a goal. (Trommler–Hammann 2020. 4)

I submit that this description is so vague that it does not describe an intelligible conception of spooky teleology. At certain points (e.g. when it mentions forces that have intentions), the text borders on the nonsensical. Of course, it is possible that the text accurately reflects the way students think, because students are simply confused. But even in that case, biology education would be better served by a rational reconstruction of unscientific intuitions. A clear picture of spooky teleology would allow instructors to explain why we are justified to think that it is absent from nature.

Further, a clear picture of spooky teleology can be useful for interpreting historical doctrines. Although my goal here is explicitly ahistorical (all I want is an ***idiomatic***, ***adequate***, and ***spooky*** conception), I think that a good definition can help us make more sense of premodern ontologies and compare them to the

antinaturalist approaches that proliferate in contemporary analytic metaphysics (see e.g. Koons–Bealer 2010).

Last but not least, a workable definition of spooky teleology is important for reassessing the received view about the death of teleology at the hands of modern science. It is conceivable that a clear understanding of spooky teleology will deliver a more nuanced conclusion. At the end of the paper, I will suggest that spooky teleology could very well be real even in light of modern science.

I. IN SEARCH OF SPOOKY TELEOLOGY: THE STATE OF THE ART

This section will present increasingly complex approaches to spooky teleology, culled from contemporary metaphysics and from discussions about earlier versions of this paper. I cannot guarantee that there are no further candidates in logical space (or even in print), but I tried to be as comprehensive as I could be.

Let me briefly mention, and set aside, an obvious candidate for spooky teleology: divine providential activity. If our world is structured in such a way that it realizes the goals of a divine being, then, clearly, the world contains spooky teleology in some sense. But if this is the whole story about goals in nature, then we don't really have a distinctive conception of spooky *teleology*. What is antithetical to contemporary naturalism, in the picture that we are considering, is the presence of a divine being who fiddles with the layout of the universe. Teleology is not a robust additional ontological component in this account, but something that supervenes on the divine will. Another way to put this point is that teleology is extrinsic to created beings if it is wholly grounded in divine providential activity. In contrast, the kind of spooky teleology that this paper seeks to understand is an *intrinsic* feature of things, not something imposed on them from outside.[2] I will treat the intrinsicality requirement as an implicit component of the criterion of ***adequacy*** in what follows.

[2] One of the reviewers raises the objection that if divine teleology is completely extrinsic, then "it is also 'completely extrinsic' to a TV set that it is for watching TV programs, or in general to any tool that is in the service of human intentions. If this sort of instrumental teleology is excluded from the picture altogether, then one wonders what can remain for the teleology of non-rational or even generally non-cognitive agents, apart from mere intrinsic spookiness without a purpose. Furthermore, if created natures are created so that their inherent mechanisms serve some divine purpose (such as the perfection of the universe), then why would this inherent drive toward a divine purpose be extrinsic to them?" Teleology is intrinsic if directedness, or the capacity for it, is part of the nature of the entity in question. TV sets are not intrinsically teleological in this sense, while plants could very well be. The fact that directedness has an external causal origin (namely, God's creative activity) or that it involves external objects as means or ends does not make it extrinsic, in my terminology. What I am trying to rule out (what I treat as 'completely extrinsic') is the kind of teleology that consists in God's arranging a collection of mechanistic systems in a pattern that serves His purposes.

1. Mentalism

Perhaps the simplest approach to spooky teleology is the view that I will call *mentalism*. According to this view, teleological systems are literally minded, they exercise their will to realize their goals. This conception is intelligible and very spooky. According to standard contemporary physicalism, seeds are not striving to grow into trees, and foetuses are not consciously trying to become healthy babies, as the mentalist claims if she treats such beings as teleological.

Not only is mentalism idiomatic and spooky, it is also quite familiar, since it is often used to ridicule the idea of teleology (cf. the Hobbes quote in the introduction). However, rhetorical effectiveness aside, mentalism is not ***adequate***, because it is either weird and irrelevant or it is empty.

The thesis that seeds, foetuses etc. are literally minded is too weird to be a good conception of the kind of spooky teleology that Darwinism is supposed to have exorcised. When someone who is not in tune with modern science claims that foetuses have a *telos*, she does not mean that they are formulating plans in a hidden homunculus mind. Note that mentalism of this egregious sort is quite different from panpsychism, so one cannot drag panpsychism into the dialectic to make mentalism look less weird and irrelevant. Panpsychists believe that all physical objects have phenomenal states, while the mentalist believes that plants and foetuses have agential cognitive states. Panpsychists attribute phenomenal consciousness to *all* things, while mentalists attribute cognitive capacities to *some* things that clearly don't have such capacities. So these doctrines are completely different, and the respectability of panpsychism does not transfer to mentalism.

