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# *A Definition of Physicalism*

PHILIP PETTIT

Is there any possibly true, substantive doctrine that can reasonably go by the name of physicalism? Some have suggested that there is not. Physicalists, according to Tim Crane and Hugh Mellor ([2], p. 186), maintain that the empirical world ‘contains just what a true complete physics would say it contains’. And in doing this, so they urge, physicalists fall into one of two traps (see too Smart [14]). Either they take the true complete physics to encompass absurdly much – say, to encompass psychology as well as microphysics – and their thesis is trivially true. Or they take it in a narrower, more familiar sense and their thesis is more or less obviously false.

Contrary to Crane and Mellor, I believe that we can define a possibly true, substantive doctrine which holds, roughly, that the empirical world ‘contains just what a true complete physics would say it contains’. I shall try to defend this view by defining a doctrine that is non-committal enough to be possibly true and that makes such a claim about the furniture of the empirical world that it deserves – perhaps not uniquely – to be described as a physicalist theory.<sup>1</sup>

There are two pairs of claims that the physicalist whom I am envisaging will make. They give expression, respectively, to these two ideas: first, that the empirical world is constituted out of materials which physics is in the best position to identify; and second, that the empirical world is governed by forces or regularities that physics is best equipped to describe. The two pairs of claims mean, at least in one sense, that the empirical world contains just what a true complete physics would say it contains; anything that is not explicitly recognized in physics will belong still to the physical dispensation, according to these claims: it will be physically constituted and physically governed.

<sup>1</sup> I am happy to describe it too in other, related terms: as naturalism or materialism or micro-physicalism, for example. It is a perfectly good candidate for what any of those terms should be taken to denote. However the terms may also be used to mark a variety of differences. Many contemporary philosophers of psychology take naturalism, for example, to be a form of physicalism that involves certain methodological commitments (e.g. Sterelny [16], p. xi). And many others take materialism to be the form of physicalism which assumes a seventeenth century conception of the physical (Crane and Mellor [2]; but compare Lewis [8]).

*Claim 1. There are microphysical entities*

- A. There is an empirical world of the sort that physics posits.
- B. Different kinds of thing in the empirical world share (subatomic) levels of composition of the kind that physics – specifically, microphysics – posits: there is a realm of smaller and simpler, microphysical entities.

The first part of this claim gives expression to a realist view of physics, under which the physicist is in the business of telling us about an objective world and the business is a potentially successful enterprise: there really is a world there for the physicist to chart. The second part of the claim directs us to the fact that physics, unlike the other sciences, has comprehensive as well as realist ambitions (on this matter see Papineau [10], Crane [1]). In the world that physics posits, things of different kinds – things of all kinds, if the next claim is sound – share certain (subatomic) levels of composition and microphysics is identified as the science that covers everything in that realm, at whatever level of composition. Physics, then, is potentially more encompassing than the other sciences. It does not confine itself to particular ranges of empirical reality, unlike psychology or biology, and neither does it confine itself, in the manner of chemistry, to the study of empirical reality above a certain (atomic) level of complexity.

In endorsing this first claim, the physicalist can remain relatively uncommitted on a variety of troublesome issues.

1. He may be more or less sanguine about the accuracy of actual physics, or even about the propriety of its methods: he may be more or less optimistic about how far actual physics is on the right track. He has to suppose that microphysics is directed at a real target – a realm of smaller and simpler entities – for the discipline is identified by this orientation (rather than by its claims or methods). But he need not think that its sights are well set or that it has achieved any particular degree of accuracy in hitting that target; he can even admit that microphysics may be forced to countenance entities that by present intuitions are not of an intuitively ‘physical’ character.

2. He can remain neutral on the proper way to formulate the claims of physics, in particular microphysics: he may think of it as the study of small particles, for example, or he may endorse a field-style formulation, under which small particles correspond to property-instances with thin world-lines.

3. Since he understands microphysics as the physics of the subatomic (or whatever) realm, he can leave open the matter of how small or how simple microphysical entities get to be, at lower levels of composition within that realm; he can leave open, as some physicists wish to do, even

the question as to whether there is any bottom level of smallest or simplest grain.

