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Real materialism[1] Galen Strawson

'Trinculo might have been referring to modern physics in the words, "This is the tune of our catch, played by the picture of Nobody".' [Eddington][2]

Love like Matter is/Much odder than we thought. [Auden][3]

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1 Introduction

Materialism is the view that every real, concrete[4] phenomenon[5] in the universe is physical. It is a view about the actual universe, and for the purposes of this paper I am going to assume that it is true.

It has been characterized in other ways. David Lewis once defined it as 'metaphysics built to endorse the truth and descriptive completeness of physics more or less as we know it',[6] and this cannot be faulted as a terminological decision. But it seems unwise to burden materialism—the view that every real concrete phenomenon in the universe is *physical*—with a commitment to the descriptive completeness of *physics* more or less as we know it. There may be physical phenomena which physics (and any non-revolutionary extension of it) cannot describe, and of which it has no inkling, either descriptive or referential.[7] Physics is one thing, the physical is another. 'Physical' is a natural-kind term—it is the ultimate natural-kind term[8]—and no sensible person thinks that physics has nailed all the essential properties of the physical. Current physics is profoundly beautiful and useful, but it is in a state of chronic internal tension.[9] It may be added, with Russell and others, that although physics appears to tell us a great deal about certain of the general structural or

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[1] This paper is an attempt to elaborate on 'Agnostic materialism' (Strawson 1994: 43-105); trailers appeared in Strawson 1998 and 1999a. Since writing it I have come across several older expressions of similar views and have added a considerable number of quotations.

[2] 1928: 292, quoting Shakespeare, *The Tempest*, Act III Scene ii. When I cite a work I give the original publication date, while the page reference is to the edition listed in the bibliography.

[3] 1940.

[4] By 'concrete' I simply mean 'not abstract'. It is natural to think that any really existing thing is ipso facto concrete, non-abstract, in which case 'concrete' is redundant. But some philosophers like to say that numbers (for example) are real things—objects that really exist, but are abstract.

[5] I use 'phenomenon' as a completely general word for any sort of existent that carries no implication as to ontological category (the trouble with the perfectly general word 'entity' is that it is now standardly understood to refer specifically to things or substances); and suppress its meaning of *appearance.*

Note that someone who agrees that physical phenomena are all there are but finds no logical incoherence in the idea that physical things could be put together in such a way as to give rise to non-physical things can define materialism as the view that every real, concrete phenomenon that there is *or could be* in the universe is physical.

[6] 1986: x.

[7] Physics is trivially referentially complete, according to materialism, in so far as its object of study is the universe, i.e. the whole of concrete reality. There may nevertheless be specific, smaller-scale phenomena of which physicists have no descriptive or referential inkling.

[8] Failure to recognize this simple point, long after the existence of natural-kind terms has been generally acknowledged, is one of the more disastrous legacies of positivism. (Compare the survival of the 'regularity theory of causation' after the abandonment of phenomenalism.)

[9] I have in mind the old quarrel between general relativity theory and quantum mechanics, but there is also turmoil in cosmology.

mathematical characteristics of the physical, it fails to give us any further insight into the nature of whatever it is that has these structural or mathematical characteristics—apart from making it plain that it is utterly bizarre relative to our ordinary conception of it.

It is unclear exactly what this last remark amounts to (is it being suggested that physics is failing to do something it could do?), but it already amounts to something very important when it comes to what is known as the 'mind-body problem'. Many take this to be the problem of how mental phenomena can be physical phenomena *given what we already know about the nature of the physical*. But those who think this are already lost. For the fact is that we have *no* good reason to think that we know anything about the physical that gives us any reason to find any problem in the idea that mental phenomena are physical phenomena. If we consider the nature of our knowledge of the physical, we realize that 'no problem of irreconcilability arises'.[10] Joseph Priestley saw this very clearly over two hundred years ago, and he was not the first. Noam Chomsky reached essentially the same conclusion over thirty years ago, and he was not the last.[11] Most present-day philosophers take no notice of it and waste a lot of time as a result: much of the present debate about the 'mind-body' problem is beside the point.

2 Terminology

I am going to use the plural-accepting, count-noun form of the word 'experience' for talking of experience***s*** as things (events) that may (and presumably do) have non-experiential being as well as experiential being. And I am going to reserve the adjective 'experiential' and the plural-lacking form of the noun 'experience' for talking about the qualitative character that experience***s*** have for those who have them as they have them, where this qualitative character is considered wholly independently of everything else. The phenomenon of experiential[12] qualitative character is part of what exists—it is part of reality, whatever its ontological category—and it is essential to have some unequivocal way of referring to it and only to it.

One could express this terminological proposal by saying that 'experiential phenomena' and 'experience' (plural-lacking form) refer in a general way to: that part of reality which one is left with when, continuing to live and think and feel as one does, one engages in an old sceptical thought experiment and imagines that the 'external world', including one's own body, does not exist. They refer to the part or aspect of reality one has to do with when one considers experience***s*** specifically and solely in respect of the experiential qualitative character they have for those who have them as they have them, and puts aside the fact that they may also be correctly describable in such non-experiential terms as 'a 70-20-30 Hertz coding triplet across the neurons of area V4'.[13]

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[10] Eddington 1928: 260.
[11] Chomsky 1968: 6-8, 98; 1988: 142-147; 1994 passim; 1995: 1-10; 1996: 38-45; 1998: 437-441; compare Crane and Mellor 1990.
[12] 'Qualitative' has to be qualified by 'experiential' because experiences also have non-experiential qualitative character, according to materialists (every non-relational property of a thing contributes to its qualitative character). Having made the point, I will either bracket 'experiential' or follow common practice and omit it.
[13] Churchland 1995: 202. Obviously 'correctly describable' does not entail 'fully describable'. Note that one also puts aside the fact that they can be correctly described in such non-experiential terms as 'perception of the Eiffel Tower'.

It is easy to forget the force of this ruling, and I will mark it by giving 'experiential' and 'experience' capital letters.

3 Realistic materialism

Realistic materialists—realistic anybodys—must grant that Experiential phenomena are real, concrete phenomena, for nothing in this life is more certain.[14] They must therefore hold that they are physical phenomena. It may sound odd to use the word 'concrete' to characterize the qualitative character of experiences of colour, gusts of depression, thoughts about diophantine equations, and so on, but it isn't, because 'concrete' simply means 'not abstract'.[15] For most purposes one may take 'concrete' to be coextensive with 'possessed of spatiotemporal existence', although this will be directly question-begging in some contexts.[16]

It may also sound odd to use 'physical' to characterize mental phenomena like Experiential phenomena: many materialists talk about the mental and the physical as if they were opposed categories. But this, *on their own view*, is like talking about cows and animals as if they were opposed categories. For every concrete phenomenon in the universe is physical, according to materialists. So all mental phenomena, including Experiential phenomena, are physical phenomena, according to materialists; just as all cows are animals.

So what are materialists doing when they talk, as they so often do, as if the mental and the physical were entirely different? What they may mean to do is to distinguish, within the realm of the physical, which is the only realm there is, according to them, between the mental and the non-mental, or between the Experiential and the non-Experiential; to distinguish, that is, between mental (or Experiential) features of the physical, and non-mental (or non-Experiential) features of the physical.[17]

It is this difference that is in question when it comes to the 'mind-body' problem; materialists who persist in talking in terms of the difference between the mental and the physical perpetuate the terms of the dualism they reject in a way that is inconsistent with their own view. I use the words 'mental' and 'non-mental' where many use the words 'mental' and 'physical' simply because I assume, as a (wholly conventional) materialist, that every real concrete phenomenon is physical, and find myself obliged to put things in this way.[18]

There is tremendous resistance to abandoning the old mental/physical terminology in favor of the mental/non-mental, Experiential/non-Experiential terminology, although the latter seems to be exactly what is required. Many think the old terminology is harmless, and a few are not misled by it: they consistently use 'physical' to mean 'non-mental physical'. But it sets up the wrong frame of thought from the start, and I suspect that those who are never misled by it are members of a small minority.

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[14] I make no distinction between 'materialism' and 'physicalism'.
[15] If 'immaterial souls' existed, they would of course be concrete phenomena.
[16] Experiential phenomena would be concrete phenomena even if space and time were not really real—were somehow mere forms of experience.
[17] One needs to distinguish between mental and Experiential phenomena because although all Experiential phenomena are mental, not all mental phenomena are Experiential, on the ordinary view of things: certain *dispositional* states—beliefs, preferences, and so on—are mental phenomena although they have no Experiential character. There are also powerful reasons for saying that there are *occurrent* mental phenomena that are non-Experiential.
[18] See Chomsky 1968: 98.

When I say that the mental, and in particular the Experiential, is physical, and endorse the view that 'experience is really just neurons firing', I mean something completely different from what some materialists have apparently meant by saying such things. I don't mean that all aspects of what is going on, in the case of conscious experience, can be described by current physics, or some non-revolutionary extension of it. Such a view amounts to radical 'eliminativism' with respect to consciousness,[19] and is mad. My claim is different. It is that the Experiential (considered just as such)[20]—the feature of reality we have to do with when we consider experiences specifically and solely in respect of the Experiential character they have for those who have them as they have them—that 'just is' physical. No one who disagrees with this is a remotely realistic materialist.

When aspiring materialists consider the living brain, in discussion of the 'mind-body problem', they often slide into supposing that the word 'brain' somehow refers only to the brain-as-revealed-by-current-physics. But this is a mistake, for it refers just as it says, to the living brain, i.e. the living brain as a whole, the brain in its total physical existence and activity. Realistic—real—materialists must agree that the total physical existence and activity of the brain of an ordinary, living person, considered over time, is *constituted* by Experiential phenomena (if only in part) in every sense in which it is constituted (in part) by non-Experiential phenomena characterizable by physics. A real (realistic) materialist cannot think that there is something still left to say about Experiential phenomena, once everything that there is to say about the physical brain has been said.

4 Materialism further defined

Materialism, then, is the view that every real concrete phenomenon is physical in every respect, but a little more needs to be said, for Experiential phenomena—together with the subject of experience, assuming that that is something extra—are the only real, concrete phenomena that we can know with certainty to exist,[21] and as it stands this definition of materialism doesn't even rule out idealism—the view that mental phenomena are the only real phenomena and have no non-mental being—from qualifying as a form of materialism! Now there is a sense in which this consequence of the definition is salutary (see e.g. §§14-15 below), but it would none the less be silly to call an idealist view 'materialism'. Russell is right to say that 'the truth about physical objects *must* be strange',[22] but it is reasonable to take materialism to be committed to the existence of non-Experiential being in the universe, in addition to Experiential being, and I shall do so in what follows.

It is also reasonable to take materialism to involve the claim that *every* existing concrete phenomenon has non-mental, non-Experiential being, whether or not it also has mental or Experiential being. Applied to mental phenomena, then, materialism claims that each particular mental phenomenon essentially has non-mental being, in

[19] Some readers doubt this, but it follows from the fact that current physics contains no predicates for Experiential phenomena at all, and that no non-revolutionary extension of it could do so.
[20] The parenthesis is redundant given the definition of 'Experiential' in §2.
[21] Unless the existence of Experiential phenomena of kinds that we know to exist entails the existence of non-Experiential phenomena. See note 24 below.
[22] 1912: 19.

addition to mental being. This is, I think, the standard view.[23]

I will assume, then, that all realistic materialists take it that there is both mental and Experiential being and non-mental, non-Experiential being. Must all realistic *monists* also take it that there is non-mental, non-Experiential being? Many would say Yes, on the grounds that it is not remotely realistic to suppose either that there is, or might be, no non-mental or non-Experiential being at all. But the question of what it is to be (metaphysically) realistic is far harder here than it is when it is merely the existence of Experience that is in question. For the purposes of this paper I will *assume* that any realistic position does take it that there is non-mental or non-Experiential being in addition to mental and Experiential being, for this assumption accords with ordinary conceptions, and my main argument does not require me to challenge it. But it is at best an assumption. Idealists, of course, reject the assumption that realistic monism requires acknowledgement of non-mental, non-Experiential phenomena, and I will enter a number of reservations along the way.[24]

It is clumsy to oscillate between 'mental' and 'Experiential', or constantly double them up, and in the next few sections I will run the discussion in terms of the mental/non-mental distinction (such as it is). This said, all my *examples* of mental phenomena will be Experiential phenomena, for they suffice to make the relevant point and are, in the present context, what matter most.