Alternatively, if the mentalist does not claim that seeds, foetuses etc. are literally agents but she claims, instead, that they are *similar* to agents, then mentalism is empty: it is not not a conception of spooky teleology but an invitation to provide one. It is quite obvious that teleological systems resemble conscious agents in some respect. The task is to explain why.

2. Retrocausality

One could think of spooky teleology as a form of retrocausality: a future state (the end or goal) causes the activity that leads to it. There are two obvious advantages of this view. First, it is ***idiomatic***: retrocausality is a familiar topic in contemporary metaphysics. Second, conceiving of teleology as retrocausality endows final states with the same metaphysical significance that causes can in principle have. For example, if causes explain their effects, then the retrocausal conception will entail that goals explain the actions leading to them. If causes make their effects more likely, goals will make the means more likely. And so on.

Unfortunately, the retrocausal conception is ***inadequate***. As Hawthorne and Nolan (2006. 274) point out, nonexistent future events cannot cause anything, hence the retrocausal conception entails that teleological processes necessarily reach their goal.[3] But this is clearly false. The development of a foetus (assuming, for the sake of argument, that it is goal-directed) can be arrested in all sorts of extraneous ways. If a three-month-old foetus dies because of an accident that has nothing to do with its own developmental processes, then it fails to realize its goal, hence its end state cannot cause anything from the future. Yet the foetus's development occurred for the sake of an end. So we have a teleological process that is not retroactively caused by its future end.

A fan of retrocausality could bring in merely possible events and say that arrested teleological processes are caused by states in close possible worlds where the end is realized. But this modification makes the view ***unidiomatic***, because interworld causation is a highly unfamiliar idea. Indeed, it is not only unfamiliar but plausibly impossible: Aristotelians would say that the merely possible cannot act, and even common sense suggests that nonactual things lack causal powers.[4] Moreover, the modified view continues to be ***inadequate***, because it portrays teleology as extrinsic to the actual world in cases where a goal-directed process is arrested. But goal-seeking, whether successful or not, should be intrinsic to things, according to the rules of ***adequacy***. So spooky teleology is not retrocausality.

3. Causal powers

In an ironic twist of history, causal powers re-emerged from the grave that early modern philosophers dug for them and they have gained a considerable following in contemporary metaphysics.[5] Some of their proponents believe that they also help make sense of teleology. Here's how Robert Koons articulates this approach:

> [C]ausal powers are inherently teleological. To have the power to produce *E* in circumstances *C* is to have the *C*-to-*E* transition as one of one's natural functions. Indeed, as George Molnar has pointed out (Molnar 2003), the ontology of causal powers

[3] On a plausible presentist view, no future events (and hence not even realized future ends) exist. Thanks to a reviewer for pointing this out.

[4] As a reviewer remarks: "If the bogeyman is not actually there in the kid's room, then the kid can be reassured that it cannot harm her." Thanks for the additional point and the example.

[5] See Ott (2009) on the early modern demise of causal powers. The history of their resurrection is yet to be written; good overviews of the state of the art include Corry (2019) and McKitrick (2018).

> builds intentionality into the very foundations of natural things. To have a power is to be in a kind of intentional state, one that is in a real sense "about" the effects one is pre-disposed to produce. (Koons 2021. S899)

A slightly different route from powers to teleology is explored by Paolini Paoletti (2021). He constructs a variety of technical concepts (weakly teleological, very weakly teleological, strongly teleological), but for illustrative purposes, the following rough idea will do: *x*'s causal power *P* is teleological iff (a) neither the activation nor the possession of *P* by *x* depends ontologically on any other power of *x* or on categorical facts, and (b) all other powers of *x* depend on *P*.

These conceptions are ***idiomatic***, since causal powers are well-known (although not universally loved) tools in the analytic metaphysician's toolkit nowadays. These conceptions are, however, ***inadequate***. Consider an electron's power to repel negatively charged particles. This property has physical intentionality in Molnar's and Koons' sense, yet the process that it gives rise to – repulsion according to the laws of electrodynamics – is clearly not teleological. The electron does not strive to repel other electrons, it does not generate an electric field for the sake of repelling other electrons, there are no better or worse ways for it to repel other electrons, and so on. Similar remarks apply to Paolini Paoletti's approach, since an electron's negative charge is plausibly seen to fulfil condition (a), while fulfilling condition (b) would not add anything interesting to the picture with respect to goal-directedness.