4. Consistently with defending a certain ‘non-emergentist’ view on the relationship between the microphysical realm and other levels – this non-emergentism is defined in the further claims below – he may think of the microphysical realm in a non-atomist way; he may believe that certain relational, microphysical properties – apart from spatio-temporal properties – are in some way fundamental.<sup>2</sup>

5. Consistently with defending such a non-emergentist view of the relationship between the microphysical realm and other levels, he may even believe that that view does not hold of the relationship between different levels, assuming there are some, within the microphysical realm.

*Claim 2. Microphysical entities constitute everything*

- A. Everything in the empirical world is composed in some way – composed without remainder – out of (subatomic) entities of the kind that microphysics posits, or it is itself uncomposed and microphysical.
- B. The composition involved is conservative or non-creative in this sense: absent the introduction of a new source of higher-level laws or forces, two microphysically composed entities cannot differ intrinsically without some difference of a microphysical kind – without some difference in the character or configuration of their microphysical components.<sup>3</sup>

Part A of the claim is left indeterminate to the extent that no specification is offered of the sort of composition required. The mode of composition may involve any of a variety of relationships, and any of a number of mixes among those varieties: for example, it may involve the relationships of identity, member to set, part to whole, token to type, realizer to role, and

<sup>2</sup> This microphysical non-atomism is inconsistent with the ‘Humean’ picture that attracts David Lewis ([7], pp. ix–x). ‘We have geometry: a system of external relations of spatiotemporal distance between points. Maybe points of spacetime itself, maybe point-sized bits of matter or aether or fields, maybe both. And at those points we have local qualities: perfectly natural intrinsic properties which need nothing bigger than a point at which to be instantiated. For short: we have an arrangement of qualities. And that is all.’ Lewis articulates the view that all that there is apart from this Humean configuration supervenes on that configuration; this amounts to a microphysicalism akin to the sort defined here. The present point, roughly, is that the microphysicalist can keep the supervenience aspect of Lewis’s picture – can maintain his microphysicalism – while dropping the Humean one.

<sup>3</sup> My thanks to Peter Smith for a helpful exchange on the content of this clause.

so on. Part B offers the one constraint that the composition must satisfy. It must be the case, under the proviso about novel laws and forces, that if there is an intrinsic difference between two things, or between the same thing at different times, then there must be a microphysical difference between them. No macrophysical difference without a microphysical one. The macrophysical, as it is often put, supervenes on the microphysical: or at least it does so, subject to the proviso given.

The supervenience claim leaves a number of matters indeterminate but that is not relevant for our purposes. The point is that the physicalist must believe in a conservative sort of microphysical composition that makes any failure of supervenience problematic: a conservative sort of composition that will force us to explain any failure of supervenience by reference to an independent source of novel laws or forces. We shall be returning to the possibility that composition is attended by the appearance of such novel laws or forces in discussing the second pair of claims that I associate with physicalism.

My main object is to define physicalism, not to defend it. But it may be worthwhile asking who is likely to reject this second claim: who, that is, apart from those who interpret physics in such a non-realist way that they cannot endorse any suitable version of the first claim. One opponent will be the dualist who thinks that there are things in the empirical world – say, Cartesian minds – that are not in any way composed out of microphysical entities. And another will be the person, perhaps difficult to imagine, who accepts microphysical composition but thinks that the composition involved is not necessarily conservative: it allows, without further need of explanation, that two entities that are composed in the same way, and of the same materials, may yet differ intrinsically from one another.

*Claim 3. There are microphysical regularities*

- A. Microphysical entities are subject to certain law-like regularities, in virtue of their microphysical properties and relations.
- B. The laws at work in the microphysical realm do not obtain because they are required to obtain by the obtaining of certain laws at a macro level: perhaps the same laws (e.g. the same conservation laws), perhaps laws of a different character; the microphysical laws, as we may say, are primitive.

Part A is not as strong as it may at first seem. It is silent on how exactly laws should be understood and on whether they may be probabilistic as well as deterministic. It allows that certain microphysical laws may ultimately apply in virtue of certain relations among microphysical entities, not in virtue of their atomistic properties. And it says, not that the behaviour of microphysical entities is governed entirely by microphysical laws,

only that there are some microphysical laws that play a governing part. Finally, part A does not say that the microphysical laws all bear on entities of the same grain: the laws involved may include laws that apply, as it were, at different levels of grain, provided those levels are all subatomic. Part B gives some edge to the claim. The laws envisaged in the microphysical realm obtain for independent reasons, whatever those may be, not because they are necessary for the operation of macro-level laws. There is no top-down push at the origin of the laws; they are as primitive as laws get to be.

