

CHAPTER ONE
PREFACE TO A QUANTUM SOCIAL SCIENCE

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In this book I explore some implications for social science of the possibility that human subjectivity or consciousness is a macroscopic quantum mechanical phenomenon – in effect, that human beings are walking wave-particle dualities. I intend the argument not as an analogy or metaphor, but in a realist sense as a claim about what human beings really are. If the claim is true, then in matters of both ontology and epistemology social life should mirror the bizarre and paradoxical world of quantum physics, and will require a “quantum social science” for its proper understanding. The elements of such a science are, to some extent, already to be found at the margins of social theory, although what I take to be their implicitly quantum character has never been explicated, and (one hopes) they might be strengthened by doing so. However, most social science today is based on the classical worldview, and as such the idea of a quantum social science poses a radical challenge to the way in which we conventionally understand our work.

The road to this argument will be hard, with the pay-off for social scientists arriving only in Chapter Four, so before going further I should perhaps first explain why one might want to embark on such a journey at all. The reason is the mind-body problem, or human beings’ long-standing inability to make any sense whatsoever of consciousness in scientific terms. Although social scientists might reasonably doubt that such an arcane philosophical issue could be relevant to them, in the next section I argue that the failure to make sense of consciousness calls into question the widespread practice in social science of explaining human behavior by reference to “intentions,” which I liken to the

élan vital of the early 20th century vitalists – an idea universally rejected today as unscientific. With this question providing a reason for setting off, I then turn in the rest of this chapter to previewing where I propose to go.

SOCIAL SCIENCE AND THE MIND-BODY PROBLEM

The Causal Closure of Physics

Social science is subject to a physics constraint: no entities, relationships, or processes posited in its inquiry should violate the laws of physics. Known in philosophy as the “causal closure of physics” or CCP,¹ this principle accords physics a fundamental status with respect to all the other sciences, which today are often collectively called the “special” sciences to signify their subordinate status.² Among the latter, at a working level the CCP is almost universally accepted in the physical and biological sciences.³ A chemist or biologist who posited entities, relationships, or processes that violated the laws of physics would quickly find their claims dismissed as pseudo-science. The situation may appear less clear in the social sciences, where skepticism toward “social physics” abounds and some reject the natural science model for social inquiry altogether. Such skepticism notwithstanding, I will argue in a moment that in practice the CCP is almost universally accepted in the social sciences as well. But before defending that perhaps provocative claim let me prepare the ground by mentioning two controversial ideas that accepting the CCP does *not* commit us to.

First, the causal closure of physics does not mean that social scientific theories must be *reducible* to physics, in the sense of being able to replace their laws with the laws of physics without loss of explanatory content. Such reductions have proven elusive even in the physical and biological sciences, the objects of which are often much closer to

physics in scale and complexity than human beings. If even chemistry isn't reducible to physics, then all the more reason to think political science won't be. Indeed, far from being reducible our knowledge of the world is quite "dappled," in Nancy Cartwright's suggestive image, growing – changing metaphors – archipelago-like in little islands of understanding, each with their own flora and fauna living in mostly splendid isolation.⁴

However, as Lawrence Sklar argues in response to Cartwright, it is important not to confuse the epistemological point that our knowledge of the world is fragmented with the ontological claim that the laws of physics *do not apply* to the whole world.⁵ After all, all macroscopic objects are somehow made up of the elementary constituents described by fundamental physics,⁶ and as such "the laws of the fundamental theory are *as true* of these objects as they are of the carefully isolated systems of small numbers of particles constructed in the laboratory."⁷ To be sure, the laws of physics, by themselves, explain very little human behavior, so *much more* must be true in the social sciences than what the fundamental theory can tell us – but those additional truths cannot force elementary constituents to violate *their* laws. So while the CCP does not imply reductionism, it does insist that the micro level physically constrains what is possible at the macro.

Second, the causal closure of physics also does not commit us to the causal closure of *the physical*, or the doctrine of *physicalism*, the orthodoxy in philosophy of science today. The CCP and physicalism are frequently, even routinely conflated,⁸ but it will be important below to understand that they are not the same. Physicalism is the modern expression of what for centuries was called materialism. Materialists held that reality is ultimately purely material, understood as the hard little bits of matter (and later also energy) described by classical physics. With this claim materialists opposed not just

traditional theism, which gave God a temporal role, but also all doctrines that would give mind or consciousness a fundamental status, like idealism, dualism, and panpsychism; for materialists, in the end everything is just matter in motion. However, materialists were eventually failed by their physicist allies, who with the discovery of quantum physics in the early 20th century found that the classical idea of matter as little bits of localizable stuff broke down at the sub-atomic level, and had to be replaced by ghostly potentialities called wave functions. While it might be thought that this failure – a falsification, really – would have dealt a death blow to materialism, materialism has instead morphed into “physicalism.”⁹ Physicalists retain their forerunners’ opposition to theism and doctrines that give mind a fundamental status, but defer to the ongoing inquiry of physics about what precisely the fundamental level looks like. In effect, reality is “whatever physics says there is” – whence physicalism’s easy conflation with the CCP.¹⁰

The problem with this conflation is not only that physicalism lacks a stable, falsifiable definition of ‘physical,’ a difficulty noted by some physicalists themselves.¹¹ The problem, as Barbara Montero has convincingly argued,¹² is that unlike the classical physics of old-fashioned materialism, quantum physics does not rule out the possibility that mind is indeed a fundamental feature of reality – it does not demand that conclusion, as yet, but neither does it preclude it. As such, to define the physical as “whatever physics says there is” is to beg the question against non-physicalism, and thereby to trivialize physicalism itself. To exclude that possibility physicalism should therefore be understood as the doctrine of “No Fundamental Mentality,” which a future physics might *or might not* confirm. And since that is how materialism was more explicitly understood, unless otherwise noted I will use ‘physicalism’ to mean ‘materialism’ below.

So accepting the causal closure of physics commits us neither to reductionism nor to physicalism – all that we have to accept, is that social life is constrained by the laws of physics. Put that way it seems difficult to disagree, since consider what doing so would mean: that social phenomena are brought about by forces to which the laws of physics do not apply. But in that case, given that everything in the world is made up of the stuff of physics, what – or perhaps *where* – are these extra-physical forces? In super-natural realms perhaps, but in that case they are beyond the realm of science. Insofar as we are committed to something like a *science* of social life, therefore, the laws of physics constitute basic constraints within which our inquiry must proceed.

Although that might still seem provocative, I think almost all social scientists today would at least implicitly agree. This seems clearest in the case of the majority positivists, a diverse group who nevertheless share a belief in naturalism, according to which there are no *essential* differences between the social and the physical sciences.¹³ Thus, while overt “physics envy” is a thing of the past, still today when they think about what defines their work as science rather than fiction, it seems likely that most positivists would agree with their colleagues in the natural sciences who take physics as the ultimate authority and constraint.

However, another diverse group of social scientists, interpretivists reject naturalism on the grounds that intentional phenomena – reasons, meanings, institutions, and so on – play a central role in human social life, and do not seem to be causes in the traditional, physical sense. As such, if we want to capture the specificity of social life – what makes it different than the objects of chemistry or geology – then physics will at the very least be of no help, and might be positively misleading.

Yet, I know of almost no interpretivist who would claim that their account of social life violates the laws of physics, or that such violations are legitimate in such work. Consider theistic arguments about God's putative intervention in the world. Whatever their private beliefs about God, with respect to their scholarship virtually all interpretive social scientists seem to agree with positivists on the principle of "methodological atheism," which rigorously brackets the question of God's reality and temporal role.¹⁴ As Juergen Habermas puts it, "a philosophy that oversteps the bounds of methodological atheism loses its philosophical seriousness."¹⁵ Similarly, no interpretivist embraces in their work the claims of astrology, divination, or other pseudo-sciences that contradict the laws of physics – or, for that matter, of ESP, the reality and physical basis for which is at least open to scientific debate.¹⁶ Indeed, to my knowledge none has even considered the possibility of either backwards causation or action at a distance in social life, two deeply counter-intuitive ideas that have nevertheless received serious consideration by philosophers of physics. Notwithstanding their hostility toward naturalism, in other words, it seems that interpretivists too at least implicitly accept that if physics tells us that something is impossible, then it is, indeed, impossible.