It may be added that the reference of the term 'Experiential' is much clearer than that of the essentially contestable term 'mental', and that the latter may in the end deserve the treatment proposed for the term 'physical' in §15 below. Nevertheless it seems best to begin in this way.[25]

I will quote Russell—post-1926 Russell—frequently when discussing materialism, for my views converge with his in certain respects, and he has been wrongly ignored in recent discussion.[26] He was still inclined to call himself a 'neutral monist' at that time, but he is equally well read as a thoroughgoing materialist.[27] He rejects materialism in name, pointing out that 'matter has become as ghostly as anything in a spiritualist séance'—it has, he says, disappeared 'as a "thing"' and has been 'replaced by emanations from a locality'[28]—, but he grants that 'those who would formerly have been materialists can still adopt a philosophy which comes to much the same

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[23] In the case of experiences, it amounts to saying that they are not just Experiential phenomena, although Experiential phenomena are of course part of what constitutes their existence. Note that to distinguish between mental being and non-mental being is not to claim to know how to draw a sharp line between them. The starting situation is simply this: we know there is mental being, and we assume, as materialists, that this is not all there is.

[24] Elsewhere (1994: 134-144) I argue that there could not be Experiential or Experiential content phenomena of the sort with which we are familiar unless there were also non-Experiential phenomena; and if it is true (1) that a subject of experience cannot itself be a wholly Experiential phenomenon (ibid. p. 144), and (2) that 'experience is impossible without an experiencer' (Frege 1918: 27), then the conclusion that the existence of Experience entails the existence of non-Experiential phenomena is guaranteed. The argument stalls, however, if one substitutes 'mental' for 'Experiential', if only because of the vagueness of the term 'mental' (ibid. pp. 140-142 and ch. 6).

[25] I discuss the difference between 'Experiential' and 'mental', and the vagueness of 'mental', in Strawson 1994 (see e.g. pp. 136-44 and ch. 6). Here I am trying to avoid the issue as far as possible.

[26] Largely, perhaps, because of the looseness of his use of the word 'see', and the reactive excesses (which led to exegetical insensitivity) of the first wave of twentieth-century 'direct realists'. See, however, Lockwood 1981.

[27] See e.g. Russell 1927b: 110, 119, 123, 126, 170. I do not understand everything Russell says and may misrepresent him. I aim to take what I think is right from his views without attempting exegesis, and I will sometimes detour from the main argument in Russellian directions.

[28] 1927b: 78, 84. N. R. Hanson spoke similarly of the 'dematerialization' of matter, and Priestley (1777) made essentially the same point. See also Lange (1865).

thing. They can say that the type of causation dealt with in physics is fundamental, and that all events are subject to physical laws'.[29] And this, in effect, is what he does himself.[30]

5 'Mental' and 'non-mental'

It may seem odd to take 'mental' as the basic positive term when characterizing materialism. But one is not a thoroughgoing materialist if one finds it so. For all materialists hold that every concrete phenomenon in the universe is physical, and they are neither sensible nor realistic if they have any inclination to deny the concrete reality of mental phenomena like Experiential phenomena.[31] It follows that they have, so far, no reason to find it odd or biased to take 'mental' rather than 'non-mental' as the basic term.

—Surely it would be better, even so, to start with some positive term 'T' for the non-mental physical, and then define a negative term, 'non-T', to cover the mental physical; or use a pair of independently positive terms?

There are two good reasons for taking 'mental' as the basic positive term, one terminological, the other philosophical. The terminological reason is simply that we do not have a convenient positive term for the non-mental (obviously we can't use 'physical', and there is no other natural candidate). The philosophical reason is very old: it is that we have direct acquaintance with—know—fundamental features of the mental nature of (physical) reality just in having experience in the way we do, in a way that has no parallel in the case of any non-mental features of (physical)[32] reality. We do not have to stand back from experiences and take them as objects of knowledge by means of some further mental operation, in order for there to be acquaintance and knowing of this sort: the having is the knowing.[33]

This point has often been questioned, but it remains immovable. Russell may exaggerate when he says that 'we know *nothing* about the intrinsic quality of physical events except when these are mental events that we directly experience',[34] or that 'as regards the world in general, both physical and mental, *everything* that we know of its

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[29] 1927b: 126-127.
[30] In his introduction to Lange's *History of Materialism*, Russell notes that 'physics is not materialistic in the old sense, since it no longer assumes matter as permanent substance' (1925: xix), and he may have the following passage from Lange in mind: 'We have in our own days so accustomed ourselves to the abstract notion of forces, or rather to a notion hovering in a mystic obscurity between abstraction and concrete comprehension, that we no longer find any difficulty in making one particle of matter act upon another without immediate contact. We may, indeed, imagine that in the proposition, 'No force without matter', we have uttered something very Materialistic, while all the time we calmly allow particles of matter to act upon each other through void space without any material link. From such ideas the great mathematicians and physicists of the seventeenth century were far removed. They were all in so far still genuine Materialists in the sense of ancient Materialism, that they made immediate contact a condition of influence. The collision of atoms or the attraction by hook shaped particles, a mere modification of collision, were the type of all Mechanism and the whole movement of science tended towards Mechanism' (1865: 1.308, quoted in Chomsky, 1996: 44).
[31] This is so even if 'eliminativism' about other candidate mental phenomena—dispositional phenomena like preferences, beliefs, and so on—is worth serious discussion.
[32] The word 'physical' is bracketed because it is redundant, here as elsewhere. See §14.
[33] Compare Shoemaker's idea (rather differently applied) that many mental states and goings on are 'constitutively self-intimating' (1990). See also Maxwell (1978: 392, 396).
[34] 1956: 153; my emphasis.

intrinsic character is derived from the mental side',[35] for it is arguable that the spacetime character of the world is part of its intrinsic character, and, further, that we may have some knowledge of this spacetime character. I don't think he exaggerates much, however. He is onto something important, and the epistemological asymmetry between claims to knowledge of Experiential being and claims to knowledge of non-Experiential being is undeniable, however unfashionable.

The asymmetry claim that concerns me is not the claim that all epistemic contact with concrete reality involves experience, and that we are inevitably a further step away from the thing with which we are in contact when it is a non-Experiential phenomenon. It is, rather, the claim that we are acquainted with reality *as it is in itself*, in certain respects, in having Experience as we do. This second claim revolts against the tendency of much current epistemology and philosophy of mind, but there is no reason why it should trouble thoughtful materialists, and I will offer a brief defence of it in §13. Here it is worth noting that it is fully compatible with the view that there may also be fundamental things we don't know about matter considered in its Experiential being.[36]

6 Aside: 'as it is in itself'

Does one need to defend the phrase 'as it is in itself', when one uses it in philosophy? I fear one does, for some think (incoherently) that it is somehow incoherent. Still, it is easy to defend. The supposition that reality is in fact a certain way, whatever we can manage to know or say about it, is obviously true. To be is to be somehow or other. Nothing can exist or be real without being a certain way at any given time.[37] And the way something is just is how it is in itself. This point is not threatened by the suggestion that our best models of the behaviour of things like photons credit them with properties that seem incompatible to us—e.g. wave-like properties and particle-like properties. What we learn from this is just that this is how photons affect us, given their intrinsic nature—given how they are in themselves, and how we are in ourselves. We acquire no reason to think (incoherently) that photons do not have some intrinsic nature at any given time. Whatever claim anyone makes about the nature of reality—including the claim that it has apparently incompatible properties—just is a claim about the way it is. This applies as much to the Everett 'many-worlds' theory of reality as to any other.

Some think that what we learn from quantum theory is that there is, objectively, no particular way that an electron or a photon is, at a given time. They confuse an epistemological point about undecidability with a metaphysical claim about the nature of things. The problem is not just that such a claim is unverifiable. The problem is that it is incoherent. For whatever the electron's or photon's weirdness (its weirdness-to-us: nothing is intrinsically weird), its being thus weird just is the way it is.

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[35] 1927a: 402; my emphasis. See Lockwood 1989: 159: 'Consciousness…provides us with a kind of 'window' on to our brains, making possible a transparent grasp of a tiny corner of material reality that is in general opaque to us…. The qualities of which we are immediately aware, in consciousness, precisely *are* some at least of the intrinsic qualities that the states and processes that go to make up the material world—more specifically, states and processes within our own brains. This was Russell's suggestion.'

[36] Not only facts about Experience in sense modalities we lack, or (e.g.) about the brightness-saturation-hue complexity of seemingly simple colour-Experience, but also, perhaps, murkier facts about its composition, and also, perhaps, about the 'hidden nature of consciousness' postulated by McGinn (1990: chs 3 and 4).

[37] If you are worried about the concept—or reality—of time, drop the last four words.

So we may talk without reservation of reality as it is in itself. Such talk involves no (allegedly dubious) metaphysics of the Kantian kind. Its propriety derives entirely and sufficiently from the thought that if a thing exists, it is a certain way. For the way it is just is how it is in itself.

7 Structure and structured

So much, for the moment, for our theoretical conception of the mental: it has some securely anchored, positive descriptive content, and we can know that this is so; for whatever the best general account of the mental, it includes Experiential phenomena in its scope; and Experiential phenomena are not only indubitably real; they are also phenomena part of whose intrinsic nature just is their Experiential character; and their Experiential character is something with which we are directly acquainted, however hard we may find the task of describing it in words. This is so even if we can make mistakes about the nature of our experiences, and even if we can do so even when we consider them merely in respect of their (Experiential) qualitative character.[38] It is so even if we differ dramatically among ourselves in the qualitative character of our experiences, in ways we cannot know about.

Our theoretical conception of the mental, then, has clear and secure descriptive content. (Don't ask for it to be put further into words; the anchoring is sufficiently described in the last paragraph.) Our theoretical conception of the non-mental, by contrast, remains, so far, a wholly negative concept. It has, as yet, no positive descriptive content.

Can anything be done about this? On one reading, Russell thinks not: the science of physics is our fundamental way of attempting to investigate the non-mental being of physical reality, and it cannot help us. 'Physics is mathematical', he says, 'not because we know so much about the physical world, but because we know so little: it is only its mathematical properties that we can discover. For the rest, our knowledge is negative'. 'We know nothing about the intrinsic quality of physical events except when these are mental events that we directly experience'. On this view, neither physics nor ordinary experience of physical objects give us any sort of knowledge of the intrinsic nature of non-mental reality.[39]

Is Russell right? Something needs to be said about his use of the word 'intrinsic'. It is potentially misleading, and it helps to consider other ways in which he puts the point. Thus he talks regularly of the 'abstractness' of physics. The knowledge it gives is, he says, 'purely formal'. It reveals the abstract 'structure' of physical phenomena while saying nothing about their 'quality'....[40]

I am not sure that the distinction between structure and quality is clear, or fundamental in such a way that it holds 'all the way down',[41] but (putting that doubt

[38] See Dennett 1991, e.g. ch. 11.
[39] Russell 1927b: 125, 1956: 153. Lockwood 1989 (ch. 10) contains some illuminating pages on Russell and a useful historical note on versions of the idea that precede Russell's. See also Maxwell 1978, whose Russellian approach is treated sympathetically in Chalmers 1996: 153-154 (and see index), and Chalmers 1997: 405-406. Jeremy Butterfield and Bas van Fraassen have pointed out to me the link here to John Worrall's 'structural realism'; see e.g. Worrall 1989 and Ladyman 1998.
[40] 1927a: 392, 382, 388.
[41] Structure is a matter of quality because a thing's qualitative character, exhaustively considered, is a matter of *all* aspects of how it is, and its structural character is an aspect of how it is. The converse claim—that quality (in spacetime) is in some sense a matter of structure—sounds a bit mystical, but it can on further reflection begin to seem hard to rebut, even when one maintains, as one must, a sharp distinction between epistemology

aside) it seems that the fundamental distinction that Russell has in mind can be expressed by saying that it is a distinction between *how X is structurally disposed* and *what X is apart from (over and above) its structural disposition*.[42] Physics gives the structure, but not the structure-transcendent nature, of the thing that has the structure. If we say that truths about how X is structurally disposed have purely *structure-specifying* content, while truths about what X is over and above its structural disposition also have *structure-transcendent* content, or, more simply, *non-structural* content, then we may say that 'non-structural' covers everything that Russell has in mind when he talks of the 'intrinsic' nature of things.[43]

One might dramatize Russell's idea by saying that physics can be thought of as a formal system which remains, in a peculiar sense, an *uninterpreted* formal system, even though we know that it *applies* to something=x—reality, the universe—and even though it is elaborated specifically in causal response to x. On this 'Ramseyfied' view, we may suppose that the universe has features that are *structurally isomorphic* to the structures delineated in the equations of physics, but we have no account of the non-structural nature of the thing that has the structure(s) in question.[44]

So we are (to pursue the metaphor) in the peculiar position of having a known, concrete *application* (and so, in one sense, an *interpretation*) for a formal system, without that application constituting a *model* (in the sense of model-theoretic semantics) that can confer positive descriptive meaning on its terms. In being the subject matter of physics, the universe provides it with a merely referential model or object, of which it gives a merely structure-specifying description. Physics is *about* the physical, and may give a correct abstract representation of its structural disposition as far as it goes; but it does not and cannot tell us anything about what the physical actually is, over and above the fact that it exemplifies a certain formal structure.[45]

8 The non-mental—space

Back now to the question whether physics can endow our general theoretical conception of the non-mental with any positive descriptive (not merely referential)

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and metaphysics. (The distinction between form and content may seem more robust, but may also succumb.)