Who might reject this third claim? The rejection of part A involves the denial that there are laws in operation in the microphysical realm. Someone may deny that there are microphysical laws on the ground that there are no laws whatsoever; this would undermine physicalism in the precise sense defined here but it would be consistent with a variant formulation that refers to forces or whatever in place of laws. Alternatively, someone may deny that there are microphysical laws while asserting that there are laws of a macro-level kind; this would constitute a much more challenging attack on physicalism in my sense. The rejection of part B would go to matters of deeper metaphysics. Someone who thinks there are microphysical laws but who holds that they are not primitive is going to have to tell a story whereby macro-level regularities propagate their requirements downwards and establish an order of microphysical law. Not a common picture but, presumably, a possible one.

*Claim 4. Microphysical regularities govern everything*

If there are macro-level laws, as there surely are, then:

- A. They do not complement micro-level laws, taking up some degree of slack left by those laws; and
- B. They are not independent of micro-level laws: they do not have the potential to conflict with them and they do not serve to reinforce them, representing an extra booster for sequences of events that are established in accordance with those laws.

This fourth claim is relevant in the debate between physicalists and anti-physicalists, because if there are any macro-laws, then those laws must ultimately put constraints on the behaviour of microphysical entities.<sup>4</sup> They govern things that are composed out of microphysical entities and if they are to dictate what happens to such things, then they must impose constraints on what happens to the microphysical components of those things. But if macro-laws constrain the behaviour of microphysical entities, then there is a question about how they relate to the microphysical

laws which, by Claim 3, are relevant to the behaviour of those entities. That is the question addressed in Claim 4.

One sort of physicalist may deny that there are any macro-level laws: that there are any laws, for example, that apply in virtue of the satisfaction of certain chemical or biological, psychological or social conditions. This line is not going to be attractive to many; at least not, under a generous conception of laws. The more usual sort of physicalist will admit that there are macro-level laws, as there are laws in the microphysical realm, but will argue, by defending the fourth claim, that those laws do not represent a regime that is independent from the microphysical order. The macro-laws do not complement microphysical laws, filling in gaps which those laws leave. And the macro-laws do not obtain on an independent basis. The satisfaction of a macro-antecedent cannot require a result that conflicts with microphysical laws. And if the satisfaction of a macro-antecedent requires a result that is already guaranteed by microphysical laws, it does not represent an extra determinant of that result. Macro-level regularities, however objective and however worthy of notice, are fixed in place by the regime which the microphysical laws establish.<sup>5</sup>

This physicalist denies that the laws that appear at the macro-level are of the novel kind, or are associated with the novel forces, mentioned in the proviso governing the second claim. He holds that in worlds like ours that proviso is fulfilled – as a contingent matter (Lewis [6]) – and so he defends a non-provisional but contingent supervenience of the macrophysical on the microphysical.<sup>6</sup> His overall position can be expressed as follows: that

<sup>4</sup> Crane and Mellor ([2], p. 190) illustrate the point nicely, with reference to Boyle's (macro-level) law. Suppose that the volume of a gas sample is suddenly halved. 'If the gas is ideal', they say, 'Boyle's law entails that when its pressure settles down again it will be twice what it was. That law does not dictate all the interim behaviour of the sample's molecules – except that it must be such as will eventually double the sample's pressure.'

<sup>5</sup> The point applies to the case where the same law – for example, the same conservation law – is involved, now at a micro-level, now at a macro-level. The point then is that that law will not have to do double duty.