A fan of causal powers could insist that even a blind physical process like electromagnetic repulsion is teleological – the realm of natural ends is much wider than fans of teleology used to think. I grant that one can use "teleology" in such a way that electromagnetic interactions qualify as teleological (just as one can use "leg" in such a way that dogs qualify as five-legged animals). But this is not the sense of "teleology" that students of spooky teleology are interested in. There is nothing spooky about the interaction of charged particles. Identifying teleology with the directedness of causal powers does not bring us any closer to understanding what spooky teleology would be if it existed. We need a conception that is much more narrow and that obviously clashes with mainstream reductive naturalism (as causal powers do not; cf. Corry 2019).

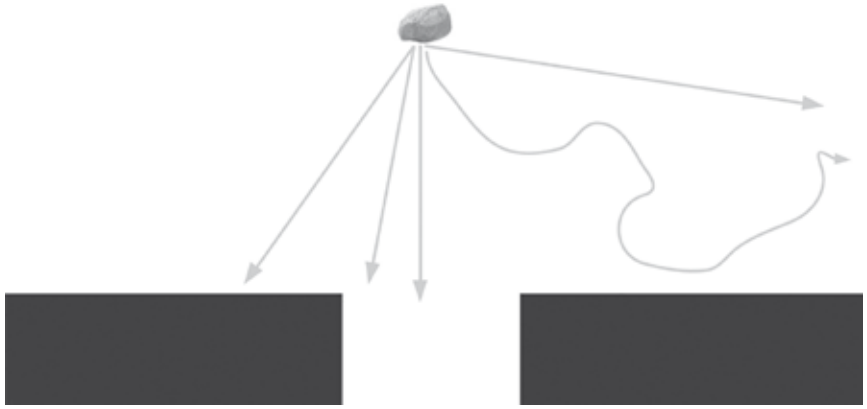
4. The Hawthorne/Nolan Model

In an interesting exercise in conceptual engineering, John Hawthorne and Daniel Nolan (2006) tried to capture a form of characteristically Aristotelian teleology using language reminiscent of the 'least action' principles of modern physics. Their conception is ***idiomatic*** by design. Moreover, since it envisions a

form of causation that (in light of modern science) does not exist, it is sufficiently ***spooky***. I will argue that the definition is nonetheless ***inadequate***.

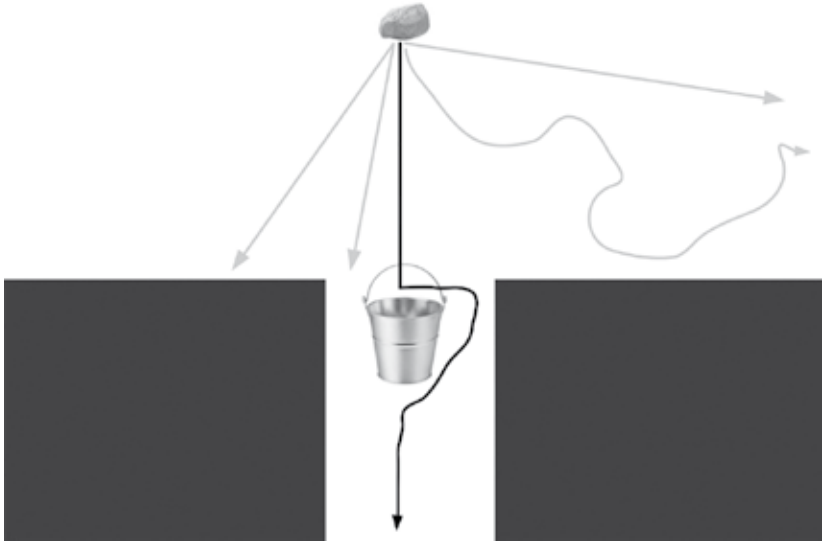
The stock example that Hawthorne and Nolan use is a rock seeking its natural place at the center of the Earth. For the sake of argument, I will neither endorse nor dispute the claim that this is a good paradigm of Aristotelian final causation. As mentioned in the introduction, issues of historical interpretation are orthogonal to the present inquiry.

Suppose that we lift our goal-seeking rock and we release it above a well. Once released, a number of logically possible trajectories are in principle available to the rock:



In the Hawthorne/Nolan model, goal-directedness is defined as the disposition to choose a specific type of trajectory. Very roughly, the idea is that the rock (while seeking its natural place at the center of the Earth) 'chooses' a trajectory that takes it to to its end at least as fast as any other available trajectory. "Choosing" is understood in a non-mentalistic fashion, as a disposition to move in a certain way. The mark of teleology, on this view, is the disposition to choose a path that is optimal in some sense.