[42] It seems (subject to the doubt expressed in the last footnote) that this distinction must be a real one—that if there is structure, there must be something structured. Only extreme positivistic irresponsibility, or failure to 'realize what an abstract affair form [or structure] really is' (Russell 1927a: 392), can make this seem questionable.

[43] At one point Russell also takes it that position in spacetime is an intrinsic property of things. Considering the relation between a perception and the object it is a perception of, he remarks that 'we cannot say whether or not it resembles the object in any intrinsic respect, except that both it and the object are brief events in space-time' (1927b: 118).

[44] When thinking of structural isomorphism, it is helpful to consider a version of an old example: the structural isomorphism between (1) sound waves produced by an orchestra playing Sibelius's 'Valse Triste' that are registered as (2) vibrations of a condenser plate in a microphone and sent as (3) electrical signals to a recording device that stores them as (4) pits on the surface of a compact disk that is then read as (5) digital information by a machine that transmits this information in the form of (6) radio waves to (7) a receiver that puts it through (8) an amplifier to (9) speakers that give rise to (10) sound waves that give rise to (11) electrical impulses in the auditory nerve that give rise to (12) neural occurrences in the auditory cortex and elsewhere that are conscious auditory experiences. There is a structural description that captures the respect in which all these phenomena are the same (assuming no significant loss of information even at the stage of conscious hearing). The abstract character of this description is revealed precisely by the fact that this is what it does: capture the respect in which all these substantially different phenomena are—structurally—the same. Compare Wittgenstein 1922: 4.0141.

[45] In 1928, a year after the publication of *The Analysis of Matter*, Max Newman published a conclusive objection to the pure form of this view, as Russell immediately acknowledged (1967-9: 413-414). See Demopoulos and Friedman 1985.

content. Russell in 1927 thinks not. I disagree because correct structural description of a thing is already description of a feature of its intrinsic nature. But this disagreement is merely terminological, and the real question is this: Can one go any further than structure-specifying content, when attempting to give a satisfactory theoretical characterization of the non-mental? Again, Russell in 1927 thinks not. It seems to me, however, that we may be able to go a little further. For I think that our ordinary conception of space may get something fundamental right about the nature of reality as it is in itself, and hence about the intrinsic nature of reality—something that survives even after the finite-but-unbounded curved gravity-constituting spacetime of relativity theory (or the ten- or eleven- or twelve-dimensional spacetime of one of the leading versions of string theory) has been granted to be closer to the truth.

I am tempted to hold up my hands, like G. E. Moore, and to consider, not my hands, but the space—by which I mean only the spatial extension[46]—between them, and to say: 'This is space (spatial extension), and it is real, and I know its nature, in some very fundamental respect, whatever else I do not know about it or anything else (e.g. the fact that it is an aspect of spacetime)'. On this view the ordinary concept of space, or indeed the concept of spacetime, in which (I claim) a fundamental feature of our ordinary conception of space survives, has correct non-structural descriptive content. It does not relate only to 'what we may call the causal skeleton of the world',[47] if to say this is to say that it does not capture any aspect of the non-structural nature of the world. It has non-structural content, and can transmit this content to our more general conception of the non-mental.[48]

Russellians may object as follows. 'This line of thought is profoundly natural, but it depends on a fundamentally false imagining. It involves the conflation of 'objective' spatial extension, spatial extension 'as it is in itself' (where this is taken as a merely referential, structural-equivalence-class specifying term with no pretension to non-structural content) with the phenomenological space (or spaces) associated with perception. It involves an almost irresistible but entirely fatal failure to 'realize what an abstract affair form really is'.[49] All those, like yourself, who think that it is viable are 'guilty, unconsciously and in spite of explicit disavowals, of *a confusion in their imaginative picture*' of reality.[50]

I think that some of those who take this line may be suffering from excessive empiricism. They take it that the notion of spatial extension—or indeed shape—that we possess is essentially informed by the character of our sensory experiences, and in this I think they are mistaken. It may well be true that sensory experiences of specific kinds are necessary for the acquisition of concepts like SHAPE or SPACE, in the case of beings like ourselves.[51] Such concepts can nevertheless float free of the different possible sensory bases of their acquisition and subsequent deployment, without ipso facto becoming 'merely' formal or structure-specifying in character. It is easy to see that grasp of the content of SHAPE (say) does not require essential reference to any

[46] I am not at all concerned with the 'substantivalist' versus 'relationalist' debate about the nature of space.
[47] Russell 1927a: 391.
[48] Cp. Hirsch (1986: 251-254). I will not here consider the 'direct realist' view that we may have some real insight into the non-mental nature of force, say, or causation, as a result of experiencing pushes and pulls and so on in the way we do.
[49] Russell 1927a: 392. One could say that it is this point that Newman turns back against Russell (see note 45).
[50] Russell 1927a: 382; my emphasis.
[51] I will use small capitals for names of concepts.

specific sensory experience. It suffices to point out that exactly the same concept of shape—i.e. *the* concept of shape, for there is only one—can plausibly be supposed to be fully masterable by two different creatures A and B on the basis of sensory experiences in entirely different sensory modalities familiar to us—sight and touch.[52] One has to endorse a rather crude form of meaning-empiricism or concept-empiricism to suppose that A and B do not—cannot—have the same concept, as they do geometry together. A concept is not a faint copy or transform of a sensory experience. It is, precisely, a concept.

That's one point. Another, crucial in this context, is that the concept of shape or space that A and B have in common is not an entirely abstract or purely formal concept, as the supporters of Russell seem to suggest. There is more to A and B sharing the specific concept SHAPE or SPACE than there is to their sharing mastery of the principles of an uninterpreted formal system that is in fact suitable for the expression of shape configurations or spatial relations although they know it only as an uninterpreted formal system. It is precisely because pure form is such a *very* 'abstract affair', as Russell says, that the concept of shape or space that A and B can have in common in spite of their different sensory experiences cannot be supposed to be a matter of pure form. To think that it is a matter of pure form is to miss out precisely their grasp of the *spatiality* of space—of that which makes their grasp of the concept of space more than grasp of (say) an abstract metric. The concept has non-structural content.

It is true that this content is abstract in one sense: it is abstract relative to all the particularities of sensation, in a way that is sufficiently indicated by reference to the fact that different creatures can acquire it (the very same concept) on the basis of experience in entirely different sensory modalities. It is indeed, and essentially, a *non-sensory* concept.[53] But it is not purely abstract in Russell's sense, because (to repeat) it involves grasp of the spatiality—rather than what one might call the mere abstract dimensionality—of space.[54] Spatiality is not abstract dimensionality: the nature of abstract dimensionality can be fully captured by a purely mathematical representation; the nature of spatiality cannot. ***One can give a purely mathematical representation of the dimensionality of space, but it won't distinguish *space* from any other possible three-dimensional 'space', e.g. the emotional vector space of a species that have just three emotions, love, anger, and despair.

Obviously questions arise about the precise nature of the non-structural content of concepts like SHAPE and SPACE, about what it is, exactly, to grasp the spatiality of space, given that SHAPE and SPACE may be fully shared by A, B, superbats, and others. But in the present context I am inclined just to hold up my hands again.[55]

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[52] One may contrast the case of a congenitally blind person with the hypothetical case of a fully sighted person congenitally paralysed and devoid of tactile or any other somatosensory sensation—before thinking of superintelligent echolocating bats and aliens with other sensory modalities.

[53] See Evans 1980: 269-271; McGinn 1983: 126.

[54] Even if no finite sensory-intellectual being can possess SHAPE or SPACE without having, or without at least having grasp of the nature of, some form of sensory experience, it does not follow that specification of the content of the concept it possesses necessarily involves reference to any features of sensory experience.

[55] If empiricists press me further I will offer (a) the suggestion that sensory modalities that differ qualitatively at first order (i.e. in the way that sight and touch do) may be said to be crucially similar at second order in as much as they are 'intrinsically spatial' in character, (b) the speculation that this similarity can itself be understood as a kind of similarity of (Experiential) *qualitative* character, (c) the acknowledgement that it may be that one must be capable of experience in some 'intrinsically spatial' sensory modality or other (even if only in imagination) in order to possess SHAPE or SPACE, (d) the reservation that even if a

Russellians may be unimpressed. Michael Lockwood, in particular, is sympathetic to the idea that knowledge of spacetime structure is not knowledge of any feature of the 'intrinsic' or non-structural nature of reality. In doing physics, Lockwood says, we may grasp the abstract structure exemplified by space while having 'no conception of its content: i.e. what it is, concretely, that fleshes out this structure. (For all we know, on this view, Henry More and Newton may be right in equating space with God's sensorium!)'[56]

But I am prepared to grant this. I am prepared to grant that we cannot rule out the possibility that space is God's sensorium,[57] or something even more unknown, and that there is therefore a sense in which we may have no idea of what it is that 'fleshes out' the abstract structure exemplified by space. For it may still be true that one grasps something fundamental about the non-structural nature of space in thinking of it as having, precisely, spatiality, rather than mere abstract dimensionality. If space is God's sensorium, so be it: God's sensorium may really have the property of spatiality. Between a fat-free, purely mathematical and thus wholly abstract representation of the structure of space and a partly structure-transcending conception of space as God's sensorium (or some such) lies a third option: an ostensibly less rich but still structure-transcending conception of space as specifically spatial (hands held up) in its dimensionality. Some may think this a fine point, but it is (I take it) a huge step away from Russell's claim that we know *nothing* about the intrinsic quality of non-mental events.[58]

I am not claiming that we do know something about the non-structural nature of space, only that we may (I hold up my hands, I move them apart—but my sense of the vulnerability of this claim has increased since I wrote this paper in 1997). This claim allows, as it should, that there may well be more to space than we can know. SPACE, like PHYSICAL, is a natural-kind concept, and there are some atrociously good reasons for thinking that there is more to space than we know or can fully understand. In addition to the (already weighty) points that physical space is non-Euclidean, and is itself something that is literally expanding,[59] and the non-locality results,[60] and questions about the nature of the vacuum, and widespread agreement that 'there is no good a priori reason why space should be a continuum',[61] I for one still can't fully understand how space and time can be interdependent in the way that they demonstrably are. We are also told on very good authority that gravity is really just a

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non-conceptual experiential modality must be in play, it is not obvious that this must be a *sensory* modality. This, however, is too simple (I discuss the question further in 'Knowledge of the World').

[56] Personal communication. Eddington agrees: 'We know nothing about the intrinsic nature of space' (1928: 51-2).

[57] After setting aside the problem of evil.

[58] 'We know nothing about the intrinsic quality of physical events except when these are mental events that we directly experience' (1956: 153). Perhaps Russell takes this distancing step himself in his 1928 reply to Newman (see note 45): 'It was quite clear to me, as I read your article, that I had not really intended to say what in fact I did say, that *nothing* is known about the physical world [the non-mental world as opposed to the mental world, in my terminology] except its structure. I had always assumed that there might be co-punctuality between percepts and non-percepts, and even that one could pass by a finite number of steps from one event to another compresent with it, from one end of the universe to the other... spacio-temporal continuity of percepts and non-percepts was so axiomatic in my thought that I failed to notice that my statements appeared to deny it' (1967-9: 413).

[59] In such a way that the correct answer to the question 'Where was the Big Bang taking place at the first moment in which it made sense to say that it was taking place anywhere?' is 'Right here', wherever you are.

[60] Bell 1964; for an informal illustration see Lockwood 1996: 163-164.

[61] Isham & Butterfield 2000.

matter of the 'curvature' of space, and that string theory is an immensely promising theory of matter (especially after the 'second superstring revolution' and the growth of M-theory, and especially when it comes to understanding gravity) that entails that there are at least ten spatial dimensions….

These points reopen the connection to the mind-body problem. For as they pile up, one can't reputably hold on to the old, powerful-seeming Cartesian intuition that there is a 'deep repugnance' or incompatibility between the nature of conscious experience and the nature of spatial extension—the intuition that 'the mental and the spatial are mutually exclusive categories'.[62] We have direct acquaintance with fundamental features of conscious experience—Experiential features—just in having it; but we really have no good reason to think that we know enough about the nature of space—or rather, about the nature of matter-in-space-considered-in-so-far-as-it-has-non-mental-being—to be able to assert that there is any repugnance.[63] And if conscious experience is in time, as almost everyone agrees, then it is in spacetime, given the way in which space and time are demonstrably interdependent—in which case it is in space in every sense in which it is in time.