And why shouldn't they? Social life involves material bodies, which no one would deny are governed by the laws of physics; it involves speech and hearing, which are equally governed by such laws; and it involves media of communication, which are governed too. Intentionality might not be reducible to the language of physics, but that should not be taken to mean that it could be inconsistent with physics, since again where then would it be? While often seen as *anti-naturalist*, therefore, interpretivism from this perspective looks more like *naturalism-plus* – an acceptance, with positivism, of the CCP

at the level of fundamental ontology, combined with other arguments designed to get at the specificity of social life.

The Mind-Body Problem and Intentional Explanation

Even if the causal closure of physics is accepted, however, social scientists may argue that its constraint is so distant as to be irrelevant to the content and/or practice of their work. Positivists are interested in the behavior of human beings, who are vastly more complex than elementary particles, and subject to relatively autonomous laws. And even if interpretivists concede that their theories are constrained by physics, so what? It still seems to have nothing to say about intentional phenomena. Accepting the CCP may be a condition for rational inquiry into the social world, but if we want to make progress in that inquiry we need to worry about problems of social science, not physics.

Against such healthy skepticism, I want to suggest that the CCP does pose a challenge to social science, by way of the mind-body problem. To get this argument off the ground I proceed in three stages. First I define the mind-body problem, in the course of which I also address my central concern in this book, consciousness. Then I make the connection to social science by arguing that consciousness is presupposed by intentional phenomena, which interpretivists and positivists alike routinely invoke in their social explanations. And finally, I draw a worrisome inference: that if consciousness cannot be reconciled with the CCP, then intentions have no more place in social science than the *élan vital* does in biology. Far from being of only philosophical interest, this would make the mind-body problem a fundamental problem of social science as well.

The Mind-Body Problem. The mind-body problem is really several problems, only one of which concerns me below. In particular, philosophers today often distinguish

between what David Chalmers has famously called the “easy problems” and “the hard problem.”¹⁷ In both cases “the problem” is framed by the CCP: namely, how to explain mental states by reference to brain (taken to be purely physical) states alone, but they deal with different aspects of the mental. Difficult as they are, what makes the easy problems at least easier is that they concern the functional aspects of the mind, or what the mind *does* – pattern recognition, information processing, cognition and so on – which there is little reason to think cannot eventually be explained physically. After all, computers process information and thus engage in a kind of cognition, and there is no suggestion that computers are not entirely physical. Insofar as the mind is like a computer, as the dominant computational theory of mind would have it, we can therefore plausibly hope that future advances in neuroscience will also unravel the mysteries of human cognition. Indeed, some of these, like the recent discovery of “mirror neurons,” are already having an impact on social science, where a “social neuroscience” is starting to emerge.¹⁸

The hard problem, in contrast, is explaining *consciousness*. As a concept ‘consciousness’ is much contested, and confusingly some philosophers use it to describe the functional aspects of the mind just noted.¹⁹ Following Chalmers and others, however, I shall use the term more narrowly to refer only to the *experiential* aspect of mind, the feeling that there is “something it is like” to be conscious.²⁰ As a social scientist two features of this experience will be of particular interest to me below: our experience of making things in the world happen, or what philosophers call “mental causation,” and our experience of free will, which underpins our moral and legal codes. But in the present context such anthropocentric notions are best set aside, since consciousness *per se* does not imply *self*-consciousness, or a realization that one is conscious, just the kind of raw

feeling one might attribute to a dog or newborn child. What is at issue here is not reflexivity, but the more primitive experience of interiority or subjectivity itself.

Explaining consciousness is “hard” because neuroscience, and the physics on which it ultimately rests, describes an objective and what seems to be purely material world, and it is unclear how such a world could ever give rise to subjective experience. As Joseph Levine has put it, there seems to be an irreducible “explanatory gap” between the objective physical description provided by neuroscience and the subjective experience of that description.²¹ A famous thought experiment by Frank Jackson makes the problem especially clear.²² Mary has lived her entire life in a black and white room, but as a brilliant neurophysiologist she knows everything there is to know about the physics of color and vision. If one day she were freed from her prison and could see red for the first time, would she learn anything new? Although philosophers continue to debate the point, intuitively the answer seems to be yes – she would *experience* red in a way that does not seem reducible to her knowledge of physics alone. “Even if we knew every last detail about the physics of the universe ... that information would not lead us to postulate the reality of conscious experience.”²³ This suggests that the hard problem is rooted not just in today’s inadequate understanding of the brain, but in something deeper.

When confronted with this problem many social scientists I’ve talked to respond that, whatever the details, consciousness must somehow be an “emergent” phenomenon. But while it has its advocates, emergence theory has not proved an easy sell among philosophers of mind. The concept of emergence is controversial even in the physical sciences,²⁴ where there is no question that the phenomena in question are at least purely *physical*, and thus somehow of a piece with physics. But in the context of the mind-body

problem what has to emerge seems to be more than purely physical – subjectivity from objectivity. Given this additional explanatory burden critics of emergence theory argue that whatever the status of such thinking in chemistry, in the case of consciousness it boils down to “...and then a miracle happens,”²⁵ which hardly seems satisfactory.

In short, whatever progress has been made on the easy problems of mind, on the hard problem it seems *none* has been made. Or at least that is what I take away from philosopher of mind Jerry Fodor’s assessment of his field, when he says that

“[n]obody has the slightest idea how anything material could be conscious.

Nobody even knows what it would be like to have the slightest idea about how anything material could be conscious. So much for the philosophy of consciousness.”²⁶

Given this level of ignorance – after centuries of hard philosophical effort no less – it is surprising that physicalism could remain such a hegemonic starting point for thinking about the mind-body problem.

But be that as it may, if we are to retain this starting point then it seems that the ontological status – the reality – of consciousness must now be put into question, because if physicalism is true then on the evidence so far there is no place for it in the scientific worldview. In short, consciousness cannot exist. And indeed some philosophers have recently bitten this bullet, arguing that our subjective experience of the world (including, for good measure, of free will) is all an “illusion.”²⁷ That may be right, but given the centrality of experience to the human condition – after all, without it we wouldn’t *experience* our condition at all! – most philosophers seem still to hope that a more satisfying but still physicalist answer will eventually be found. In the meantime, we are

left with “two incompatible ontologies ... the ontology of subjectivity and free agency, on the one hand, and that of things or objects and their relations in the external world, on the other.”²⁸ It’s not for nothing that consciousness is widely seen as one of the deepest mysteries facing the modern mind.

Consciousness and Intentionality. But is it a mystery that need concern social scientists? Judging from the infrequency with which we invoke consciousness in our work one might be tempted to say no.