This idea must be Chisholmed a bit. According to the rudimentary definition sketched above, the rock should choose a path that takes it to the center of the Earth at least as fast as any other path could. But then the rock should go around the bucket in the following scenario:



Circumnavigating the bucket would help the rock reach its goal quicker, but this is clearly not how rocks move. To avoid this counter-intuitive consequence, Hawthorne and Nolan propose the following sophisticated criterion:

> (HN) At any time *t*, the rock will follow a continuation of its path in such a way that, for some period after *t*, the rock has greater end-velocity [=moves faster toward its goal] than it would have on any alternative path that is compatible with the relevant constraints.

(HN), unlike the earlier rudimentary definition, predicts that the rock will fall into the bucket instead of circumnavigating it, because doing so yields a greater end-velocity in the period when the circumnavigating trajectory proceeds sideways. So (HN) is at least *prima facie* applicable to actual phenomena. The gist of (HN) is that something behaves teleologically iff its path is always locally optimal in the sense that it takes the object toward its end at least as fast as any other available path.

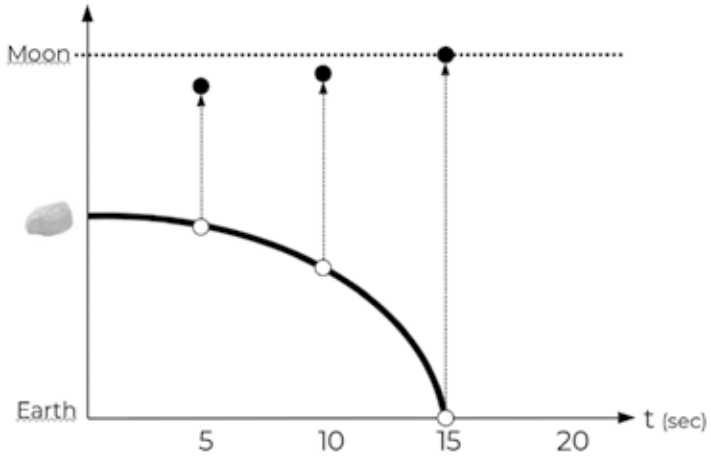
Is this conception ***adequate***? Not really. First of all, it is subject to counter-examples even within the narrow domain of goal-seeking rocks. Consider the Moon Stone, an unusual (merely possible) piece of rock whose behaviour is governed by the following rules:

> (A) If the Moon Stone is not on the surface of the Moon and it is not physically restrained, then it makes an instantaneous jump toward the Moon every five seconds. The size of the jump at *t* is $0.999*\Delta(t)$ if $\Delta(t) > 1$ km

and $\Delta(t)$ otherwise, where $\Delta(t)$ is the rock's distance from the nearest point on the surface of the Moon at t.

(B) When the Moon Stone is not jumping and it is not on the surface of the Moon, it obeys (HN).

If the Moon Stone is released somewhere on Earth, its trajectory looks something like this:



According to the Hawthorne/Nolan model, the Moon Stone is teleologically directed at the center of the Earth between $t = 0$ sec and $t = 15$ sec, since it obeys (HN) at every point in that period. But, clearly, the Moon Stone is *not* teleologically directed at reaching the center of the Earth. Its goal (assuming, for the sake of argument, that it has one) is to get to the Moon. And it works towards this goal with admirable efficiency, much more efficiently than the Earth-bound rock of Hawthorne and Nolan. So the Hawthorne/Nolan model, although ***idiomatic*** and moderately ***spooky***, is ***inadequate***.

One could perhaps get around this problem by more Chisholming, for example, by requiring that the end-velocity be well-defined throughout the trajectory. But then the Moon Stone will qualify as non-teleological, which also sounds wrong.

A reviewer raises the objection that the Moon Stone's behaviour is not only physically impossible but contrary to our sane intuitions about motion. So it hardly qualifies as a counterexample. I reply that nomologically impossible scenarios provide perfectly good counterexamples if (HN) is meant to be a metaphysically necessary criterion of goal-directedness. The Moon Stone is metaphysically possible, it is goal-directed (to the extent that stones can be), and it fails to satisfy (HN). So (HN) does not capture a metaphysically necessary condition of teleology.