<sup>6</sup> Crane and Mellor ([2], p. 205) offer an argument against supervenience – with reference to the psychological and the physical – but one that leaves me unmoved. They admit that 'token thoughts and sensations are only supposed to supervene on simultaneous tokens of non-mental properties' but maintain, nonetheless, that this supervenience conflicts with the possibility of non-mental, indeterministic causation of mental events: in particular, the causation by the same non-mental antecedents of these mental events here, and of those, different mental events there. I see no difficulty. Past non-mental causes can give rise indeterministically to different mental events, consistently with supervenience, provided that they do so – as all physicalists will surely say – through giving rise indeterministically to different non-mental subveners.

once the microphysical conditions and the microphysical laws have been fixed, then all the crucial features of a world like ours will have been fixed; viz., all the other laws that obtain at the world, all the conditions – all the initial conditions – that engage those laws and all the things that happen in accordance with the laws. The position on laws is put in place by the fourth claim, where the position on initial conditions is entailed by the second.

The position on laws amounts to a sort of nomological fundamentalism. Not only is the empirical world microphysically constituted, the empirical world is also microphysically governed. But this fundamentalism, it should be noted, does not involve eliminativism or reductivism. Consistently with thinking that macro-level laws obtain at a world superveniently on the microphysical conditions and microphysical laws that obtain there, a physicalist need not think that *really*, in some sense, there are no macro-level laws: that only the microphysical laws truly exist. Anything that supervenes on what is real must be real itself and so there is no pressure to deny reality to macro-laws. Again, consistently with thinking that macro-level laws supervene on the microphysical regime, a physicalist need not imagine that it is going to be possible for human beings, at least under some idealisation of their capacities, to reduce macro-level laws to microphysical conditions and regularities. Reducibility may fail, for example, because there is no prospect of anyone's ever being able to identify in microphysical terms – in terms that might connect with microphysical laws – the condition under which a given macro-level regularity applies; that condition may be multiply and wildly realisable, as it is often put, at the microphysical level.

As fundamentalism is not eliminativism or reductivism, so it need not amount to any sort of epiphenomenalism about macro-laws. (See Jacob [5], Macdonald [9], Pettit [11], Yablo [17]) Such an epiphenomenalism would hold that the antecedent conditions that macro-laws – in particular, causal macro-laws – relate to certain consequences are not really causally relevant to those consequences: that they do not do the work, whatever it is, that is required for causal relevance.

Epiphenomenalism may seem to receive support from our fundamentalism. If there is a bottom microphysical level, and if the properties at this level satisfy a certain irreducibilist conception of causal efficacy, then properties at other levels can only count as causal in a derived sense. Under the irreducibilist conception, causal factors are characterized by the possession of a productive 'oomph' or 'bif' and, assuming that the basic microphysical property-instances exercise this power, higher-level factors can only have it by grace of being co-instantiated with microphysical causes; if they had it on an independent basis, then they would represent



independent laws.<sup>7</sup> But the physicalist need not endorse this conception of causal efficacy, and need not even think that there is a bottom microphysical level.

The simultaneous obtaining of laws at different levels means that there must be a certain architecture in place: the antecedent of a higher-level law must be such that however it is microphysically realized – more or less – the realizer reliably leads, by the microphysical laws, to a realizer of the macrophysical consequent. If a higher-level antecedent is relevant in this way to a given result then we may say that it ‘programs’ for the result (Jackson and Pettit [3], [4]; Pettit [11], [12]). Under the irreducibilist conception of causal efficacy, higher-level factors program for results that are really produced – produced in the full, irreducible sense of production – by the basic microphysical properties. But under other conceptions of causal efficacy they may program for results in a proper causal manner. If causal efficacy is explicated in terms of laws or counterfactuals, for example, then programming properties may certainly count as fully causal. And, equally, they may count as causal if causal efficacy is understood by reference to certain paradigms, or by reference to the process, whatever it is, that certain paradigms are taken to exemplify: say, a distinctive transfer of energy. There is no reason why a higher-level property cannot satisfy such a conception of causal efficacy. (See Pettit [13])

Let us grant that the fundamentalism which the physicalist defends in maintaining his last claim does not involve eliminativism, reductivism or epiphenomenalism. Nevertheless, it must be admitted that the last claim of the physicalist is, intuitively, very strong. It commits him to the view that everything that happens which is relevant to the microphysical realm – that is, by the first two claims, everything that happens in the empirical world – happens in accordance with primitive microphysical regularities and without any reinforcement from independent macro-level laws. What happens may accord with macro-level laws, being required if those laws are to obtain, but macro-level laws will not reflect any independent dispensation in the government of things. They reflect at a coarse level a dispensation that is fully manifested, in finer grain, within the realm of microphysical laws.<sup>8</sup>