On the positivist side the goal is always to make social science as generalizable and as objective as possible, whereas subjective experience is inherently idiosyncratic and not directly accessible to third-person inquiry. At its most extreme positivism took the form of behaviorism, which eschewed reference to mental phenomena altogether in favor of observable behavior only, but since the cognitive revolution in psychology most positivists seem willing to attribute desires, beliefs, and other unobservable cognitions to human beings. However, the fact that these cognitions might be *conscious* seems to do no work in positivist theorizing, and is almost never remarked upon except perhaps as a methodological problem to be overcome on the way to objective social science. As such, positivist social science seems very much to reflect the “taboo on subjectivity” that XXXX Wallace argues characterizes 20th century science more generally.²⁹

On the interpretive side matters are less clear, but here too there seems to be a generalized reluctance to thematize consciousness (or subjectivity) as such. Less clear because interpretivists are all about language and meaning, which seem connected to subjectivity. But outside psychology, where there is a long-standing phenomenological tradition that takes subjectivity seriously,³⁰ with the exception of minority schools like

Austrian economics, the phenomenological sociology of Alfred Schutz, and perhaps a few others – most interpretive scholars in the social sciences emphasize *inter*-subjectivity rather than subjectivity per se. Although it would take me too far afield here, for those who know their work consider in this respect Wittgenstein, Foucault, and Habermas, three giants of interpretive scholarship – each in different ways trying to get away from the “philosophy of the subject,” which they see as a bankrupt Cartesian project.³¹ While perhaps not “taboo,” therefore, there seems to be at least a serious ambivalence among interpretivists about the ontological status and explanatory role of consciousness, such that like their positivist colleagues many interpretivists do not feel a pressing *need* to make it central to their theorizing.

While most social scientists might not be interested in consciousness, however, many of them, positivists and interpretivists alike, *do* care about intentional states, which I want now to argue presuppose consciousness. If so, then a large swath of contemporary social science rests on at least implicit assumptions about consciousness and its relationship to the material world.

Intentionality is the sense in which mental states are intrinsically “about” or directed toward something beyond themselves, whether objects in the world, fictional objects in the mind, or the mental states of other people.³² This is in marked contrast to the non-intentional states that make up objects lacking minds; the physical states that constitute rocks or glaciers, for example, are not “about” anything. Although social scientists do not often reference this technical, aboutness definition of intentionality, our more common sense usage implies it. Thus, in positivist scholarship intentionality is often taken to mean that human behavior is purposive or goal-directed. Here, as in

rational choice theory, intentionality refers to a desired *but not yet attained* end-state toward the achievement of which action is oriented. In interpretivist work one is more likely to find intentionality defined in terms of meaning, which refers to the significance of something *for a particular subject*. But in both cases, intentionality is understood as being about an actor's relationship to a real or imagined world beyond itself.

Social scientists today routinely invoke intentional states in their accounts of social life. This does not mean that explaining intentional action is always the goal of their inquiry, since much of what social scientists do is study *unintended* consequences – but those are only meaningful as such in relation to an assumption that human behavior is intentional. Even self-consciously non-intentional approaches like macro-structural and evolutionary social theories typically assume intentionality at the micro-level, and insofar as institutions are *collective* intentions, intentionality may be present at the macro-level as well.³³ This pervasiveness of reference to intentions in social science is not surprising, since in everyday life and the law too it is widely assumed that human action is, usually, intentional. A social science that did not accommodate this understanding would be an odd and impoverished science indeed.

Attributions of intentionality become a *problem* for social science, however, if they presuppose consciousness, the ontological status of which by virtue of the mind-body problem is in doubt. There is considerable debate among philosophers about how to understand the relationship between consciousness and intentionality, with four main positions in the literature: 1) that consciousness derives from intentionality, 2) that it is underived and separable from intentionality, 3) that it is underived but inseparable, and 4) that it is underived, inseparable from and essential to intentionality.³⁴ Since there are

thoughtful arguments on all sides (else there wouldn't be a debate), rather than try to argue the case here I am simply going to stipulate on intuitive grounds that the fourth view is correct. Namely, that “consciousness is the irreplaceable source of intentionality and meaning” (Siewert, p. 17), or as John Searle puts it, “only a being that could have conscious intentional states could have intentional states at all.”³⁵

This seems the most intuitively plausible position because it is the only one that clearly precludes machines from having intentional states. Human beings might program a machine to act *as if* it were intentional – in the way a thermostat may be said to be goal-directed – but the real intentionality resides in the designer, not the thermostat. Note that this is not to deny the possibility of unconscious intentions, as long as they can be made at least potentially conscious.³⁶ And nor is it to deny collective intentions, which are grounded in (if not necessarily reducible to) individual intentions, and so are derivatively tied to consciousness. Rather, it is to say only that where there is no consciousness there can be no intentionality. By extension, if social scientists today assume that human beings are intentional, then they are assuming we are conscious as well.

That would not be controversial, I take it, but for the mind-body problem, which puts the ontological status of consciousness into question. It is as a direct result of this question that we get the long-standing and rancorous epistemological debate between positivists and interpretivists about whether social science is essentially different than physical science, and thus whether our goal should be Explanation or Understanding.³⁷ Although the naturalism debate has often focused on what to do with meaning and intentionality rather than consciousness *per se*, if my stipulation here is correct then this debate is nothing other than a local manifestation of the larger mind-body problem. In

this light one might say then that the social sciences as a whole are characterized by an implicit mind-body dualism, with positivists and interpretivists each embracing one of the two seemingly incompatible ontologies referred to above.

The Threat of Vitalism. Fortunately, this philosophical dualism at the collective level has not prevented individual social scientists from going about their work, whether by simply choosing one side as a guide and getting on with it, or (more rarely) trying self-consciously to integrate positivism and interpretivism. While that might suggest that the mind-body problem really *doesn't* matter to social science, after all, what I want to argue now is that in view of the foregoing discussion the problem goes deeper, into our work itself. The questionable reality of consciousness with which we are left by the hard problem suggests that intentional explanations are of questionable legitimacy as well.

The analogy I would propose here – though I'll suggest below it may be more than an analogy – is between intentional explanation and vitalism. Vitalism is a theory of what makes life “life,” and was widely held in scientific and philosophical circles in the 19th and early 20th centuries. Against their materialist contemporaries, vitalists argued that the only way to account for the nature, form, and functioning of life is to posit a non-material *élan vital* or “life force” which cannot be reduced to the material constitution of biological bodies.³⁸ Materialists were of course withering in their philosophical criticism of such ideas, but what probably really turned the tide against vitalism were revolutionary advances in biology, including genetics, which seemed to eliminate the explanatory need for an *élan vital*. (The political appropriation of vitalist ideas by fascists probably didn't help either). As a result, there are few relatively recently respectable ideas as discredited today as vitalism, which is considered pseudo-scientific and has almost no adherents.³⁹

What makes vitalism instructive in the present context is that two of the main reasons that scientists and philosophers today reject it as unscientific seem to apply to intentional explanations as well. First, on the level of epistemology, we have no direct empirical evidence for the *élan vital*, which was thought to be inherently unobservable. Similarly, there is no publicly available empirical evidence for consciousness (and thus intentions) either, which seems to be inherently private. To be sure, scientists routinely include unobservable entities in their theories, and realists have built an entire philosophy of science around the assumption that we can know such entities at least theoretically, if not empirically. But this is where the second, ontological critique of vitalism comes in. As an explicitly extra-physical phenomenon the *élan vital* seems to conflict with the CCP (or at least with the physicalist rendering of the CCP). It's not just that we can't see it there because it's unobservable; the *élan vital* can't *be* there because physics seems to tell us no such thing could exist.⁴⁰ Similarly, if consciousness can't be reconciled with the CCP then it can't *be* there either, first-person experience notwithstanding.

These epistemological and ontological similarities suggest at least a strong analogy exists between the status of consciousness in modern science and the debate a century ago over the *élan vital*. Indeed, Daniel Dennett has recently used this analogy to argue against those, like David Chalmers, who think that physicalism will never explain consciousness, by suggesting that if that were true then vitalism would be true as well – and since we all know that vitalism is false, a physicalist view of consciousness must be true.⁴¹ For his part Chalmers rejects the analogy, arguing that the vitalists were trying to explain only the form and functioning of organisms – analogous to the “easy” mind-body problems – which we subsequently learned could be explained by material conditions

alone, and that there therefore simply is no “hard problem” of life analogous to the hard problem of consciousness. But that is not so clear. On the historical side, Brian Garrett shows that at least some vitalists were very much concerned with more than just the form and functioning of organisms, but the nature of life itself.⁴² And today, notwithstanding the dramatic advances in the biological sciences purporting to make vitalism unnecessary, it is striking that there is still no consensus among materialists on what precisely life *is*, suggesting that there in fact is a hard problem of life.⁴³ As such, I take Dennett to be right that the two debates are isomorphic.