Note that it follows that even if our notion of space can confer some non-structural content on our best theoretical conception of the non-mental, it cannot confer any content that is guaranteed to distinguish it from any fully articulated theoretical conception of the mental, although we still intuitively feel it to fit with the former conception in a way in which we don't feel it to fit with the latter.[64]

9 The non-mental—spin, mass, and charge

I have proposed that our theoretical conception of the non-mental may be able to acquire some non-structural content from its first lieutenant, the concept of space. Can it acquire any more? Well, I think that our more particular spatial concepts of shape, size, position, distance, and local motion (I raise my hands and bring them together) *may* also get something right about reality as it is in itself, and so contribute to the non-structural content of our general theoretical conception of the non-mental; I think Locke may be essentially right in his view that some of our ideas of primary qualities correctly represent how things are in themselves, although his account needs recasting.[65] It may also be that our ordinary conception of time gets something right about the nature of reality (both Experiential and non-Experiential)—even if we need to conceive time as part of spacetime in order to think about it properly. I just don't know.[66]

Going on from space, time, extension, shape, position, distance, and motion, in the attempt to give a positive characterization of the non-mental, one may want to

[62] McGinn 1995: 221.
[63] Foster (1982: ch. 5) and McGinn (1995) give forceful presentations of the repugnance intuition. At one point McGinn makes the funky suggestion that consciousness might be a manifestation of the non-spatial nature of pre-Big Bang reality (223-224). I think he moves in a better direction when he shifts to the very different claim that 'consciousness tests the adequacy of our spatial understanding. It marks the place of deep lack of knowledge about space' (230).
[64] I am grateful to Mark Sainsbury for encouraging me to make this point more explicit.
[65] Locke's talk of 'resemblance' between primary qualities and ideas of primary qualities is unfortunate in as much as it suggests a (mere) picturing relation, and Russell (1927a: 385) holds that Locke is definitely wrong.
[66] Perhaps it gets something right in an Augustinian sense, according to which we can be said to know what time is even though we find we don't know what to say when someone asks us what it is.

mention properties like spin, mass, charge, gravitational attraction, 'colour' and 'flavour' (in the quantum-theoretic sense). But one will have to bear in mind that our grasp of these things—any grasp of them over and above that which is conveyed by their intimate relation to ***concepts of space and time—is expressed merely in equations;[67] and the truth in Russell's remark that physics is mathematical not because we know so much about the physical world, but because we know so little. So although I like to think that ***concepts of space and time carry non-structural content, I do not think this can be true of any of these other concepts considered independently of their relations to ***concepts of space and time. Here Russell is right: we know nothing of the non-mental non-structural nature of—for example—electrical phenomena apart from their spacetime structure; all we have are equations.[68]

But even if knowledge of spacetime structure is all we have, in the way of non-structural knowledge of the nature of the non-mental, it makes a huge difference to the case. Consider the difference between a characterization of the forces of electrical attraction and repulsion in which their spatial character (the way they decrease with increasing distance) is given a purely mathematical, abstract-dimensional interpretation, and one in which it is given a genuinely spatial interpretation. Consider any account of anything in which time relations have a merely mathematical abstract representation, and one in which the temporality of time is somehow represented.

10 Hens' eggs

I want now to give a further characterization of what it is to be a genuine materialist. But I must first answer one more objection that occurs to many.

—It seems to follow, from your claim that we have no knowledge of the non-structural, intrinsic or as we may say *N-intrinsic* nature of things, that we cannot know that there are tables and chairs and hens and hens' eggs and 'that hens' eggs are generally laid by hens'.[69] But this is a chair I'm sitting in, and it's made of wood, and this is a hen, and this is a hen's egg, and this hen laid it. These are all facts I know, and they are N-intrinsic facts—ultimate, absolute truths—about the nature of reality. They must be included in any true and full account of the history of the universe.

My reply to this objection is similar to Moore's a hundred years ago. I agree that we know many such truths, but I take it, as a materialist, that hens are wholly made of the fundamental constituents of matter that physics discusses, and that when we

[67] Unless some 'direct realist' account of our understanding of force is defensible. See note 48. Note, though, that no sensible direct realist view can suppose that we derive understanding of the nature of force directly from the merely *sensory* character of experiences of pushes, pulls, and so on; that would be like thinking that we can get some real insight into the nature of electricity from the qualitative character that experiences of electric shocks have for us (compare Evans 1980: 270). Somehow, the sensory experiences would have to be the basis of an abstract, essentially cognitive, general, non-sensory concept of force.

[68] The word 'non-mental' is not redundant in the last sentence, for it seems very plausible to suppose that consciousness is an electrical phenomenon, whatever else it is; in which case it may be said that we do have some knowledge of the non-structural nature of electrical phenomena just in having conscious experience.

[69] Moore 1905-6: 64.

consider our knowledge of these fundamental constituents we encounter the crucial and entirely general sense in which we know nothing about the fundamental N-intrinsic nature of matter. As far as I can see, this ignorance is entirely compatible with the sense in which we do have knowledge of the N-intrinsic of reality in knowing that there are hens, and what hens are, and what wood is, and so on. And this compatibility is no more surprising than the fact that I can know that this is a statue without knowing what it is made of.

—But we know what hens are made of—carbon, hydrogen, and oxygen, mostly—and we know what carbon, hydrogen, and oxygen are made of—electrons and quarks with various characteristics. Physics gives us knowledge of the properties of these things. If you think that it fails to give us any knowledge of their ultimate, N-intrinsic nature that's because you think that a thing is more than its properties. But that's just bad old metaphysics. A thing is not in any sense more than its properties.

I agree that there is an irredeemably difficult but inescapable sense in which it is true to say that a thing is not more than its properties—I agree that 'in their relation to the object, the properties are not in fact subordinated to it, but are the way of existing of the object itself'[70]—but the present claim is not that a concrete phenomenon must be more than its properties, but that it must be more than its purely formal or structural properties. If you say that this is more bad metaphysics, a yearning for lumpen stuff, our disagreement will be plain. My reply will be that you have evidently forgotten 'what an abstract affair form really is'. A concrete phenomenon must be more than its purely formal or structural properties, because these, considered just as such, have a purely abstract mathematical representation, and are, concretely, nothing—nothing at all. It is true that we get out of the realm of the purely abstract when we add in spatiotemporal properties, on my account, but a thing's non-structural properties can't consist only in its spatiotemporal properties—at least so long as spacetime is conceived merely as a dimensional manifold with no physical or substantial nature.[71]

Here, then, we return to the point that—the sense in which—we have no knowledge of the N-intrinsic nature of things in spite of the sense in which it is true to say that we know what hens and hens' eggs are.

11 True materialism

I have suggested that our general theoretical conception of the mental has substantial non-structural descriptive content, because we have acquaintance with fundamental features of the mental nature of reality just in having experience in the way we do. Our general theoretical conception of the non-mental has substantial structure-specifying content, and I have suggested, with some hesitation, that it may also have crucial and correct *non*-structural content deriving from spatiotemporal concepts. Apart from this, though, it is arguable (subject to note 48) that we know nothing about the intrinsic or non-structural nature of non-mental reality.

With this in place, we may ask what is to be a genuine materialist. The first thing

[70] Kant 1781: A414/B441. I have substituted 'object' and 'property' for 'substance' and 'accident' respectively.
[71] For the importance of this qualification, see note 124 below.

to do is to intone once more that realistic or real materialism entails full acknowledgement of the reality of Experiential phenomena: they are as real as rocks, hence wholly physical, strictly on a par with anything that is correctly characterized by physics.[72] They are part of fundamental reality, whatever is or is not the case.

It follows that current physics, considered as a general account of the general nature of the physical, is like *Othello* without Desdemona: it contains only predicates for non-Experiential being, so it cannot characterize Experiential being at all (recall the definition in §2). It cannot characterize a fundamental feature of reality at all.

No one who doubts this is a true materialist. Partly for this reason, I think that genuine, reflective endorsement of materialism is a considerable achievement for anyone who has had a standard modern Western education. Materialism must at first provoke a feeling of deep bewilderment in anyone contemplating the question 'What is the nature of the physical?' The occurrence of such a feeling is diagnostic of real engagement with the materialist hypothesis, real engagement with the thought that Experiential phenomena are physical phenomena just like extension phenomena and electrical phenomena in so far as they are correctly characterized by physics (or indeed common sense). I think Russell is profoundly right when he says that most are 'guilty, unconsciously and in spite of explicit disavowals, of a confusion in their imaginative picture of matter'.

I suspect that some will be unable to shake off the confusion, although Locke made the crucial move long ago. Some may say that modern science has changed the situation radically since Locke's time. It has—but only in so far as it has massively reinforced Locke's point.

Perhaps I am generalizing illegitimately from my own experience, revealing my own inadequacy rather than the inadequacy of recent discussion of the 'mind-body' problem, but I don't think so. Materialism requires concerted meditative effort. Russell recommends 'long reflection'.[73] If one hasn't felt a kind of vertigo of astonishment, when facing the thought, obligatory for all materialists, that consciousness is a wholly physical phenomenon in every respect, including every Experiential respect—a sense of having been precipitated into a completely new confrontation with the utter strangeness of the physical (the real) relative to all existing common-sense and scientific conceptions of it—, then one hasn't begun to be a thoughtful materialist. One hasn't got to the starting line.[74]

Some may find that this feeling recurs each time they concentrate on the mind-body problem. Others may increasingly think themselves—quietistically, apophatically, pragmatically, intuitively—into the unknownness of the (non-mental) physical in such a way that they no longer experience the fact that mental and non-mental phenomena are equally physical as involving any clash. At this point 'methodological naturalism'—the methodological attitude to scientific enquiry into the phenomena of mind recommended by Chomsky—will become truly natural for them, as well as correct.[75] I think it is creeping over me. But recidivism is to be expected: the powerfully open state of mind required by true materialism is hard to achieve as a

[72] 'As characterized by physics' is a necessary qualification; see the remarks about 'brain' on p. 000 above.
[73] 1927b: 112.
[74] The only alternative, I think, is that one has a very rare and beautiful intellect.
[75] See Chomsky 1994; 1995: 1-10. Chomsky is a clear example of someone who is, methodologically, a true materialist in my sense. I am not sure that he would accept the title, however; he avoids the term 'materialist' because of the point made by Lange in note 28 above, which I try to counter on page 000 below.

natural attitude to the world. It involves a profound reseating of one's intuitive theoretical understanding of things.[76]

I say 'intuitive theoretical understanding', but it isn't as if there is any other kind, when the stress falls on the word 'understanding'. For (briefly) what we think of as real *understanding* of a natural phenomenon is at bottom a *feeling*, and it is *always* and *necessarily* relative to other things one just takes for granted, finds intuitive, feels comfortable with. This is true in science as it is in common life. I feel I fully understand why this tower casts this shadow in this sunlight, given what I take for granted about the world (I simply do not ask why light should do *that*, of all things, when it hits stone). I may also feel I understand—see—why this billiard ball does *this* when struck in this way by that billiard ball. But in this case there is already a more accessible sense in which I don't really *understand* what is going on, and it is an old point that if I were to ask for and receive an explanation, in terms of impact and energy transfer, this would inevitably invite further questions about the nature of impact and energy transfer, starting a series of questions and answers that would have to end with a reply that was not an explanation but rather had the form 'Well, that's just the way things are'.[77]

The true materialist outlook may become natural for some, then, but many will find they can maintain it only for relatively short periods of time. It is not a small thing. To achieve it is to have evacuated one's natural and gripping common-sense ± science-based conception of the nature of the physical of every element that makes it seem puzzling that Experiential phenomena are physical. I think it is to be at ease with the idea that consciousness is a form of matter.[78]

It can help to perform special acts of concentration—focusing one's thought on one's brain and trying to hold fully in mind the idea that one's experience as one does so is part of the physical being of the brain (part of the physical being of the brain that one may be said to be acquainted with as it is in itself, at least in part, because its being as it is for one as one has it just is what it is in itself, at least in part). It is worth trying to sustain this—it is part of doing philosophy—, forcing one's thought back to the confrontation when it slips. At first one may simply encounter the curious phenomenological character of the act of concentration, but it is useful to go on—to engage, for example, in silent, understanding-engaging subvocalizations of such thoughts as 'I am now thinking about my brain, and am thinking that this experience I am now having of this very thinking—and this subvocalization—is part of the physical activity and being of my brain.' It is also useful to look at others, including young children, as they experience the world, and to think of the common-or-garden matter that is in their heads (hydrogen, oxygen, carbon, iron, potassium, sodium, and so on). It is useful to listen to music, and focus on the thought that one's auditory experience is a form of matter.[79]

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[76] In fact one doesn't have to be a materialist to hold that no defensible conception of the physical contains any element that gives one positive reason to doubt that Experiential phenomena are physical. One can hold this even if committed to dualism.