The fundamentalism which the physicalist defends gives total hegemony, as we might say, to the microphysical order: it introduces a dictatorship of

<sup>7</sup> It will not do by way of response to say, as Russell said, that physics does not need the category of causality. Even if physics does not need the category – even if the category is a commonsense one – it may be possible to apply the category to the posits of physics; certainly, the category would seem to be applicable at the level of entities like electrons and protons. If the category is applicable in this way, then the epiphenomenalist argument can continue to be pressed.

the proletariat. Many philosophers will find it appealing to strike back, in democratic spirit, on behalf of the middle and upper classes, insisting that those classes are just as indispensable in the government of the world. One variety of the counter-revolution – the denial of A – would give a role to macro-laws by restricting the domain over which microphysical laws rule. The other variety – the denial of B – would give them a role by insisting that their presence and their relevance in the government of certain sequences of events is not guaranteed just by the obtaining of suitable microphysical conditions and laws; if the macro-laws obtain and are relevant to certain happenings that are already required by microphysical laws, then this means that there is another shoulder at the wheel.

What can the physicalist say in response to such misgivings? My job, I stress again, is not to defend physicalism, only to define it. But there are three quick points I would like to invoke in its defence. One is the familiar consideration that, even if it offends against democratic instincts, the sort of doctrine in question displays an attractive economy and simplicity (Pettit [12], Chapter 3). For example, the doctrine explains why laws at different levels work so smoothly and systematically in tandem; it does not have to appeal to any happy coincidence of effect or any pre-established harmony. The second and third considerations are not so commonly mentioned.

The second is that the physicalism defined here is a concrete but fairly cautious version of an abstract and plausible claim (cf. Lewis, [8]). The abstract claim is that the various kinds of things in the world are composed of smaller and simpler items; that this composition establishes a hierarchy of different levels of thing; and that there is some less-than-highest level of composition such that if we fix how things are governed from there down, then we will have fixed how things at every level are governed. This claim is concretized in the physicalism that we have defined here. The composing items are said to be the kinds of thing that microphysics posits and the level at which we go to microphysics – the subatomic level – is said to be one such that if we fix how things are governed from there down, then we will have fixed how everything is governed. Both of these claims are cautious, abstracting as they do from microphysical detail, and to that extent they should not be found excessively controversial (cf. Smart [14], Smith [15], pp. 25–26).

<sup>8</sup> There is one respect in which the last claim is less strong than it may at first seem. If microphysics is the science of what is smaller and simpler than the atom – or whatever – then the last claim is consistent with the view that there is no single level of grain at which microphysical laws obtain hegemonically. Thus the fundamental microphysical laws may include some laws at a relatively smaller level of grain, some at a relatively higher, at least for all that the fourth claim says.

The third point I wish to make is of a different character. Many philosophical projects attempt to vindicate commonplace discourses: commonplace discourses about colour or value or mentality or whatever. It is good practice with such projects to try to vindicate the target discourse under hard assumptions rather than easy ones: under assumptions that would make vindication more difficult rather than less. And the assumptions associated with physicalism, as I have defined it here, satisfy that desideratum. They represent a worst-case – or at least a pretty bad-case – scenario from the point of view of relevant, discourse-saving projects. The fact that the physicalist picture is a scenario of this kind does not give philosophers reason to believe it, of course, but it may give them reason to carry on as if it were sound; it may give them reason to treat physicalism as a standard, working hypothesis.

And so to our conclusion. The four claims that I have presented suggest, as a physicalist doctrine ought to do, that the empirical world contains just what a true complete physics would say it contains. There may be more to the world than what is explicitly recognized in physics but all that there is, according to these claims, is physically constituted and physically governed. For all that we know, the doctrine in question may possibly be true; it is non-committal enough about scientific detail to fit with our current knowledge. But for all that we know, the doctrine is also possibly false: the claims are not trivial or even *a priori*. Thus it represents a physicalist doctrine that escapes the charge of being either trivially true or more or less obviously false. It raises a genuine question of physicalism.<sup>9</sup>

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