If so, then from a physicalist perspective positing intentions to explain human behavior is like positing an *élan vital* to explain life. And indeed, this is the explicit implication of at least two physicalist perspectives on intentionalism in social science. One is old-style behaviorism, which eschews reference to intentions on epistemological grounds as invoking causes that cannot be known scientifically. And like Dennett, B.F. Skinner makes an analogy to vitalism, arguing that “mentalism” is to psychology what vitalism is to biology (and for good measure, what animism is to physics).⁴⁴ The other, more recent perspective is the “eliminative materialism” of Patricia and Paul Churchland and their followers, which envisions the eventual replacement of intentionalist “folk psychological” theories of human behavior with proper materialist explanations that refer to brain states alone.⁴⁵ From perspectives like these, intentional “explanations” are at best pre-scientific placeholders until real science comes along, in the light of which they will be seen in the future to be as pseudo-scientific as vitalism is today.

It might be objected that this analogy to vitalism seems to presuppose a realist epistemology, in which the goal of scientific inquiry is to disclose the world as it really is.

From a realist standpoint to invoke intentions in social theories is also to *posit* them as at least provisionally real, and as such entails an ontological commitment to the reality of consciousness that may be vulnerable to the vitalism analogy. But many social scientists today adhere to non-realist epistemologies, whether in the form of post-structuralism on the “left” or empiricism and pragmatism on the “right.”⁴⁶

Consider, for example, how an empiricist or pragmatist might think about intentional explanation. On their view, theory should be judged not by how well it discloses the world as it really is, which cannot “really” be known, but by how well it enables us to predict, solve problems, or otherwise get by in the world.⁴⁷ Theory is a useful tool or instrument, not something we have to take as literally true. This gives social scientists the freedom to explain social life *as if* people had intentions, without committing us to their reality. And that is evidently *useful*, because one of the main reasons that behaviorism was largely abandoned is that the explanations behaviorists came up with were mostly trivial. By admitting into their theorizing intentions – which it may be conceded are indeed “fictions” in an ontological sense – social scientists have made significant progress in understanding social life, which would be lost if intentional explanations were ruled out *a priori* while we waited, perhaps decades, for materialist explanations to be found. It is precisely to avoid such premature theoretical closure that while adhering to the unity of the sciences in the broad sense, naturalists also believe that the causal claims of the “special sciences” should be taken at face value.⁴⁸ Whatever the problems for realist views, in short, from a non-realist, “as if” perspective social scientists need not let themselves be bullied by philosophers into giving up one of their most powerful explanatory weapons (intentions), analogies to vitalism or no.

Indeed, one might press this objection further against the whole idea of a supposed physics constraint on the special sciences, by pointing out that even in the physical sciences it is common to make assumptions, like ideal gases and frictionless planes,⁴⁹ which are *explicitly fictional* and thus “violate the laws of physics.” Many areas of the physical and social sciences revolve around the analysis of simplified or idealized models that everyone knows do not correspond to reality (like rational choice theory, for example). If fictions are essential to the practice of science, as Hans Vaihinger argued in his “philosophy of the As If,”⁵⁰ then why should social scientists eschew reference to intentions just because we have not (yet) found a way to reconcile consciousness with physics? As long as such references are useful in advancing social scientific knowledge, then from this “neo-instrumentalist” or “pragmatist” perspective⁵¹ they should be countenanced just like any other scientific fiction.

While pressing for a liberal attitude toward the use of fictions in science, Vaihinger and his contemporary followers are nevertheless concerned to hold the line against *unscientific* fictions in science,⁵² and here the vitalism analogy continues to have force. For what constitutes a “scientific” fiction? This has not received much attention in the fictionalism literature, but part of the answer is presumably explanatory utility: if it is useful then it is legitimate. However, that can’t be the whole story, because the *élan vital* is certainly *useful*, if not for explaining the form and functioning of organisms (the “easy” problems of life) then for explaining life itself (the “hard” problem), the riddle of which materialists themselves have not solved. Yet, in today’s debate about the nature of life vitalism is never considered a legitimate position, even as a convenient fiction. That may

be because of a second consideration, which is that it is impossible to test experimentally for a phenomenon that is supposed to be not just unobservable but non-physical.

However, that seems to beg the question against vitalists and as such highlights what I think is really going on here, which is that fictions are considered scientific if they are *physical* fictions. As Peter Godfrey-Smith puts it with respect to fictionalized models in science, “each model system itself is something that would be concrete if real; it would be an arrangement of physical entities.”⁵³ It’s as if the laws of physics were different, but *still laws of physics*. And that is precisely the problem with intentions, which is that it is unclear how they could be reconciled with *any* laws of physics, real or imaginary. From both a pragmatist perspective and a realist one, in short, intentions seem not to deserve a place – even a fictionalized place – in science, any more than the *élan vital*.

Where Does This Leave Us?

My point in raising the threat of vitalism is not to suggest that intentional explanations should be abandoned as unscientific – quite the contrary. There are at least two good reasons to keep them in social scientists’ tool-kit. The first is that they often work better than the alternatives. Purely behaviorist explanations have explained little, and neuroscientific explanations are still in their infancy (and even when they mature what about Mary?). By attributing intentions to people, in contrast, social scientists have been able to develop sophisticated theories that seem to explain a good deal of human behavior (e.g. rational choice theory). Moreover, such explanations are also used widely in everyday life, without which it is difficult to imagine how we might get by with our fellow human beings. So even if eventually intentional explanations are replaced by

something “more scientific,” a taint of vitalism alone should not induce social scientists to give up an explanatory tool that, at present at least, appears indispensable.

The other reason to keep intentional explanations is ethical. It is through attributions of intentionality that the actual subjects of social science – experiencing, feeling *conscious* individuals – make an appearance in our work. Insofar as we think of social science being addressed to those subjects, in the form of normative implications for their behavior, for example, it seems important that their subjectivity not be written out of the picture altogether – for otherwise who are we talking to? As the German philosopher Manfred Frank puts it, “with the naturalization of subjectivity a version of the categorical imperative loses its addressee.”⁵⁴ And the problem is not just with the categorical imperative. I take it that part of the point of all scientific inquiry is to confer meaning on events, by taking what seems otherwise inexplicable and fitting it into a pattern that is relevant to particular subjects. If so, then it could be argued that social scientists have a *responsibility* to keep intentionality in the mix, since humanity can’t count on physical scientists to do so, who in their relentless pursuit of objectivity have given us a picture of the world without subjectivity in it. Which is to say, without *Us* in it, for being conscious is at the very heart of being human, and something that few of us would give up if we had the choice.⁵⁵ One of the consequences of the mind-body problem is that as long as there is no place for consciousness in the natural order we’re “not at home in the universe.”⁵⁶ This is not a problem social scientists can solve, but by keeping the flame of subjectivity alive in their own work they can at least remind us that there is someone looking. The challenge, then, is not to abandon intentional explanations but to justify them as more than pseudo-science.