[77] See e.g. van Fraassen 1980: ch. 5, Strawson 1994: 84-93.

[78] I think that it requires realization that this claim is inadequately expressed by saying 'consciousness is a property of matter', or even 'consciousness is a physical property of matter', given the almost irresistible incentives to metaphysical misunderstanding that are—I argue elsewhere—already built into the word 'property'.

[79] Perhaps intuitive materialism is not always an achievement, and comes easily, and without positive error, in certain Eastern schools of thought. The requirement that there be no positive error of conception is, however, important.

12 Knowledge of ignorance

Finding it deeply puzzling how something could be physical is not the same as finding something that one takes to be physical deeply puzzling. It is often said that quantum theory is deeply counterintuitive—e.g. in its description of the wave-like and particle-like behaviour of fundamental particles, but no one seems to find it puzzling to suppose that it deals wholly with physical phenomena.[80]

The main reason for this seems to be as follows: WAVE and PARTICLE engage smoothly with standard physics concepts of shape, size, position, motion, and so on. There is, so far, a clear sense in which the two concepts are *theoretically homogeneous*, or at least non-heterogeneous; they operate on the same, single conceptual playing field of physics.[81] But when we try to integrate conscious-experience terms with the terms of physics (and common-sense physics), we find that they entirely lack any such felt theoretical homogeneity, or non-heterogeneity. To this extent, they force constantly renewed bewilderment—in a way quite different from the way in which quantum-mechanical phenomena do—on materialists who like to think they have *some* sort of coherent, theoretically unified understanding of the overall nature of the physical, however general that understanding may be, and however incomplete in its details.

But this is the central mistake: to think that one has some sort of theoretically unified understanding of the overall nature of the physical. Once one realizes that this cannot be true, if materialism is true, things change.[82] It begins to look as if there is actually *less* difficulty in the suggestion that physical phenomena have both Experiential and non-Experiential being than in the suggestion that photons (e.g.) behave both like particles and waves. For in the case of Experiential terms and non-Experiential terms there is no direct clash of concepts of the sort that occurs in the case of the wave-particle duality. Being a wave is incompatible with being a particle, but there is nothing in the possession of non-Experiential being that we know to be intrinsically inimical to the possession of Experiential being: we simply do not know enough about the nature of non-Experiential being to have any good reason to suppose that this might be so. Thus the Experiential terms and the non-Experiential terms do not in fact *actively clash*, as the wave and particle terms do. Rather, they fail to connect or engage. One is making progress as a materialist when one has lost all sense of an active clash. It has no scientific or philosophical justification. As Russell says, 'the physical [sc non-mental] world is only known as regards certain abstract features of its space-time structure—features which, because of their abstractness, do not suffice to show whether the physical world is, or is not, different in intrinsic character from the world of mind'.[83]

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[80] Some may object that there is a compelling description of quantum-mechanical phenomena that completely eliminates the air of mystery attaching to wave-particle duality (see e.g. Deutsch 1997: ch. 2); but it does so at the cost of another large strangeness, because it requires one to accept Everett's many-worlds hypothesis; and although it may be that this is what one should do, I will continue to use the case of wave-particle duality as an example for the purposes of discussion. (I will also put aside the view that the real intuitive difficulty resides in the phenomenon of superposition rather than in the wave-particle duality.)

[81] I try to give more content to the idea of theoretical homogeneity in Strawson 1994: 88-93. Note that one can have a sense that a group of terms is theoretically homogeneous, or at least not problematically heterogeneous, without feeling that one *understands* the phenomena these terms are used to describe.

[82] Although there are plenty of deep puzzles in physics even when mind is put to one side.

[83] 1948: 240; see also 247.

Arnauld made the essential point in 1641, in his comments on Descartes's *Meditations*, and he was not the first.[84] Locke in 1690 'did not apprehend that there was any real inconsistency between the known properties of body, and those that have generally been referred to mind'.[85] Algarotti observes in 1737 that

> we are as yet but Children in this vast Universe, and are very far from having a compleat Idea of Matter; we are utterly unable to pronounce what Properties are agreeable to it, and what are not,[86]

and Hume in 1739 shows a very clear understanding of the point.[87] Priestley in 1777 argues, with unanswerable force, and by appeal to a scientific conception of the physical that (in essence) still holds good today, 'that we have *no reason* to suppose that there are in man two substances so distinct from each other as have been represented'.[88] Kant concurs in 1781, although his special terms of debate preclude him from agreeing directly with Priestley's further materialist claim that 'mind ... is not a substance distinct from the body, but the result of corporeal organization'; that 'in man [thought] is a property of the nervous system, or rather of the brain'; that 'sensation and thought do necessarily result from the organization of the brain'.[89] The quality of the mind-body debate is in many ways lower today than any other time in the last three hundred years.

Substance dualism may have looked like a plausible response to the mind-body problem in Descartes's time, for classical *mechanistic* materialism, according to which the physical world consists entirely of small, solid, intrinsically inert particles in motion, was then the dominant view, and Leibniz's famous image of the mill seemed hard to counter.[90] But the strict mechanist understanding of the physical world was fatally undermined by 1687, when Newton published his *Principia*.[91] Since then

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[84] In Descartes 1641: 141-3. Lange (1865) discusses many precursors.

[85] Priestley 1777 (1965: 115). Locke doesn't fully carry through his point that our ignorance of the nature of the physical means that we lack any good reason to doubt that consciousness is wholly physical; for at one point he says that 'matter…is evidently in its own nature void of sense and thought' (1690: IV. iii. 6; see also IV. x. 5, 10). But he also says that we 'possibly shall never be able to know whether any material being thinks, or no', and holds that an omnipotent being could give 'some systems of matter, fitly disposed, a power to perceive and think' (IV. iii. 6). The force of the second quotation is less than one might suppose: it does not conclusively establish that Locke thought that God could make matter have such a power *intrinsically* or in and of itself—i.e. without any special wizardry. But Locke's correspondence with Stillingfleet strongly suggests that his considered view is that our ignorance of the nature of the matter is in the end too great for us to have any good reason to claim that matter could not have the power of thought in and of itself (1696-9: 459-462).

[86] 1737: 2.194.

[87] 1739: 246-248.

[88] 1777 (181: 219). Priestley observes, correctly, that there is no evidence for absolute solidity: 'I…define…matter…to be a substance possessed of the property of *extension*, and of *powers of attraction and repulsion*. And since it has never yet been asserted, that the powers of *sensation* and *thought* are incompatible with these (solidity, or impenetrability only, having been thought to be repugnant to them), I therefore maintain that we have no reason to suppose that there are in man two substances so distinct from each other as have been represented.'

[89] Kant 1781: A358-60; Priestley 1777 (1818: 220, 244, 303). John Toland in 1704 'obviously regards thought as a phenomenon which is an inherent accompaniment of the material movements in the nervous system' (Lange 1865: 1.329).

[90] 'We must admit that perception, and whatever depends on it, cannot be explained on mechanical principles, i.e. by shapes and movements. If we pretend that that there is a machine [e.g. a brain] whose structure makes it think, sense and have perception, then we can conceive it enlarged,...so that we can go inside it as into a mill. Suppose that we do: then if we inspect the interior we shall find there nothing but parts which push one another, and never anything which could explain a perception. Thus, perception must be sought in simple substances, not in what is composite or in machines' (Leibniz 1720: 150 [*Monadology* §17]).

[91] Locke saw this pretty clearly after reading Newton (see e.g. Locke 1690: 309, 559-60, 1696-9: 467-468). Chomsky (1995: 4) quotes tellingly from Leibniz and Huygens, who

we have had no good scientific reason to think that mind is not physical. And even before Newton, in the high days of 'contact mechanics', there were no *philosophically* respectable grounds for claiming that mind is not physical. The mechanists or 'Cartesians', as Hume calls them, made a wholly unjustifiable move: they 'established it as a principle that we are *perfectly acquainted* with the essence of matter'.[92] That is, they not only assumed that their fundamental theory of matter was sound as far as it went; they also assumed that it went all the way—that it was complete. It is the second of these two false assumptions that causes most trouble, for even if the Cartesians had been right that all physical change is a matter of the motion, contact, and impact of solid particles, they still would not have been justified in claiming that this fact was definitely—knowably—incompatible with some of it also being a matter of conscious goings on. Many today make exactly the same sort of mistake.

13 The reality of appearance

I have claimed that thoughtful materialism requires draining one's conception of the non-Experiential physical of any element that, in a puzzling world, makes it seem especially puzzling that the Experiential is physical. Many philosophers—all those legions who tried, for most of the twentieth century, to reduce the mental to the non-mental in some way—think this is the wrong way round. They think we have to drain our conception of the Experiential of any element that produces special puzzlement, leaving our existing conception of the non-Experiential physical in place. But no substantial draining can be done on the Experiential side. In having Experience in the way we do, we are directly acquainted with certain features of the ultimate nature of reality, as Russell and others have remarked—whether or not we can put what we know into words in any theoretically tractable way. And this is so whatever it is best to say about any non-Experiential (e.g. dispositional) aspects of the mental that there may be. We may certainly hope to *develop* our understanding of the nature of the Experiential; but we can do this only by adding to what we already know of it by direct acquaintance.

—But in having experience we only have access to an appearance of how things are and are not cognizant, in the mere having of the experience, of how anything is in itself.[93]

The reply is immediate. Here, how things appear or seem is how they really are: the reality that is at present in question just is the appearing or seeming. In the case of any Experiential episode E there may be something X of which it is true to say that in undergoing E we only have access to an appearance of X, and not to how X is in itself. But serious materialists must hold that E itself, the event of being-appeared-to, with all the qualitative character that it has, is itself part of physical reality. They cannot say that it too is just an appearance, and not part of how things are, on pain of

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condemned Newton for abandoning sound 'mechanical principles' and reverting to mystical 'sympathies and antipathies' and 'inexplicable qualities'. And yet Leibniz's considered view is arguably in harmony with the present view.

[92] Hume 1739: 159; my emphasis.

[93] See Dennett (1991: 365-366), and the reply in Strawson (1994: 51-52).

infinite regress. They must grant that it is itself a reality, and a reality with which we must, in plausibility, be allowed to have some sort of direct acquaintance. As Russell says, we must 'treat "seeming" with respect'.[94]

At this point some may try to adapt Ryle-type arguments for the 'systematic elusiveness of the 'I'' to the present case.[95] They may argue that anything that can count as *knowledge* of experience involves an operation of taking experience as an object that necessarily precludes apprehending it in such a way that one can be said to have access to how it is in itself, rather than merely to an appearance of it. Now I suspect that this ancient form of argument is invalid even in its original application, where it is used to argue that the putative mental subject of experience can never directly apprehend itself.[96] But even if this is not so it has no valid application to the present case—to things like pain and colour-experience. The way a colour-experience is Experientially, for the subject of experience that has it, is part of its essential nature—its ultimate reality—as a physical phenomenon. When we claim (with Russell) that to have an experience is eo ipso to be acquainted with certain of the intrinsic features of reality, we do not have to suppose that this acquaintance involves standing back from the experience reflectively and examining it by means of a further, distinct experience. It doesn't. This picture is too cognitivist (or perhaps too German-Idealist). The having is the knowing.

14 The radiance of reality

I have argued that the first thing that one needs to do, when it comes to the mind-body problem, is to reflect on one's ignorance: one's ignorance of the non-Experiential. One's intuitive theoretical attitude to the nature of the non-Experiential needs to evolve until any sense that there is an active clash between Experiential terms and non-Experiential terms has disappeared, leaving only the awareness that they fail to connect in a way that brings a sense of intuitive understanding. This awareness ought not to be merely a matter of book learning.

At this point at least two paths open up for materialists. The first goes deeper into reflection on the nature of understanding in physics. Proceeding down this path, one encounters one's sense that at least some of the terms of physics (both common-sense and scientific) connect up with one another in a way that justifies a feeling of intuitive understanding of at least some of what goes on in the world. One is then asked to examine (possibly at length) the question of what exactly one supposes this to amount to. Does it really amount to anything very solid? Is it more than a certain kind of feeling one is disposed to get (either innately or as a result of training) when considering some but not other co-occurrences of features in the world? What exactly is its significance?[97]

Well, one probably has to go down this path, as a materialist, returning to the questions raised on p. 00. But I will choose another, which has a sunnier aspect. Here one confronts the deep puzzlement one still feels when one considers Experiential properties and non-Experiential properties and fails to see how they coexist, and, also, one's persisting feeling that this puzzlement has, in a puzzling world, a very special if

[94] 1927b: 101.
[95] Ryle 1949: 186-189. The idea is an old one.
[96] I argue for this in Strawson 1999b: §10.
[97] See, again, van Fraassen 1980: ch. 5.

not unique status.