The interlocutor might want to suggest that (HN) is not meant to be a metaphysically necessary condition, but some weaker kind. But I don't see what kind of weaker condition it could be. One cannot claim that (HN) is merely nomologically necessary, because (HN) is actually false – that's not how stones move in our world.[6] (HN) contradicts the actual laws of nature, so it describes a nomologically impossible phenomenon. Moreover, if one wants to capture the essence of teleology, mere nomological necessity does not fit the bill in the first place.

Counterexamples aside, there is a much more fundamental problem with the Hawthorne/Nolan conception: it is hard to generalize to final states that are not mere spatial positions. Louis strives to conquer Prussia – is his behaviour is teleological at *t* iff his action at *t* is part of the fastest possible campaign against Prussia? Not necessarily. Deliberate delay could, in principle, contribute to a more decisive victory. Is a foetus teleologically directed at becoming a healthy baby iff its biochemical processes turn it into a healthy baby as fast as possible? Again, no. So teleology is not locally optimal end-velocity.

5. Bedau's Beneficial Causes

The philosopher of biology Mark Bedau has offered a highly interesting theory according to which biological teleology involves the good of the organism. Although Bedau did not aim to define spooky teleology in general, his conception can be turned into such a definition by treating goodness as a metaphysically heavyweight general requirement.

Bedau's account is designed to cover functional traits like the heart's beating to circulate blood. His core idea is the following:

(B) *x F*s in order to *G* iff *x F*s because [*F*-ing contributes to *G*-ing & *G*-ing is good][7]

For example, the heart beats in order to circulate blood iff the heart beats because [its beating contributes to blood circulation & blood circulation is good for the organism]. Goodness is directly involved in teleological processes on this account; it helps explain why the process in question occurs.

(B) is not spooky by default, because its definiens is logically compatible with axiological antirealism. It could be that (B) is true but goodness is only in the

[6] For example, if you release a stone at the International Space Station, it will not satisfy (HN).

[7] Things enclosed in [...] are meant to be complex facts. "*G*-ing is good" is elliptical for "*G*-ing is good for the organism that has *x* as a part." Note that the definiens of (B) is very different from the following claim: (*x F*s because *F*-ing contributes to *G*-ing) & (*G*-ing is good). For discussion, see Bedau (1992. 787ff).

eye of the beholder. In that case, teleology itself is in the eye of the beholder. Alternatively, a reductive naturalist account of value turns (B) into a reductive naturalist analysis of teleology. (Of course, values must be naturalized without mentioning teleology to make this work.)

On the other hand, if (B) describes a real, observer-independent phenomenon *and* goodness cannot be reduced to value-free facts, then (B) is definitely ***spooky***. According to mainstream physicalism, irreducible objective values are not implicated in natural processes.

Whether (B) is ***idiomatic*** depends on the metaphysical content of "because". I can think of two options here: the "because" of causal explanation and the "because" of metaphysical explanation. The former makes (B) ***unidiomatic***, as it is hard to see how values could cause things. (Values can be treated as causes in the philosophy of action, but that's beside the point here unless one opts for mentalism.) Alternatively, "because" could signal some kind of 'metaphysical explanation' that is, according to Fine (2001) and others, symptomatic of metaphysical grounding, an allegedly all-important relation that plays a theoretical role similar to, but more general than, supervenience. This interpretation, however, renders the resulting analysis highly dubious. To illustrate, consider the claim that the the heart beats because$_{metaphysical}$ [its beating contributes to the circulation of blood & blood circulation is good]. If "because$_{metaphysical}$" signals metaphysical grounding, then the fact that [the heart's beating contributes to the circulation of blood & blood circulation is good] grounds the fact that the heart beats. But that sounds wrong – grounding is linked to phenomena like composition, realization, and constitution (cf. Schaffer 2009, 2017). None of those fit the relation between blood circulation and the heart's beating, which is a paradigmatically causal one.

So (B) is not ***idiomatic***. Nor is it ***adequate***, because robustly teleological processes can be directed at bad things. One can easily think of human history as a march toward a giant catastrophe, as a teleological process aimed at evil and destruction.[8] Yet under (B), this is logically impossible. Further, teleological processes whose ends are neither good nor bad are also impossible according to (B), even though they are possible. For no particular reason whatsoever, Steve sets out to count the blades of grass in his garden. Steve's activity is clearly goal-directed, but its end state is neither good nor bad.[9] So goal-directedness is not essentially connected to value. (That said, (B) could be entirely adequate in the context of biological functions. My point is that (B) is not a *general* definition of spooky teleology.)

[8] See e.g. *The Dialectic of Enlightenment* by Adorno and Horkheimer (1947/2002).