THE ROAD TO QUANTUM CONSCIOUSNESS

A problem like this shouldn't exist. By that I don't mean there shouldn't be hard questions to which we don't yet know the answer; there are plenty of those, like the cure for cancer or global warming. Rather, I mean that with the mind-body problem we don't even know what a solution would look like. It does not seem to be a matter merely of awaiting better neuroscience, since even a perfect understanding of the "neural correlates of consciousness" would still not tell us why *any* physical structure would be conscious (the "explanatory gap").⁵⁷ So although future neuroscience will undoubtedly yield many insights into the material basis of consciousness, solving the mind-body problem will also require a philosophical intervention.

Faced with a long-standing philosophical impasse, one is tempted to take the path of Wittgenstein, who argued that the mind-body problem is not a genuine problem at all, but a pseudo-problem generated by misleading language we use to talk about the mind. In particular, with his argument against the possibility of a private language Wittgenstein criticized the reification of consciousness as an interior thing or mental object, separate from its expression in the world, which then produces the apparent puzzle of how this thing relates to the world causally. On his view, mind and behavior should be seen as internally or conceptually related, not causally. This is not a denial of subjective experience per se, but a reminder that whatever sense we can make of subjectivity is intimately bound up with what can be said publicly or *inter*-subjectively.⁵⁸ The task of philosophy is thus to strip away the linguistic confusions that prevent us from seeing this, so that consciousness is no longer seen as a problem requiring a "solution."

Wittgenstein's and others' ideas about the internal relation between thought and action will have important uses later in my argument, but like many I am not persuaded that there is not a genuine problem here. If we accept that physics is causally complete, then it seems like a fair and meaningful question to ask how consciousness could exist in such a world, whereas the *élan vital* does not. Such a question does not require treating consciousness as a thing or object, and indeed in Chapter Three I will conceptualize it as a process. But this process seems totally unlike conventional physical processes, since it involves an experience of interiority that cannot be reduced to inter-subjectivity – even if it cannot be meaningfully expressed without it either. How is such a process physically possible? Why should there be any *experience* of the world at all? The question seems likely to remain even after linguistic confusions are stripped away.

Still, a proper engagement with Wittgenstein's powerful analysis would require a lengthy discussion for which I am hardly qualified, and in the end he may be right. But since part of the reason one might travel his road is because the others all look like dead ends, before we give up on the mind-body problem and just go home – and forgo possible new insights as a result – it makes sense to consider whether there really is no other path. So I propose to press on, by treating the problem as genuine, but tackling it in way that to my knowledge Wittgenstein did not consider.

There is an analytical technique or stratagem⁵⁹ that when philosophical debates persist unproductively for a long time, to gain traction one should look at what the sides have in common. In the mind-body problem a key, generally unstated assumption shared by the two main historical protagonists (at least), materialism/physicalism and dualism, is that the nature of the body – matter – is clear, and so “the problem” is only with the mind.

Specifically, it has been taken as common sense that the material world is completely and only *material*. This common sense stems from both our experience of ordinary physical objects as things with mass and extension but no apparent subjective interior; and from the emergence in the 17th century of classical physics, which described a universe of physical objects with great success.

The traditional view of matter *is* common sense, but with the quantum revolution in the early 20th century we now know that it is wrong. Indeed, it is not just our idea of matter that is wrong, but the whole worldview to which classical physics gave rise. This worldview assumed that: 1) everything in reality consists ultimately of matter and (later) energy (materialism); 2) matter can be separated into tiny bits (atomism); 3) all causation is local and transmitted by relations of force (mechanism); 4) everything that happens had to happen (determinism); and 5) objects exist independently of subjects' perception of them (objectivism). As I show in the next chapter, quantum physics calls these beliefs deeply into question, by suggesting that: 1) at the sub-atomic level classical matter disappears and its place is taken by "wave functions"; 2) wave functions are entangled with each other and so the universe is fundamentally holistic; 3) non-local causation is possible and not about force; 4) indeterminism is rampant; and 5) subjects and objects cannot be clearly distinguished from each other before they interact.

I say quantum physics *suggests* these things because unlike classical physics, it is by no means clear what precisely it is telling us about the deep structure of reality. The question has been the subject of intense philosophical debate for over 75 years between advocates of over a dozen semi-official "Interpretations" of quantum mechanics. One of the main issues in this debate is, given what quantum theory shows us experimentally,

which (if any) assumptions of the classical worldview can be salvaged, and at what metaphysical price. Thus, for example, despite the apparent breakdown of classical matter at the sub-atomic level, quantum theory does *not* show that materialism (in the minimalist sense of No Fundamental Mentality) is false; but as we will see in Chapter Two it does force those who would continue to defend that assumption to accept some very radical consequences – like multiple universes in the “Many Worlds” Interpretation. And so it goes for every other interpretation, each of which makes different metaphysical trade-offs but end up being equally wild from a common-sense point of view. Regardless of which interpretation one finds personally most compelling, however, what the very existence of such a debate shows is that the nature of matter is no less mysterious than the nature of mind. In the mind-body problem, in short, we have not only a mind problem but also a “body problem.”⁶⁰

Materialists and dualists might say not so fast, for the problem of mind takes place on a macroscopic scale far, far above the quantum level, a scale where matter still has its familiar properties and classical physics remains a valid description. It’s not that quantum theory doesn’t apply to the macro level, since it applies everywhere; the whole universe is quantum. But as a result of a phenomenon known as “decoherence,” except in very special and highly controlled conditions, wave functions “collapse” or decohere into classical particles as soon as they interact. The quantum effects are still there, but with zillions of interactions in just a single grain of sand their significance completely washes out in a statistical sense. This is why the macroscopic world appears to us as it does – classical.

Echoing and reinforcing this conventional wisdom, contemporary neuroscience is based on the “neuron doctrine,” which assumes that the smallest unit of the brain relevant to the explanation of consciousness is the neuron – smaller than a grain of sand perhaps (there are about 100 million in the average brain), but many orders of magnitude larger than sub-atomic phenomena, and themselves unbelievably complex. (A typical neuron consists of tens of millions of microtubules, themselves consisting of tens of millions of dimers – and at which point we are *still* not on the quantum scale). So even if matter in the ultimate, quantum sense is not really “matter” anymore, the kind of matter relevant to the mind-body problem still is.

But what if this orthodoxy is wrong? What if the physics of consciousness is not classical, but quantum?⁶¹ (That it has to be one or the other is an important point, but this is best dealt with in a footnote).⁶²

That is the radical suggestion of a small but growing number of neuro-scientists and philosophers, who since the early 1990s have been developing what has become known as the “quantum consciousness hypothesis” (QCH). The hypothesis actually has two distinct parts – a scientific claim about the brain, and a metaphysical assumption about consciousness.

Quantum Brain Theory

The scientific claim is that the brain is able to sustain quantum coherence – a wave function – at the macroscopic, whole brain level. How the brain might do this is not agreed on even by defenders of the QCH, who have explored the possibility from several different angles. Most well-known is the bottom-up model of Stuart Hameroff and his colleagues, who argue that the purpose of all those millions of microtubules and

dimers within each neuron (combined with “quantum tunneling” between neurons), is precisely to prevent decoherence, by channeling quantum states upward from the sub-atomic level to the brain.⁶³ In contrast, Herbert Frohlich, Giuseppe Vitiello, Kunio Yasue and Mari Jibu, Henry Stapp, and others have developed more top-down models working from the meso- or even macro-level.⁶⁴ The particular mechanisms postulated by different versions of quantum brain theory seem relatively independent, so that some claims might be right even if others turn out to be wrong; but their overall conclusion is the same – that the brain is quantum. Thus, while there is as yet no unified theory of the quantum brain, there is enough coherence, so to speak, among the various candidates for those of us on the outside to worry less about which particular model is correct than about the implications should at least one of them prove to be.