The question is whether one can do anything about this. I think the answer is Yes. I think physics can help us—it has already helped us a great deal—by diluting or undermining features of our natural conception of the physical that make non-Experiential phenomena appear *toto coelo* different from Experiential phenomena

The basic point is simple, and can be elaborated as follows. At first, perhaps, one takes it that matter is simply solid stuff, uniform, non-particulate: Scandinavian cheese. Then, perhaps, one learns that it is composed of distinct atoms—particles that cohere more or less closely together to make up objects, but that have empty space (to put it simplistically but intelligibly) between them. Then, perhaps, one learns that these atoms are themselves made up of tiny, separate particles, and full of empty space themselves.[98] One learns that a physical object like the earth or a person is almost all empty space. One learns that matter is not at all what one thought.

Now one may accept this while holding on to the idea that matter is at root solid and dense. For this picture retains the idea that there are particles of matter: minuscule grainy bits of ultimate stuff that are in themselves perfectly solid (in Locke's phrase), 'continuum-dense'. And one may say that only these, strictly speaking, are matter: matter as such. But it is more than two hundred years since Priestley (citing Boscovich) observed that there is no positive observational or theoretical reason to suppose that the fundamental constituents of matter have any perfectly solid central part.[99]

In spite of this, a fairly robust conception of truly solid particles survived all the way into pre-1925 quantum mechanics. It suffered its most dramatic blow only in modern (1925 on) quantum mechanics, in which neither the nucleus nor the electrons of an atom are straight-up solid objects, and are much more naturally thought of as fields. It may be said that the basic idea of the grainy particle survives even here, at least in as much as the nucleus and its components are still fairly well localized within a small central region inside the atom (albeit with small 'tails' that go out to infinity), and in as much as the probability of finding one of the (far less localized) electrons is significant only within a volume that is normally considered to be the dimensions of the atom. But this commitment to the localization of particles does not in itself amount to any sort of commitment to continuum-dense solidity, but only to fields and repulsive forces that grow stronger without any clear limit when one travels in certain directions (i.e. towards the centre of the field associated with a particle). And whatever is left of the picture of ultimate grainy bits is further etiolated in quantum field theory, in which the notion of the field more fully overrides the picture of grainy particles.[100] In this theory it becomes very hard to treat 'bound' systems like atoms at all. As for what I've been calling 'empty space'—the supposed vacuum—, it is understood to be simply the lowest energy state of fields like the electron, proton, and photon fields. It turns out to be something which 'has structure and can get squeezed,

[98] As in the old quantum-theory model of the atom, c. 1910-1924. The standard way to convey the amount of empty space inside an atom is to say that if the nucleus is imagined to be as big as a 1 mm pinhead, then the nearest electrons—themselves much smaller than the nucleus—are 100 metres away.

[99] See also Foster (1982: 67-72), and Harré and Madden (1975: ch. 9).

[100] 'In the modern theory of elementary particles known as the Standard Model, a theory that has been well verified experimentally, the fundamental components of nature are a few dozen kinds of field' (Weinberg 1997: 20). We continue to talk in terms of particles because the quantization of the field, whereby each different (normal) mode of vibration of the field is associated with a discrete ladder of energy levels, automatically gives rise to particle-like phenomena so far as observation is concerned.

and can do work'.[101]

It may be said that quantum field theory is complicated and ill-understood, but there is a clear sense in which grainy, inert bits of matter, naively conceived, are already lost to us independently of quantum field theory, given only the fact that matter is a form of energy, and interconvertible with it. This fact of interconvertibility is widely known, however little it is understood, and it seems to me that it further, and utterly, confounds any understanding of matter that takes it to be in any obvious way incompatible with consciousness. To put it dramatically: physics thinks of matter considered in its non-Experiential being as a thing of spacetime-located forces, energy, fields, and it can also seem rather natural to conceive of consciousness (i.e. matter apprehended in its Experiential being) as a spacetime-located form or manifestation of energy, as a kind of force, and even, perhaps, as a kind of field.[102] We may still think the two things are deeply heterogeneous, but we have no good reason to believe this.[103] We just don't know enough about the nature of matter considered in its non-Experiential being; and doubtless there are things we don't know about matter considered in its Experiential being. Those who think speculations like this are enjoyable but not really serious haven't really begun on the task of being a materialist; they haven't understood the strangeness of the physical and the extent of our ignorance. It is a long time since Russell argued that 'from the standpoint of philosophy the distinction between physical and mental is superficial and unreal', and it seems that physics can back philosophy on this question.[104] In fact—and it had to come back to this—we really don't know enough to say that there is any non-mental being. All the appearances of a non-mental world may just be the way that physical phenomena—in themselves entirely mental phenomena—appear to us; the appearance being another mental phenomenon.[105]

Whatever you think of this last proposal, lumpish, inert matter, dense or corpuscled, stuff that seems essentially alien to the phenomenon of consciousness, has given way to fields of energy, essentially active diaphanous process-stuff that—intuitively—seems far less unlike the process of consciousness. When Nagel speaks of the 'squishy brain', when McGinn speaks of 'brain 'gook'' and asks how 'technicolour phenomenology ... can ... arise from soggy grey matter', when the neurophysiologist Susan Greenfield describes the brain as a 'sludgy mass', they vividly and usefully express part of the 'imaginative ... confusion' in the ordinary idea

[101] Harvey Brown, personal communication; see Saunders and Brown (1991). Perhaps Descartes was right, deep down, in his theory of the plenum.
[102] Compare Maxwell 1978: 399, James 1890: 1.147 n. It is arguable that Schopenhauer holds something close to this view.
[103] Using this very wording, Kant (1781/7: B427-8) remarks that the 'heterogeneity' of mind and body is merely assumed and not known.
[104] Russell 1927a: 402.
[105] Richard Price is consistently outclassed by Priestley in their *Free Discussion of the Doctrine of Materialism*, but he gets this point exactly right: 'if...it comes out that [Priestley's] account of matter does not answer to the common ideas of matter, [and] is not *solid* extension, but something *not solid* that exists in space, it agrees so far with spirit', or mind (Priestley and Price 1778: 54; Price held that spirit was not only located in space but might also be extended). This is a rather good description of how things have come out, in physics. The account of matter given by current physics does not 'answer to the common ideas of matter'; it does not take matter to be 'solid extension', but rather 'something not solid that exists in space'. So far, then, it agrees with our understanding of mind or consciousness, although the agreement can only be negative, given that we have no non-mathematical grasp of the non-structural nature of the non-Experiential being of matter—apart (perhaps) from our grasp of its spacetime structure.

of matter.[106] But physics comes to our aid: there is a clear sense in which the best description of the nature of the non-Experiential *in non-technical, common-sense terms* comes from physics. For what, expressed in common-sense terms, does physics find in the volume of spacetime occupied by a brain? Not a sludgy mass, but an astonishingly (to us) insubstantial-seeming play of energy, an ethereally radiant vibrancy.

It finds, in other words, a physical object; which, thus far examined, is like any other. Examined further, this particular physical object turns out to have a vast further set of remarkable properties: all the sweeping sheets and scudding clouds and trains of intraneuronal and interneuronal electrochemical activity which physics (in conjunction with neurophysiology) apprehends as a further level of extraordinarily complex intensities of movement and (non-Experiential) organization.

All this being so, do we have any good reason to think that we know anything about the non-mental physical (assuming it exists) that licenses surprise—even the very mildest surprise—at the thought that the Experiential is physical? I do not think so. Brains are special, but they are not strange. The ghost in the machine is special, but it is certainly in the machine, and the machine, like the rest of the physical world, is already a bit of a ghost—as ghostly, in Russell's view, 'as anything in a spiritualist séance'.[107]

So when David Lewis says that 'the most formidable opposition to any form of mind-body identity comes from the friends of qualia'[108] there is no reason to agree. The main opposition to (realistic) mind-body identity comes, paradoxically, from its most passionate proponents, who are so strongly inclined to think they know more about the nature of the non-mental physical than they do. Lewis exemplifies the great mistake in his well known summary account of his position in the philosophy of mind: 'Remember', he says, 'that the physical nature of ordinary matter under mild conditions is very well understood'.[109] But there is no reason to believe this, and every reason to disbelieve it. 'What knowledge have we of the nature of atoms that renders it at all incongruous that they should constitute a thinking [Experiencing] object?', asks Eddington, who took the existence of Experiential phenomena—qualia—for granted: 'science has nothing to say as to the intrinsic nature of the atom.' The atom, so far as we know anything about it,

> is, like everything else in physics, a schedule of pointer readings [on instrument dials]. The schedule is, we agree, attached to some unknown background. Why not then attach it to something of a spiritual nature of which a prominent characteristic is *thought* [consciousness, Experience]? It seems rather *silly* to prefer to attach it to something of a so-called 'concrete' nature inconsistent with thought, and then to wonder where the thought comes from. We have dismissed all preconception as to the background of our pointer readings, and for the most part can discover nothing as to its nature. But in one case—namely, for the pointer readings of my own brain—I have an insight which is not limited to the evidence of the pointer readings. That insight shows that they are attached to a background of consciousness.[110]

The point is still negative. It may destroy one common source of puzzlement, but

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[106] Nagel 1998: 338, McGinn 1991: 1, 100, Greenfield BBC 21 June 1997. In spite of these quotations I think that all three of these writers are fundamentally on the right track when it comes to the mind-body problem.
[107] 1927b: 78.
[108] Lewis 1999: 5; qualia are Experiential phenomena.
[109] Lewis 1994: 412.
[110] Eddington 1928: 259-60; my emphasis on 'silly'.

it doesn't offer any sort of positive account of the relation between the play of energy non-Experientially conceived and the play of energy Experientially apprehended, and some may find it no help at all. Others may say that it is a positive mistake to think that it is especially helpful, on the grounds that there is in the end no more difficulty in the thought that the existence of matter naively and grossly conceived involves the existence of consciousness than there is in the thought that matter quantum-mechanically conceived does so.[111]

We can grant them their objection for their own consumption (they are likely to be fairly sophisticated philosophers). Many others—not excluding philosophers—are likely to find the negative point rather useful, and I will conclude this section by relating it to three currently popular issues.

[1] Eliminativism. Consider any philosopher who has ever been tempted, even momentarily, by the 'eliminativist' suggestion that one has to question the reality of the Experiential in some way in order to be a thoroughgoing materialist. It is an extraordinary suggestion,[112] and what is most striking about it in the present context is that it constitutes the most perfect demonstration in the history of philosophy of the grip of the very thing that it seeks to reject: dualist thinking. The eliminativists make the same initial mistake as Descartes—the mistake of assuming that they understand more about the nature of the physical than they do—but their subjugation to dualist thinking is far deeper than Descartes.[113] They are so certain that the physical excludes the Experiential that they are prepared to deny the reality of the Experiential in some (admittedly unclear) way—i.e. to make the most ridiculous claim ever made in philosophy—in order to retain the physical. (The mistake of thinking one may have grasped the essential nature of the physical is perhaps forgivable in the early seventeenth century, but not now.)

[2] The hard part of the mind-body problem. It can be seriously misleading to talk of 'the hard part of the mind-body problem',[114] or 'the hard problem',[115] for this suggests that the problem is clearly posed. It is not, as Chomsky has observed. One might say that it is not sufficiently well-defined for us to be able to say that it is hard; for although we have a clear and substantial positive fix on the non-structural nature of Experiential reality, we have no substantial positive fix on the non-structural nature of non-Experiential reality, apart, perhaps, from its spatiotemporal characteristics. To this extent we have no good reason to think that the mind-body problem is a harder problem than the problem posed for our understanding by the peculiarities of quantum physics, or indeed—as Chomsky might say—by the phenomenon of motion. The problem is the nature of the physical, and in particular,

[111] They will find Russell's line of thought equally unnecessary as a way of reaching a conclusion they already fully accept: 'having realised the abstractness of what physics has to say, we no longer have any difficulty in fitting the visual sensation into the causal series. It used to be thought 'mysterious' that purely physical [i.e. non-mental] phenomena should end in something mental. That was because people thought they knew a lot about physical phenomena, and were sure they differed in quality from mental phenomena. We now realise that we know nothing of the intrinsic quality of physical phenomena except when they happen to be sensations, and that therefore there is no reason to be surprised that some are sensations, or to suppose that the others are totally unlike sensations' (1927b: 117).