[9] An interlocutor remarks that Steve may actually need the number for some reason, and if he does not, then he is probably obsessive-compulsive and so not a real agent. Such cases are all conceivable, but so is a scenario where Steve is neither obsessive nor has any further use or need for the number of blades of grass in his garden. It is possible for people to strive for goals that have little or no value.

II. IRREDUCIBLE PERSISTENT PLASTICITY

The rest of the paper will offer a definition of spooky teleology that is both old and new. More precisely, its teleological component is old and the spookiness factor is new. I use an approach that was popular in the 1950s but fell out of fashion afterwards.[10] I will first argue that the conception in question – the idea that teleology is persistent plasticity – is both ***idiomatic*** and ***adequate***. Then I will mix in spookiness by adding a clause about irreducibility.

Imagine placing a rat in a maze that has food at the center. If the rat's sense of smell is good and the center of the maze can be reached from every entry point, then the rat will navigate to the center regardless of its initial position. Its goal-directed behaviour is *plastic* – moderate perturbations of the initial state result in virtually no perturbation of the final state.

The rat's behaviour is also *persistent* in the following sense: if we block a passage that the rat wants to traverse, then the rat will find an alternative route. If we place hurdles in its way, it will climb over them. And so on. The rat corrects its course when it encounters obstacles.

More generally, a behavioural disposition *D* is *plastic* with respect to state *G* iff bearers of *D* are disposed to reach *G* from a wide variety of starting points (so that moderate perturbations of the initial state result in virtually no perturbation of the final state). And *D* is persistent iff bearers of *D* are disposed to course-correct in the face of obstacles. *D* is persistently plastic iff it is both persistent and plastic.

Building on a venerable tradition in the philosophy of biology, I suggest identifying teleology in general with persistent plasticity:

(T) *x*'s goal is to reach state $G =_{df} x$ has a plastic and persistent disposition to reach *G*

This definition is ***idiomatic***. Apart from the concept of dispositions, which is familiar, (T) only uses the concepts of persistence and plasticity, which are easy to grasp and do not involve any unfamiliar metaphysical machinery.

Showing that (T) is ***adequate*** will take a bit more work. I submit that the definiens is a necessary condition of teleology. Surely, whatever a teleological system is, it ought to behave in a plastic and persistent manner with respect to its goals. If the rat is disposed to reach the food from only one entry point and it starts scratching its ear in all other cases, then it is not teleologically directed

[10] My main inspiration is Braithwaite (1947), complemented with Nagel's (1977. 272) notion of persistence. This is an amalgam of what Garson (2016. 17) calls the "behaviouristic" and the "mechanistic" approaches to teleology, the latter of which was influenced by cybernetics. Both were popular in the 1950s but are seldom defended today in the philosophy of biology (with the exception of McShea and his coworkers, see later).

at feeding. Similarly, if the rat stops when it encounters obstacles that it could overcome, then it is probably not hungry.

So the question is whether (T) states a sufficient condition of goal-directedness. According to Garson (2016. 23), (T) is threatened by overbreadth, because it classifies a wide variety of non-teleological systems as teleological. Imagine a marble ball that is released at the edge of a semi-spherical bowl. The ball ends up at the bottom of the bowl, and it does so in a plastic way: no matter where we release it, the ball always reaches the bottom. Its behaviour is persistent as well, because "it can adjust its trajectory in the face of obstacles" (Garson 2016. 23). So the ball has a goal, according to (T). But it does not. So (T) is wrong.

This objection seems to me quite easy to neutralize, because the ball's behaviour is obviously *not* persistent. If we place barriers on the inner surface of the bowl (so that it resembles a maze), the ball will get stuck on its way down. Unlike the rat, it is manifestly *not* disposed to course-correct.

One could modify the counterexample by reference to some brute physical disposition that is impossible to obstruct. Suppose (for the sake of argument) that the Sun's gravitational pull on Earth is the manifestation of a disposition. The disposition in question is plastic: wherever you put the Earth, the Sun will attract it. And the disposition in question is persistent: no matter how you try to obstruct it, the Sun will always attract the Earth. So, under (T), the Sun's goal is to attract the Earth. But the Sun has no goals. So (T) is wrong.

This counterexample also fails, because the concept of obstruction has no meaning with respect to gravity. There are no anti-gravitational shields. The claim that gravity course-corrects in the face of obstacles, if true, is merely vacuously true, like the claim that all unicorns love jazz. Accordingly, the counterexample can be neutralized by making explicit the presupposition that *x* has a *nonvacously* plastic and persistent disposition to reach *G*. Note, further, that if one considers a fundamental physical phenomenon that *can* be obstructed, like electromagnetism, then (T) will correctly classify it as non-teleological. Electric forces do not get around nonconducting materials that are placed between charged bodies.