Whether quantum brain theory might be true is highly speculative and deeply controversial. Speculative, because with current technology it is almost impossible to test the idea; controversial, because orthodoxy tells us *a priori* that it is impossible to sustain quantum coherence in something as warm, wet, and complex as the human brain.⁶⁵ Despite the daunting empirical and theoretical challenges it faces, however, quantum brain theory has slowly attracted a growing number of advocates, and is now respectable enough to be included in some textbooks (albeit inevitably in a concluding chapter on “alternative approaches”),⁶⁶ and – if this is evidence of respectability – to be vigorously attacked by important critics. Two facts may help explain this growth. First, as yet we understand very, very little about how the brain works, especially below the neural level, so things that today we “know” are impossible might well turn out to be true – something that has happened more than once in the history of science. And second, there is simply

that utter lack of progress on the hard problem of consciousness when approached from a classical perspective. Thus, to skeptics who say there is no way quantum brain theory could be true, it seems equally reasonable to retort there is no way a classical theory of consciousness could be true either! On the principle that you can't replace something with nothing, therefore, until we know much more about the brain and its relationship to consciousness it makes sense for scientists to keep an open mind.

If quantum brain theory is true then the mind is essentially a quantum computer, rather than the classical computer envisioned by contemporary computational theories of the mind. However, that would not explain consciousness by itself, since there is still the question of why any material structure, even one as complex as a quantum computer, would be conscious. It is to this question that the second, metaphysical prong of the QCH is addressed.

Panpsychism

Panpsychism is the view that mind goes all the way down in matter to the elementary level – that matter is intrinsically *minded* rather than purely material. In this view panpsychism most obviously opposes materialism, but note that it also challenges materialism's traditional rivals of idealism and dualism. Against the idealist belief that mind is primary panpsychists see it as only an aspect of matter, not something to which matter can be reduced. And by the same token, although panpsychists agree with dualists that mind and matter are distinct and irreducible, they do not accept that matter is purely material (which dualism shares with materialism) and thus that mind is a substance over and above matter. Mind and matter constitute a duality, not a dualism.

How that duality should be conceived is debated by panpsychists, among whom we might distinguish two broad schools. For “dual-aspect” theorists mind-matter duality is simply a brute fact of nature, like matter is for materialists. For “neutral monists,” on the other hand, the duality is itself generated by an underlying reality that is neither mind nor matter. As we will see in Chapter Three, from a quantum perspective there are good reasons to favor the latter, neutral monist position.

As a philosophical doctrine panpsychism dates to Eastern religions and the ancient Greeks; indeed, if animism is counted as a form of panpsychism, then one might reckon it as humanity’s original, pre-philosophical ontology. But forms of panpsychism also find expression in the great philosophical systems of Spinoza, Leibniz, Schopenhauer, Peirce, Russell, and Whitehead (among others). Still, with the exception of Whitehead, after the mid-20th century panpsychism became completely marginal in philosophical debates, and is now routinely dismissed as absurd.⁶⁷ In part this reflects the deepening grip of materialism and the classical worldview on the modern imagination, since in classical physics there is neither a place nor a *need* – in the sense of otherwise unsolved problems – for assuming that matter is minded. With no independent, physical reason to make such an assumption, the case for panpsychism then seems to turn on its ability to explain consciousness, but in the view of skeptics this is *ad hoc*, circular, and non-falsifiable in much the same way as postulating the *élan vital* is to explain life.

Nevertheless, after years in which it was impossible to find even a single journal article on panpsychism, in the mid-1990s the number of scholarly publications on the topic started to increase dramatically. This work is coming from at least two sources. The first is purely philosophical arguments to the effect that the failure of materialism

(and dualism) to solve the mind-body problem – after all those centuries of hard work – means that panpsychism *must* be true.⁶⁸ The other, perhaps more surprising source is quantum physics. For unlike classical physics, there is a clear place in the formalism of quantum mechanics for the operation of mind – the collapse of the wave function – which has no apparent physical cause. Now whether this amounts to a physical *need* to embrace panpsychism would be very much contested by philosophers of physics, and in fact most interpretations of quantum theory make metaphysical trade-offs that allow them to retain a kind of materialism. Yet what is clear is that quantum theory *allows* for an assumption of Fundamental Mentality in a way that classical physics does not. And indeed, as we will see in Chapter Two panpsychist interpretations of quantum theory already exist and are taken increasingly seriously today, not just by philosophers but even by physicists.⁶⁹ As the well-known Freeman Dyson put it, “mind is already inherent in every electron, and the processes of human consciousness differ only in degree but not kind from the processes of choice between quantum states which we call ‘chance’ when they are made by electrons.”⁷⁰

To say that electrons have “minds” obviously raises big questions about what precisely this could mean, which I take up in Chapter Three. But of more immediate concern is that even if its interpretation of the physics is right, panpsychism still faces two important challenges: explaining how zillions of putative elementary minds in the brain combine into the unitary consciousness most of us experience day to day,⁷¹ and, conversely, explaining why then other macroscopic objects like rocks and trees are not conscious too (or are they?). This brings us back to quantum brain theory, since both questions would have ready answers if the brain can sustain quantum coherence. The

“combination problem” would be solved by the entanglement that is a constitutive feature of quantum coherence. In that case, a unitary experience could emerge not through some arrangement of elementary parts which otherwise retain their identities, as in classical accounts of emergence, but through the fusion of those identities themselves.⁷² By the same token, the “rock problem” – the standard objection to classical panpsychism – would be solved by the hypothesis that the physical structure of rocks and other inorganic objects does not enable them to sustain quantum coherence. Trees, on the other hand, as organic forms *would* be expected to exhibit quantum coherence,⁷³ and as such to be conscious (though what plant consciousness might mean is hardly less problematic than the proposition that electrons have minds!). Thus, while much more obviously needs to be said about these issues, my claim will be that not only does panpsychism answer the question of consciousness left by quantum brain theory, but quantum brain theory answers long-standing questions about panpsychism as well.

The Double Movement and the Promise of a Quantum Vitalism

In an epistemological sense, then, the QCH involves a kind of double movement toward the mind-body problem. There is a bottom-up movement through quantum brain theory, which projects known facts about quantum phenomena from the micro level to the macro; and a top-down movement through panpsychism, which projects known facts about the mind from the macro level to the micro. Beyond this difference in direction, moreover, the two movements also have interestingly different epistemological foundations.

Quantum brain theory is a scientific theory like any other, written from a third-person perspective and involving hypotheses about the physical world that in principle

are accessible to all. In this respect the epistemological basis for its claim to knowledge is familiar and widely accepted, even if the theory itself eventually proves to be wrong. Panpsychism, on the other hand, rests its claim to knowledge on *first*-person authority, on what you and I know certainly to be true (that we are conscious), but can never prove to each other because it involves an experience of interiority that is in principle inaccessible to other minds. While from a third-person perspective such first-person knowledge is not “knowledge” at all, given the inability of that perspective to account for consciousness panpsychists argue that the first-person perspective must be accorded epistemic standing as well. As Arthur Schopenhauer put it,

“...we ourselves are the thing-in-itself. Consequently, a way from within stands open to us to that real inner nature of things to which we cannot penetrate from without.”⁷⁴

Still, all this might seem ad hoc but for the fact that, as we will see in Chapter Two, our most sophisticated *physical* theory – quantum theory – poses the question of what to do with consciousness in a very direct way. As such, what the QCH suggests is that two of the deepest mysteries facing the modern mind – the problem of interpreting quantum mechanics and the problem of explaining consciousness – are related or even two sides of the same coin.⁷⁵ Although I will not be primarily concerned with the former problem here, I shall argue that putting them into conversation with each other enables us to bootstrap a solution to the latter.