[112] It seems considerably more implausible than Xenocrates' suggestion that the soul is a self-moving number (see Aristotle *De Anima* 408b-409a).

[113] In fact it is not clear that Descartes does make this mistake, although it is clear that some eliminativists do. Descartes was for a long time seen as a dangerous source of materialist views, and there are some reasons for thinking that his official dualism was motivated partly by the desire to stave off persecution by religious authorities.

[114] Strawson 1989: 80, 1994: 93; compare McGinn 1989: 1.

[115] Chalmers 1995: 200.

perhaps, of the non-mental physical.

[3] Zombies. It is, finally, a mistake to think that we can know that 'zombies' could exist—where zombies are understood to be creatures that have no Experiential properties although they are *perfect physical duplicates* (PPDs) of Experiencing human beings.[116] The argument that PPD-zombies could exist proceeds from two premisses: [1] it is conceivable that PPD-zombies exist, [2] if something is conceivable, then it is possible. The argument is plainly valid, and (unlike many) I have no great problem with [2]. The problem is that we can't know [1] to be true, and have *no* reason to think it is. To be a genuine materialist is precisely to hold that [1] is false, and while materialism cannot be known to be true, it cannot be refuted a priori, as it could be if [1] could be known to be true. PHYSICAL is a natural-kind concept, and since we know that there is much that we do not know about the nature of the physical, we cannot claim to know that a Experienceless PPD—a perfect physical duplicate, no less—of a currently Experiencing human being is even conceivable, and could possibly exist. One needs to be very careful how one embeds natural-kind terms in 'it is conceivable that' contexts.[117]

It is worth adding that anyone who holds that it is as a matter of *physical* fact impossible for a PPD of an actual, living normally Experiencing human being to have no Experience must hold that PPD-zombies are *metaphysically* (if not *logically*) impossible. Physical impossibility entails metaphysical impossibility in this case, because the question is precisely what is possible given the actual nature of the physical.

15 Realistic monism

In §1 I pointed out that the word 'physical', as used by genuine materialists, entails 'real and concrete': given that one is restricting one's attention to concrete phenomena, as we are doing here, to say something is a physical phenomenon is simply to say that it is a real phenomenon. But then why bother to use 'physical'?[118] It has become an entirely empty or vacuous term, in so far as it is supposed to mean anything more than 'real'. So why not simply use 'real'? And why bother with 'real', given that we are talking about whatever (concretely) exists, whatever it is? It is redundant. All one strictly needs, to mark the distinctions centrally at issue in the unfortunately named 'mind-body problem', are 'mental' and 'non-mental', 'Experiential' and 'non-Experiential'.[119] One can simply declare oneself to be a *Experiential-and-non-Experiential* monist: one who registers the indubitable reality of Experiential phenomena and takes it that there are also non-Experiential phenomena.

I nominated this position for the title 'realistic monism', having explicitly assumed (p. 000) that any realistic position must take it that there is non-Experiential being. Now this assumption can be backed by an argument that seems

[116] I don't know where these zombies come from—but they may be Australian. Ten years or so ago philosophical zombies were far more plausible creatures: they were defined to be *outwardly* and *behaviourally* indistinguishable from human beings while having unknown (possibly non-biological) insides, and were, accordingly, of considerable interest to functionalists and behaviourists.

[117] It is worth noting that a perfect physical duplicate of an actual human being would have to be governed by the same physical laws.

[118] Compare Crane and Mellor 1990.

[119] According to the view presented in Strawson 1994: 162-75, the latter pair suffice on their own.

quite strong—(1) Experience (Experiential content) certainly exists, (2) Experience (Experiential content) is impossible without a subject of experience, (3) a subject of experience cannot itself be an entirely Experiential (Experiential-content) phenomenon, so (4) the existence of Experience (Experiential content) entails the existence of non-Experiential phenomena.[120] But one can have no deep confidence in the correctness of the assumption if one accepts the general principles of ignorance defended in this paper, and this argument for it invites the reply that even if a subject of experience must have non-Experiential being relative to its own Experience, its non-Experiential being may be the Experience of some other, lower-order, subject or group of subjects, and so on down. I am not sure this reply is cogent, in fact, or that premiss (3) is solid,[121] but I propose to leave the assumption as an assumption: one cannot really know what is 'realistic', at this point.

—You say we can do without the word 'physical'. But if one can do without 'physical', then 'materialist', used so diligently in this paper, is just as superfluous—vacuous. You have already stated (note 14) that you make no distinction between materialism and physicalism, and the word 'materialist' is deeply compromised by its history.

History is two-faced, and I think that 'materialist'—an adjective formed from the natural-kind term 'matter'—can be harmlessly and even illuminatingly retained.[122] What, after all, is matter? As a materialist, I take it that it is whatever we are actually talking about when we talk about concrete reality. I fix the reference of the term 'matter' in this way—giving a chair a kick, perhaps—independently of any reference to theories. I can be certain that there is such a thing as matter, as a realistic materialist monist—one who takes it that Experience is wholly material in nature—because I can be certain that there is such a thing as concrete reality: Experience, at the very least. What a materialist may still wish to add to this is the insistence that nothing can count as matter unless it has some sort of non-Experiential being (§4); together with the working presumption that current physics is genuinely reality-representing in certain ways, even if any correctness of representation is only a matter of the holding of certain relations of structural correspondence between the nature of matter and the equations of physics.

In so far as I am a realistic materialist monist, then, I presume that physics's best account of the structure of reality is genuinely reality-representing in substantive ways, and that the term 'materialist' is in good order. I sail close to the wind—by which I mean the charge of vacuousness, and the charge that it may be hard to distinguish my position from idealism—in my use of the word 'matter' because that is exactly what one has to do at this point. Kicking another chair, I grant that the term 'materialist' has travelled far from some of its past uses, but there is no good reason to think that its meaning is especially tied to its past uses rather than to the

[120] As remarked in note 24, I do not think that there is any clear parallel argument for the claim that non-*mental* being must exist if Experience exists, because the term 'mental' is too unclear for such an argument to be constructed. Nor do I know how someone like Bradley would respond to this argument.
[121] I address this question in 'What is the relation between an experience, the subject of the experience, and the content of the experience?'.
[122] Here at last, it seems, I may differ from Chomsky—but only, I think, on a point of terminology. (Obviously 'physical' can also be retained in so far as it is synonymous with 'material'.)

current understanding of matter.[123] And there is a sense in which its past use makes it particularly well worth retaining: it makes the claim that the present position is materialist vivid by prompting resistance that turns out to be groundless when the position is properly understood.[124]

That is all I have to say about the word 'materialist', and some will probably think that I would do better call myself a 'neutral monist', or just a 'monist'.[125] But what about 'monist'? There is serious unclarity in this notion. Monists hold that there is, in spite of all the variety in the world, a fundamental sense in which there is only one basic kind of stuff or being. But questions about how many kinds of stuff or being there are are answerable only relative to a particular point of view or interest; and what point of view is so privileged that it allows one to say that it is an absolute metaphysical fact that there is only one kind stuff or being in reality? Materialists call themselves monists because they think that all things are of one kind—the physical kind. But many of them also hold that there is more than one kind of fundamental particle, and this claim, taken literally, entails that there isn't after all any one basic kind of being out of which everything is constituted. For it is the claim that these particles are themselves, in their diversity, the ultimate constituents of reality; in which case there is kind-plurality or stuff-plurality right at the bottom of things.

—But these particles are nevertheless all *physical*, and in that sense of one kind.

To say that they can be classed together as single-substanced in this way is question-begging until it is backed by a positive theoretical account of why it is correct to say that they are all ultimately (constituted) of one kind (of substance). To claim that their causal interaction sufficiently proves their same-substancehood is to beg the question in another way, on the terms of the classical debate, for classical substance-dualists simply deny that causal interaction entails same-substancehood. The claim that they are all spatiotemporally located also begs the question. For how does this prove same substancehood?

It may be replied that all the particles are just different forms of the same stuff—energy. And it may be added that the so-called fundamental particles—quarks

[123] There is, in particular, no good reason to think that it is especially tied to the seventeenth-century conception of matter as something passive and inert. The conception of matter as essentially energy-involving, or at least as something to which motion is intrinsic, is already present in the work of Democritus and Epicurus.

[124] I should add that I take it that spacetime itself is material (it is a disputed question). In quantum field theory, reality consists of spacetime and a collection of fields defined on spacetime; what we think of as material objects are emergent (in the non-spooky sense) features of these fields. But spacetime is not a merely passive container, for according to general relativity the action-reaction principle applies as between spacetime and matter (this is the phenomenon Pullman (1998: 351) usefully calls 'the vacuum-matter complementarity, or…the virtual-material duality of particles'). Moreover, the gravitational field, unlike the other fields, is not distinct from spacetime itself. Rather, the gravitational field, within a given region, just is the spacetime geometry of that region. The structural relations it involves are physical or material because they are spatiotemporal (they are not merely abstract-dimensional). Note also that energy can be stored and propagated within the gravitational field, and hence within the spacetime fabric itself, which again suggests that spacetime is substantial and hence—given materialism—material, in a way that Newtonian space and time, say, are not. (My thanks to Michael Lockwood and Harvey Brown for discussion of this matter.)

[125] Neutral monism is not an option on the present view, because we know that Experience like ours is part of reality, whatever else is or is not the case, and we know its nature—its 'ultimate' nature, if you like—in having it; whatever else is or is not the case. It cannot be supposed to be merely an appearance of something that is in itself quite unlike Experience.

and leptons—are not strictly speaking fundamental, and are in fact all constituted of just one kind of thing: superstrings. And these monist approaches deserve investigation—to be conducted with an appropriately respectful attitude to panpsychism.[126] But one can overleap them by simply rejecting the terms of the classical debate: one can take causal interaction to be a sufficient condition of same-substancehood.

I think that this is the right dialectical move in the present context, if one wants to retain any version of the terminology of substance. Dualists who postulate two distinct substances while holding that they interact causally not only face the old problem of how to give an honest account of this interaction. They also face the (far more difficult) problem of justifying the claim that there are two substances. As far as I can see, *the only justification that has ever been attempted* has consisted in an appeal to the *intuition* that the mental or the Experiential is utterly different in nature from matter. But this intuition lacks any remotely respectable theoretical support, if the argument of this paper is even roughly right. The truth is that dualism has nothing in its favour—to think that it has does is simply to reveal that one thinks one knows more about the nature of things than one does—and it has Occam's razor (that blunt sharp instrument) against it. This is not to rule out the theoretical possibility that substance dualism—or pluralism—is in fact the best view to take about our universe for reasons of which we know nothing.[127] The fact remains that the objection to dualism just given remains decisive when dualism is considered specifically as a theoretical response to the 'mind-body problem'.

—But why persist with 'monist'? You might as well call yourself a 'neutral pluralist', for all the difference it makes, and 'monist' carries bad baggage. Why not simply call yourself a 'non-committal naturalist', or, with Chomsky, a 'methodological naturalist'? Or a '?-ist'?[128]

This section stirs up large questions, but I'm not too troubled. In some moods I am prepared to call myself an Experiential-and-non-Experiential ?-ist and think no more about the word 'monist'; there is no decidable issue here, as the old decriers of metaphysics (e.g. Locke, Hume, Kant) knew. At the moment, though, the physics idea (the ancient idea) that everything is made of the same ultimate stuff—that the deep diversity of the universe is a matter of different states or arrangements of the same fundamental *ens* or *entia*—that 'in the whole universe there is only one substance differently modified'[129]—seems to me as compelling as it is remarkable, and I choose to register my attraction to it with the word 'monism'. If realistic monism is Chomskyan methodological naturalism ontologized, good.

16 Emergence? [new section not in published version, unfinished]

[126] See e.g. Seager 1995. Note that panpsychism does *not* require one to believe that tables and chairs are subjects of Experience.
[127] There may be phenomena in the universe that cannot interact causally given their nature (rather than their position in spacetime), or that do so only on the first Thursday of every seventh century, in a highly peculiar way.
[128] Sebastian Gardner proposed that I am a '?-ist' in 1990 (see Strawson 1994: 105). It is hard to find satisfactory names, and Grover Maxwell, who holds essentially the same position as I do, calls himself a 'nonmaterialist physicalist' (1978: 365).
[129] La Mettrie, 1747: 39.

And yet I am not quite a ?-ist after all; for Eddington's point about silliness (cited above on p. 00) is very powerful, and I am going to repeat and expand it.