Woodfield raises an objection about the individuation of goals in conceptions similar to (T). Specifically, he claims that any behavioural disposition can be rendered plastic by choosing a sufficiently fine-grained level of description:

> [A]ny straight line [in configuration space] representing a causal process can be bulged out in the middle or opened up like a fan, simply by choosing more refined criteria of type-identity for the middle or the start of the chain than for the end. (Woodfield 1976. 46)

Consider a defective rat that reaches the food from initial state I_1 only, aimlessly wandering around in hundreds of other possible cases. We can increase the number of goal-attaining initial positions if we switch to a finer-grained descrip-

tion: take the state I_1*, which differs from I_1 by a single molecule. The rat will also reach the food from I_1*. Now we have *two* favourable initial states, and we are on the road to plasticity. By choosing an appropriate level of grain, we'll be able to claim that the rat finds the food from a large number of initial states.

In response, one can point out that choosing different levels of grain to describe the end state and the trajectories leading up to it does not make the behavioural disposition in question plastic any more than calling tails "legs" makes dogs five-legged animals. Such differential tinkering is completely unmotivated from an epistemological standpoint, and it is easily circumvented by requiring that the final state and the activity leading up to it be described at the same level of grain (since they belong to the same level of reality).

Scheffler (1959) calls attention to 'the difficulty of multiple goals' in connection with definitions like (T). Suppose that some event E always accompanies the end state G – *s*ay, the rat always touches the food with its snout before feeding, or it always defecates after feeding. Then any behaviour that is plastic and persistent with respect to G will *ipso facto* be plastic and persistent with respect to E, and so (T) will classify E as a goal, even if it is a mere by-product.

This objection also fails. If E is some part of G (e.g. E is the state of the rat's touching the food with its snout), then E can plausibly be taken to be part of the goal. On the other hand, if E is distinct from G, then one can engineer a situation where E is absent but G is still attained (for example, one can prevent the rat from defecating after feeding).

To undermine this response, the interlocutor would have to find an E that is distinct from G yet necessarily accompanies G. To illustrate, let E be the rat's heart continuing to beat; surely this must accompany any instance of feeding. (T) then tells us that is part of the rat's goal to have its heart continue to beat while it eats. Or let E be the food's exerting a tiny gravitational pull on the rat; this, too, must accompany any instance of feeding, and so by (T), it is part of the rat's goal that its food exert a gravitational force on it.

But such counterexamples are also easy to dispose of. Whatever life-permitting situation the rat finds itself in, its heart will beat and external objects will exert gravitational forces on it. These general background conditions can and should be disregarded when we look at the behavioural tendencies that are present in a given situation. If the existence of such nomologically necessary background conditions were sufficient to undermine (T), then theories of causation and the ontology of dispositions would be similarly undermined, since the individuation of events is equally important there. Breaking is always accompanied by tiny gravitational interactions between the broken fragments; does it follow that a wine glass, apart from being disposed to break, is also disposed to have its fragments exert a minute gravitational pull on each other? And does this create an insurmountable problem for the individuation of fragility? I don't think so. The precise solution to this problem is far from obvious, but the problem is so

general that it cannot constitute an argument against (T) unless the interlocutor is willing to claim that the metaphysics of nature is in general undermined because of this single issue.

I conclude that (T) is ***adequate***. It is, however, not yet ***spooky***. I propose to make it so by adding a clause about irreducibility:

(ST) *x* is characterized by spooky teleology with respect to goal $G =_{df}$ (i) *x* has a plastic and persistent disposition *D* to reach *G*, and (ii) *D* is not reducible to the properties of *x*'s parts or to properties of things distinct from *x*

In a slogan: spooky teleology is irreducible plastic persistence.

This definition is still ***idiomatic***, since the idea of reducibility (understood as an ontological, not linguistic or epistemological, phenomenon) is quite familiar. (ST) is also ***adequate***, since it defines teleology the same way as (T) did: clause (i) is simply the definiens of (T). Finally, the definition is distinctly ***spooky***, because standard contemporary physicalists are likely to reject the idea that plastic and persistent behavioural dispositions (such as a rat's tendency to navigate to the food) are irreducible. The only irreducible dispositions are the fundamental physical ones, according to standard contemporary physicalism; everything else is just a jumble of fundamental interactions.