Heading back now toward social science the QCH also puts the question of vitalism in a rather different light. Earlier I used the “threat” of vitalism to develop a *reductio* of materialism and intentional explanation: since we all know there is no such

thing as the *élan vital*, social scientific explanations which presuppose an unreduced consciousness, like intentional explanations, are no more scientific than vitalism. Now, in contrast, it appears that the vitalists were right all along: there *is* an irreducible “life force” inside organisms, quantum coherence, which constitutes an interiority that can only be known directly, as subjective experience, not objectively. As we shall see in Chapter Five, in this “quantum vitalism”⁷⁶ we end up philosophically with an updated and scientifically better-founded version of the *Lebensphilosophie* of Goethe and 19th century Romantics, a tradition that has since died out but whose ideas are echoed in the life-affirming worldviews of Nietzsche, Merleau-Ponty, Hans Jonas and others.⁷⁷ Such a perspective calls into question an assumption that the modern scientific worldview takes completely given, which is that all ultimate explanatory principles must be purely material and therefore “dead.”⁷⁸ By suggesting that interiority as quantum coherence goes all the way down (or up as the case may be), the QCH challenges this “philosophy of death,” and confirms the great physicist Eugene Wigner’s intuition that it is through biology that the problems of physics will ultimately be solved.⁷⁹ Far from justifying the exclusion of intentional explanations from social science, a quantum vitalism would be their basis.

TOWARD A QUANTUM SOCIAL SCIENCE

If something like this argument is true, then human beings⁸⁰ are literally walking wave-particle dualities, and therefore subject to a quantum rather than just a classical physics constraint. I say “rather than *just*...” because a classical constraint remains on the material functioning of our bodies, which interact with their physical environment in classical ways and whose operation can be destroyed by purely material forces, like the

kinetic energy of a bullet.⁸¹ But when it comes to what makes our bodies *alive* – their subjectivity, intentionality, and capacity for social behavior – the constraint would be quantum instead. This matters, because in the quantum world things can happen that are impossible in the classical, and as such quantum constraints on social life present also an *opportunity*, to discover in effect a new reality.

The main purpose of this section is to preview the arguments in Chapters Four and Five about what that reality might look like. However, to put these ideas in sharper relief I first want to set them against the backdrop of how contemporary social scientists understand their physics constraint. Recalling that the constraint must one or the other, the idea of a quantum social science will be more interesting to the extent that the conventional wisdom is classical.

Classical Social Science

How do contemporary social scientists understand the physics constraint on their work? Is it in fact classical? The question is complicated by two things. First, few social scientists today have written on what they take the physics constraint to be. This is not for want of philosophical reflection more generally, since almost from the start issues of ontology and epistemology have been deeply contested in the social sciences. But in this debate there has been little discussion specifically of our relation to physics,⁸² and so in answering the question of how social scientists understand the physics constraint we are forced to infer *implicit* understandings. Second, and perhaps in part for this reason, there may be tensions between those implicit understandings and our explicit research practice. I am thinking here in particular of intentional explanations, which I argued above amount

to a kind of vitalism that has no place in the classical worldview. So the practice of social science might honor a classical constraint less than our theories do.

Nevertheless, the one-word answer to whether contemporary social scientists feel bound by the classical worldview is, with suitable yet suggestive qualifications, by and large, yes. Historical and substantive considerations alike point to this conclusion.

On the historical side, substantial scholarship has been done showing that from their origins in the 17th century to their consolidation in the late 19th the nascent social sciences were deeply influenced by physics, the most successful and prestigious science of the day.⁸³ For both scientific and rhetorical reasons, the Founders – Hobbes, Hume, Smith, Comte, Jevons, Walras, Marshall, Pareto, and others – borrowed frequently and self-consciously from classical physics in their thinking about society. Bernard Cohen notes that this borrowing took a variety of forms – analogies, metaphors, homologies, and identities – and argues convincingly, that efforts to establish homologies and identities – the stronger possible connections between the two domains – usually failed, leaving the overt impact of physics on the social sciences mostly in the weaker form of analogies and metaphors.⁸⁴ But even if early borrowing from physics did not prove very fruitful at the level of substantive theory, at the deeper level of ontology and epistemology its impact was profound. By the early 20th century the metaphysical assumptions of the classical worldview – materialism, determinism, atomism, and the rest – were deeply ingrained in the minds of social (indeed, almost all) scientists. These ideas were taken to be a true reflection of reality, and thus fundamental constraints within which legitimate – i.e. “scientific” – social inquiry could be done.

That this history is still with us today is suggested by what happened next (or didn't). At the same time that the quantum revolution was transforming physics in the early decades of the 20th century, in the social sciences "physics envy" seemed to be going distinctly out of fashion. Whether because borrowing from physics had yielded few substantive insights, or because social scientists were now more self-confident, or because they thought on principled grounds that quantum mechanics had no macroscopic relevance, the *effect* was that the social sciences never really considered the implications of the quantum revolution for their inquiry. This is not for lack of awareness. In fact, in his Presidential Address to the American Political Science Association in December 1927 – just weeks after the famous Solvay conference of leading quantum theorists that is often marked as the culmination of the revolution – William Bennett Munro challenged his fellow social scientists to come to grips with the emerging worldview.⁸⁵ But although Philip Mirowski argues that the "spirit" of the changes in physics did contribute to social scientists' embrace of probabilistic methods in the 1930s, this was not accompanied by reflection on the significance of quantum theory itself.⁸⁶ In short, by default if nothing else, history suggests that when it comes to our implicit physics constraint, contemporary social scientists are still living in the classical world of the Founders.

And indeed, on the substantive side, classical thinking I believe permeates the fundamental assumptions most social scientists today make about the nature of social life and our relationship to it. Since it would take a significant program of empirical research to prove this,⁸⁷ however, consider instead your own intuitions about the following, what I take to be classical, assumptions about social life: 1) the properties and states of human beings, including mental states like desires and beliefs, are set by their micro-physical

constitution; 2) those properties and states are always physically well-defined; 3) consciousness is epiphenomenal and as such need not be considered in explanations of human behavior; 4) the mind is like a computer; 5) reasons are causes in the same sense that physical causes are; 6) there is no action at a distance in social life; 7) macro-social phenomena like groups and institutions can be reduced to the properties and interactions of independently existing individuals; 8) time flows in one direction only, from past to future; 9) time and space are objective background conditions for human action; and 10) social scientists can observe social life without necessarily interfering with it. My expectation is that most positivist social scientists (at least) today would accept most if not all of these assumptions, and do so unhesitatingly, as simple common sense. Yet, none would necessarily hold in a quantum context.

Moreover, it is not only positivists whose thinking is deeply structured by the classical worldview, but paradoxically also their interpretivist critics. That may seem unfair. After all, interpretivists have defined themselves precisely in opposition to the positivist ideal of social science as a physical science, and in different ways they have always made intentionality and meaning – subjective phenomena that do not seem to fit the classical worldview – the center of their analyses. And indeed, as we will see later, in their research practice if anyone has been “doing” quantum social science all along, *avant la lettre*, it would be mostly interpretivists.

However, as I suggested above, to my knowledge no interpretivist has questioned the causal closure of physics as a fundamental constraint on social inquiry, and until very recently only slightly more have questioned that the relevant physics is classical.⁸⁸ Which seems to suggest that at least when interpretivists think about *nature*, as a whole,

they share with positivists an implicit common sense that everything is matter and energy, that matter is purely material, and so on down the classical list. (Or put the other way, consider how few interpretivists explicitly embrace anti-materialist doctrines like dualism, panpsychism, or vitalism; the rhetorical strategy seems instead to be to defend the autonomy of the social sciences at the explanatory and methodological level). In accepting classical constraints about nature, however, interpretivists then also inherit the mind-body problem, which I have argued is created by and insoluble within these constraints. Stuck with this problem but wanting to foreground intentionality and meaning, the result in interpretive work is either a de facto Cartesian dualism, in which ideas are treated at least analytically as a distinct realm from a rump material base,⁸⁹ or repeated calls to transcend dualism. Yet, as long as these calls are bound by classical physics they cannot be answered.