One thing we know about matter, given that materialism is true, is that when you put it together in the way in which it is put together in brains like ours, it constitutes Experience like ours. Now our knowledge of the intrinsic nature of the objects treated in physics 'consists solely of readings of pointers [on instrument dials] and other indicators'. This being so, Eddington asks, 'what knowledge have we of the nature of atoms that renders it at all incongruous that they should constitute a thinking object?' None, he replies: 'science has nothing to say as to the intrinsic nature of the atom. The physical atom is, like everything else in physics, a schedule of pointer readings'[130] or, differently put, something whose nature physics can represent only in (differential) equations, only in spatio-temporal and mathematical terms.

The schedule is, we agree, attached to some unknown background. Why not then attach it to something of spiritual nature of which a prominent characteristic is *thought* [consciousness, Experience]? It seems rather silly to prefer to attach it to something of a so-called 'concrete' nature inconsistent with thought, and then to wonder where the thought comes from. We have dismissed all preconception as to the background of our pointer readings, and for the most part can discover nothing as to its nature. But in one case—namely, for the pointer readings of my own brain—I have an insight which is not limited to the evidence of the pointer readings. That insight shows that they are attached to a background of consciousness.

It follows, he takes it, that

I may expect that the background of other pointer readings in physics is ***of a nature continuous with that revealed to me in this way***,

even while

I do not suppose that it always has the more specialized attributes of consciousness. But in regard to my one piece of **insight** into the background no problem of irreconcilability arises; I have no other knowledge of the background with which to reconcile it….*There is nothing to prevent the assemblage of atoms constituting a brain from being of itself a thinking* [*conscious, Experiencing*] *object in virtue of that nature which physics leaves undetermined and undeterminable.* If we must embed our schedule of indicator readings in some kind of background, at least let us accept the only hint we have received as to the significance of the background—namely, that it **has a nature capable of manifesting itself** as mental activity.[131]

This is intensely sensible and Occamical. And yet many materialists simply assume that matter, in itself, is an essentially non-Experiential phenomenon.

I say this and I find myself thinking Do they really? This rapid inner question is not rhetorical or aggressive, meaning 'They must be pretty dumb if they really think, and think they know, that matter is an essentially non-Experiential phenomenon.' On the contrary, I'm thinking that I may be being really dumb, that they're going to protest that of course they aren't so ridiculous as to hold that matter, in its basic nature, is an essentially non-Experiential phenomenon, and I'm making a fool of

[130] Note the ontological short form ('the physical atom *is*...') used to express an epistemological claim. One finds the same in Hume, Russell, and many others. This is *certainly* not Eddington's ontological view: he says we know nothing about the intrinsic nature of physical reality; just as Hume says that we cannot know the ultimate nature of things. Only crazy metaphysical positivists move from the epistemological claim to the ontological claim.

[131] Eddington 1928: 258-60. He is not the first or the last to make the point.

myself to think that they do.

Oh well, I'll risk it. I do think they—or some of them—really think that matter, in itself, is an essentially non-Experiential phenomenon. Or at least I think they think they do, although I do not really see how they can, if they are remotely realistic in their materialism. I think they take it, for a start, that the fundamental physical entities, the ultimate constituents of reality, particles, fields, strings, 'simples', or *ultimates*, as I will call them, whatever they are, are, in themselves, essentially non-Experiential phenomena.

But if they are real materialists, realistic materialists, then they cannot deny that when you put matter together in the way in which it is put together in brains like ours, it constitutes—is—Experience like ours—all by itself. All by itself, for there is on their own materialist view nothing else, nothing non-material, involved. And some of them *are* real realists about Experiential phenomena. And yet they do I think hold that matter, in itself, or that ultimates, in themselves, are entirely and essentially non-Experiential phenomena.

Is this a possible position? I don't think so. But one defence goes like this. One proposes that Experiential phenomena are *emergent* phenomena—that consciousness properties, Experience properties, are emergent properties of wholly non-conscious, non-Experiential phenomena. The idea is that matter *in itself*, in its basic nature, is in some sense a wholly non-conscious, non-Experiential phenomenon, and yet that when parts of it interact in certain ways, conscious phenomena 'emerge'. (The idea is that the ultimates in themselves are wholly non-conscious, non-Experiential phenomena, and yet that when they associate in certain ways, conscious/Experiential phenomena 'emerge'.)

I think it is very, very hard to understand what this is supposed to involve. I think that it may in fact be an incoherent view. At the very least, I think that it is much harder to understand what it is supposed to involve than many have realized. So I'm going to finish with this, and trudge over some familiar ground.

Liquidity is often proposed as a shiningly clear example of an emergent property. Liquidity is not a property of individual H_2O molecules, nor is it a property of the ultimates of which H_2O molecules are composed; but when you put many H_2O molecules together they constitute a liquid; they constitute something liquid (at room temperature, at least). So liquidity is an emergent property of groups of H_2O molecules. When heat is applied evenly to the bottom of a tray filled with a thin sheet of viscous oil, it transforms the smooth surface of the oil into an array of hexagonal cells of moving fluid called Bénard convection cells.[132] This is another popular example of emergence: there are many chemical and physical systems in which pattern is created through interactions based solely on physical laws, and such patterns are called 'emergent'.

Can we hope to understand the alleged emergence of Experiential phenomena from non-Experiential phenomena by reference to such models? I don't think so. The emergence of liquidity is shiningly easy to grasp. We can easily make intuitive sense of the idea that certain sorts of molecules are so constituted that they don't bind together in a tight lattice but slide past or off each other (in accordance with van de Waals molecular interaction properties) in a way that gives rise to (is) the phenomenon of liquidity. So too, we can easily make sense of the idea that physical

[132] Velarde & Normand 1980

laws relating to surface tension, viscosity, and other forces governing the motion of molecules in a heated fluid give rise to hexagonal patterns on the surface of heated oil. In both cases we move in a small set of homogeneous spacetime-and-motion-involving physics notions with no sense of puzzlement. Put another way, we can see that the phenomenon of liquidity arises naturally out of, and is indeed *wholly dependent on*, phenomena that do not in themselves involve liquidity at all.

The notion of such total dependence looks useful, for it seems plain—true by definition—that there must be some central sense in which an emergent property or phenomenon is wholly dependent on that which it emerges from. Otherwise it will simply not be true to say that the former is emergent from the latter—for at least part of the former will have to hail from somewhere else.

But this is what causes the problem when it comes to relating the supposedly emergent property of Experience to the supposedly wholly non-Experiential phenomena from which it supposedly emerges. For it now seems that if experiential phenomena—colour-experiences, for example—really are somehow (wholly) dependent on non-experiential phenomena in such a way as to be truly emergent from them, emergent from them and from them alone, then there must be

> a correct way of describing things…given which one can relate color-experience, considered just as such, to the non-experiential phenomena on which it is supposed to depend, in such a way that the dependence is as intelligible as the dependence of the liquidity of water on the interaction properties of individual molecules. The alternative, after all, is that there should be total dependence that is not intelligible or explicable in any possible physics, dependence that is unintelligible and inexplicable even to God, as it were.[133]

You can get liquidity from non-liquid molecules as easily as you can get a cricket team from eleven things that are not cricket teams. In God's physics, it would have to be just as plain how you get experiential phenomena from wholly non-experiential phenomena. But this is what boggles the mind, or should do. We have, once again, no difficulty in the idea that liquid phenomena might be emergent properties of wholly non-liquid phenomena. But when we take up the case of Experience again, and look for an analogy of the right size or momentousness, as it were, we can't make do with things like liquidity. We need something on a wholly different scale.

What might be an analogy of the right size? Well, suppose someone [pseudo-Boscovich] proposes that all ultimates—all real, concrete ultimates—are, in truth, wholly unextended entities; that this is the truth about their being—that they have no extension; that there is *no* sense in which they themselves are extended. And suppose he goes on to say that when collections of these entities stand in certain (real, concrete) relations, they give rise to or constitute truly, genuinely extended concrete entities; real, concrete extension being in this sense an *emergent property* of phenomena that are, although by hypothesis real and concrete, wholly unextended.

Well, I think that this suggestion might well be rejected as absurd, and rightly; but the suggestion that when non-Experiential phenomena stand in certain relations they instantiate or constitute Experiential phenomena, Experience being an emergent property of non-Experiential phenomena, seems exactly on a par. That's why I offer it as an analogy.

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[133] Strawson 1994: xxx.

Someone may say that the idea that collections of concrete entities that are truly, genuinely unextended can give rise or constitute concrete entities that truly, genuinely extended is not absurd at all. It's actually scientific orthodoxy, on one far from unnatural view of what ultimates are.

But this won't really do; it really won't. Anything that has, or is well understood as, a field, or that has any sort of attractive or repulsive being or energy, has extension; and although there are plenty of ultimates that have no electric charge, there are none that are not associated with a field.

The extended/unextended analogy may nevertheless be thought unhelpful, so let me make a slight shift. Suppose someone proposes that there are real, concrete, wholly non-*spatial* phenomena, and that when they stand in certain wholly non-spatial relations they give rise to or constitute real, concrete spatial phenomena, these being *emergent features* of wholly non-spatial phenomena.

Here I resort to the *argumentum a visceris*. My gut tells me that real, concrete spatial phenomena *can't* be emergent properties of something wholly non-spatial, and that this is an analogy of the right size. And that, in just the same way, Experiential phenomena can't be emergent properties of wholly non-Experiential phenomena. It is, I take it, built into the heart of the notion of emergence that *emergence cannot be brute*, even if an ultimate's possession of the properties it does possess is allowed to be brute. The wild, positivism-inspired metaphysical irresponsibilities of the twentieth century may lead some to think that they have no problem with brute emergence. But *emergence* cannot be brute. And Occam cuts in again. Faced with the undeniable raality of Experience, why *on earth* posit that matter in itself is essentially non-Experiential and take on the extra burden of brute emergence?

But what do I know about all this? Almost nothing. With this kind of speculation 'we are got into fairy land', as Hume says, and in any case I'm a yokel when it comes to physics. And if people who are more in the know are happy to agree with Isham and Butterfield that 'there is no good a priori reason why space should be a continuum', any impossibility claim seems rash. And some may propose the Big Bang as precisely a case in which spatial phenomena are indeed emergent features of something intrinsically wholly non-spatial.

If they do propose this, one may perhaps extract from them the concession that in that case the thing emerged-from, the non-spatial thing, must at the very least be intrinsically suited to constituting spatial phenomena in certain situations. It must be 'proto-spatial' in that sense.

But then they would no doubt reply that exactly the same may be true of experiential phenomena. On this view, experiential phenomena can indeed emerge from wholly non-experiential phenomena. It's just that these non-experiential phenomena are intrinsically suited to produce experiential phenomena in certain situations, and are 'proto-experiential' in that sense.

At this point I give up. You can obviously make chalk from cheese because if you go down to the subatomic level they are both the same stuff; but I don't think you can make experience from something wholly non-experiential. And since we know with certainty that experience exists, it seems we should assume that whatever else there is either experiential, in some manner, or proto-experiential, whatever that may mean. So I reach the same conclusion as Eddington.

‘To put the conclusion crudely’, he says,

‘the stuff of the world is mind-stuff. As is often the way with crude statements, I shall have to explain that by ‘mind’ I do not here exactly mean mind and by ‘stuff’ I do not at all mean stuff…. The mind-stuff of the world is, of course, something more general than our individual conscious minds;

nevertheless, he believes,

‘we may think of its nature as not altogether foreign to the feelings in our consciousness. The realistic matter and fields of force of former physical theory are altogether irrelevant—except in so far as the mind-stuff itself has spun these imaginings. The symbolic matter and fields of force of present-day theory are more relevant, but they bear to it the same relation that the bursar’s accounts bear to the activity of the college. Having granted this, the mental activity of the part of the world constituting ourselves occasions no surprise; it is known to us by direct self-knowledge, and we do not explain it away as something other than we know it to be—or, rather, it knows itself to be. It is the physical aspects of the world that we have to explain…. [276-7]

Eddington summarizes his position as follows: ‘To put the conclusion crudely—the stuff of the world is mind-stuff.’ ‘As is often the way with crude statements’, he continues, ‘I shall have to explain that by “mind” I do not here exactly mean mind and by “stuff” I do not at all mean stuff’; ‘the mind-stuff of the world is, of course, something more general than our individual conscious minds’. Nevertheless, he believes, ‘we may think of its nature as not altogether foreign to the feelings in our consciousness.’[134] Something along these lines seems to me to be the most parsimonious, plausible and indeed ‘hard-nosed’ position that anyone who is remotely realistic about the nature of reality can take up in the present state of our knowledge. So this, I propose, is what real materialism looks like.[135]

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[134] 1928: 276-7.
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NB every particle in the standard model feels a force, even the photon (photon-photon forces) albeit mediated by (virtual) pair creation/annihilation processes for the sources of the photon.