A reviewer complains that (ST) is not too different from 'minimum energy' conceptions like the Hawthorne–Nolan one. And similarities aside, why should we regard the processes in question as goal-directed at all? As the reviewer remarks, "by these lights, even a waterfall would be goal-directed, even if the pool at the bottom is certainty not 'directing' the water into it."

As to the first worry, (ST) is not a minimum-energy principle simply because it does not mention energy at all. According to (ST), an entity or system can be goal-directed even if it chooses paths that do not satisfy a 'least-action' law. A military commander who wins a battle but loses more soldiers than the best of all commanders would have is nonetheless behaving teleologically if he satisfies the definiens of (ST).

As to the second worry, I reply that waterfalls are not goal-directed under (ST), because they are neither persistent nor plastic. Moderate perturbations of their initial conditions do not result in virtually no perturbations in the outcome – if the river is diverted at the origin, it will not curve back to form a waterfall at the same cliff. Nor is a waterfall persistent. If a dam is erected right at the cliff, the water will not flow around it to reach the pond.

Apart from being ***idiomatic***, ***adequate***, and ***spooky***, (ST) has two further advantages. First, it fits the intuition that in the case of robustly teleological processes, the goal is the metaphysical ground of the activity that occurs for its sake. To see why (ST) supports this intuition, consider the most extreme form

of spooky teleology conceivable under (ST), the case where *x*'s plastic and persistent disposition is not reducible to *anything* – not even to other properties of *x*. Call this "maximally spooky teleology." And consider the variety of fine-grained dispositions that *D* entails in such cases: *x* will reach G under initial condition I_1, *x* will reach *G* under a rather different initial condition I_2, *x* will reach *G* if faced with obstacle O_1, *x* will reach *G* faced with a different obstacle O_2..., where I_1, I_2... and O_1, O_2... are gerrymandered collections, not instances of some natural kind. The only thing that unifies this motley bunch of behavioural tendencies is *G*, the goal. And so if *D* is not reducible to anything, then the only metaphysical structure that is discernible in *D* is that its manifestations all terminate in *G;* the goal *G* individuates *D*. So if teleology is maximally spooky, then the the metaphysical explanation of the activities leading to *G* will always involve *G* itself, and in that sense, the goal will ground the activities that occur for its sake.

Another valuable feature of (ST) is that it treats spooky teleology as a subtype of teleology, since (ST) includes the definiens of (T). (T) itself is compatible with reductionism, so (ST) makes it possible for friends of spooky teleology to conduct empirically informed debates with friends of naturalized teleology. Moreover, this is not just a logical possibility but an existing opportunity, since the philosopher of biology Daniel McShae and his coworkers do use (T) in their reductive analyses of biological teleology (McShea 2012, Lee–McShea 2020, Babcock–McShea 2021). Friends of spooky teleology are off to a good start if they manage to show that those reductive projects fail.

More generally, friends of spooky teleology who accept (ST) can deploy preexisting arguments for emergence in the philosophy of science to resurrect real teleology. If organisms, or ecosystems, or human minds, or plural subjects, or societies etc. are (i) strongly emergent and (ii) display persistently plastic behaviour, then spooky teleology is a reality, according to the definition that I recommend. And since arguments for (i) and (ii) are not hard to come by, (ST) supports the interim conclusion that robust teleology may not be quite as dead as it seems.

III. SUMMARY

This paper sought a definition of the kind of teleology that modern science allegedly eradicated. My inquiry was ahistorical: instead if trying to reconstruct old doctrines, I was looking for a definition suitable for contemporary analytic metaphysics; one that is ***idiomatic*** (intelligible for contemporary metaphysicians), ***adequate*** (defines goal-directedness), and ***spooky*** (describes a phenomenon that standard contemporary physicalists do not believe in).

I introduced six candidate definitions, and I argued that their scorecard is the following:

	Idiomatic	*Adequate*	*Spooky*
Mentalism	+	–	+
Retrocausality	+	–	+
Causal Powers	+	–	–
The Hawthorne/Nolan Model	+	–	+
Bedau's Beneficial Causes	–	–	+
Irreducible Persistent Plasticity	+	+	+

The last conception is superior to all the others, in my view, and it justifies the intuition that in cases of maximally spooky teleology, the goal is one of the metaphysical grounds of the activities leading to it. I also indicated that my proposed definition helps stage empirically informed debates with friends of naturalized teleology. The outcome of those debates – the viability of resurrecting robust teleology – will depend on the strength of emergentist arguments in biology, the philosophy of mind, and social ontology.

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