These are sweeping generalizations about interpretivist (and positivist) social science that, for the moment at least, I hope you will let stand. For my purpose here is not to condemn all existing social science as somehow “wrong” – anymore than classical physics became “wrong” after the quantum revolution (it is a limit case). Moreover, social scientists’ frequent and successful use of intentional explanations and other interpretive methods belies any simple claim that “contemporary social science is classical,” period.

But ultimately that is precisely my point: that our implicit assumptions about the metaphysical foundations of intentionality and our actual explanatory practices regarding intentionality are incoherent, and need to be brought into line. Now, it might be argued, in the pragmatist spirit of Nuno Monteiro and Keven Ruby that even if such incoherence

exists there is no “need” for social scientists to address it. After all, philosophers still cannot agree on the proper foundations for knowledge, and so are in no position to be legislating to social scientists, who know best how to do their work.⁹⁰ Agreed, but my goal here is not to legislate but to *legitimate*, namely practices like intentional explanation which presuppose subjectivity, and as such from a classical standpoint may be charged with pseudo-scientific vitalism. Since Monteiro and Ruby themselves wish to hold the philosophical line against pseudo-science, how else to justify our continued use of such explanations if not by reconstructing our foundations? And who knows? Perhaps a new physics constraint will have other benefits too.

Preview of Quantum Social Theory

Note to Workshop Participants: This 4-5 page section is not yet written (just when I get to the punch line! – though I will talk a bit about it in my remarks on Friday), but it is intended only to preview my positive argument in Chapters Four and Five about what social ontology and epistemology might look like from this perspective. I then plan to end the chapter with a 3-4pp section on why we should interpret my argument in realist as opposed to metaphorical terms, which speaks to the value added of the approach. So the text of the chapter will be under 50 pages.

ENDNOTES

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- ¹ With apologies to the Chinese Communist Party. The principle is also sometimes known as the causal *completeness* of physics, as well as the causal closure of the *physical*, although the latter conflates the CCP with physicalism and as such is problematic (see below).
- ² Fodor (1974).
- ³ Vicente (2006: ###).
- ⁴ Cartwright (1999); also see Dupre (1993).
- ⁵ Sklar (2003).
- ⁶ Today taken to be quantum field theory.
- ⁷ Sklar (2003: 433), emphasis in the original.
- ⁸ This is true even in the best philosophy of mind; E.g. Kim (1998: 147); other e.g.s...physicalism gets its name from physics
- ⁹ See Dupre (###); Loewer (####), and others.
- ¹⁰ See, for example, Vicente (2006), footnote 5.
- ¹¹ On the difficulties of defining physicalism see Poland (1994) and XXXX.
- ¹² Montero (1999; 2003); also see Crane and Mellor (1990). And Wilson 2006? And Brown and Ladyman (2009); Goecke (2009).
- ¹³ Naturalists do sometimes also say that the special sciences get to determine their own ontologies, but these should not be in conflict with fundamental physics.
- ¹⁴ For provocative exceptions see Porpora (2006) and Gregory (2008).
- ¹⁵ Habermas (2002: 160).
- ¹⁶ See, for example, Jahn and Dunne (200#).
- ¹⁷ Chalmers (1996).
- ¹⁸ CITATIONS
- ¹⁹ See Block's 4 (3?) aspects; Guzuldere (1997)... Also new 2009 JCS article identifying 42 definitions of C and/or that special issue of JCS on defining consciousness
- ²⁰ Nagel (1974); other CITATIONS too. Chalmers 1996; Horgan and Kriegel (2008); Searle 92; others.
- ²¹ Levine (1983).
- ²² Jackson (1982: 130; 1986). Interestingly the case is not purely hypothetical. Patrick Spaet (2009: 161) [IN PANPSYCHISM FILES] recounts the story of Norwegian vision scientist Knut Nordby, who was completely color blind. In Nordby's own words, "[a]lthough I have acquired a thorough theoretical knowledge of the physics of colours and the physiology of the colour receptor mechanisms, nothing of this can help me to understand the true nature of colours."
- ²³ Chalmers (1996: 101).
- ²⁴ CITATIONS to emergence literature in physical sciences.
- ²⁵ Strawson on panpsychism is good on critique of strong emergence; other critiques?
- ²⁶ Kirk (1997: ###) quoting Fodor...
- ²⁷ CITATIONS; special issue of JCS; Wegner (200#).
- ²⁸ Freundlieb (2000: 238).
- ²⁹ Wallace (2000??).
- ³⁰ CITATIONS
- ³¹ CITATIONS to critiques; Frank on Habermas, e.g.
- ³² CITATION to Stanford Encyclopedia article. Cite Brentano (dates) as first...
- ³³ E.g. Searle (1995).
- ³⁴ Siewert (2002), pp. 16-19.
- ³⁵ CITATION; also see Kriegel (2003), and other citations? Consider the counter-factual: if human beings were zombies or robots, would ascriptions of intentionality make sense?
- ³⁶ Searle (1992).
- ³⁷ CITATIONS; Dilthey; something recent.
- ³⁸ ADD ENTELECHY; CITATIONS TO DEFINITIONS OF VITALISM
- ³⁹ QUALIFY RE CANGUILHEM AND THEORY/CULTURE/SOCIETY SPECIAL ISSUE;
- ⁴⁰ The argument here is of the "it can't be true, therefore it isn't" variety.
- ⁴¹ Dennett (1997), Chalmers (1996).

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- ⁴² Garrett (2006).
- ⁴³ CITATIONS to definition of life debate; include Schrodinger (1944).
- ⁴⁴ CITATION
- ⁴⁵ CITATION
- ⁴⁶ Though as is common in politics, at the extremes the epistemological left and right may have more in common with each other than they do with the center.
- ⁴⁷ Friedman (1953) is perhaps the most well known exposition of such a view in social science, but in different forms it is widely held.
- ⁴⁸ Though this belief is in some tension with naturalists' concomitant commitment to physicalism; see Ladyman (2008: 745).
- ⁴⁹ Godfrey-Smith (2009: 101).
- ⁵⁰ Vaihinger (1924); see Fine (1993/2009) for a revival of Vaihinger's ideas.
- ⁵¹ The characterizations are Giere's (2009: 255).
- ⁵² So much so that Giere (2009) worries that in today's "cultural climate," embracing too eagerly the idea that scientific models are fictions may provide succor to creationists and others who threaten to break the distinction down. Also see Sklar (2003: 438).
- ⁵³ Godfrey-Smith (2009: 104).
- ⁵⁴ Frank ((2002: 391).
- ⁵⁵ See especially Siewert (200#).
- ⁵⁶ CITATION
- ⁵⁷ CITATIONS
- ⁵⁸ For recent discussions of consciousness indebted to Wittgenstein's philosophy see Bennett and Hacker (2003) and Overgaard (2004).
- ⁵⁹ Attributed to Frank Ramsey; CITATION
- ⁶⁰ Montero (199#)
- ⁶¹ CITATION to big recent edited volume from Springer
- ⁶² DISCUSSION of distinction; CITATION to SHPoMP article on when 'classical' emerges; note issue of what if the solution lies in future physics;
- ⁶³ CITATIONS
- ⁶⁴ CITATIONS
- ⁶⁵ See especially Tegmark (2000) and Litt, et al. (2006); for a rejoinder see Hagan, et al. (200#).
- ⁶⁶ CITATIONS
- ⁶⁷ CITATIONS; Goff (2009).
- ⁶⁸ I am thinking here in particular of the work of David Chalmers (1996), David Griffin (1998), and Galen Strawson (200#). For a comprehensive historical overview of panpsychism see Skrbina (2005).
- ⁶⁹ CITATIONS: Malin (2001), Pylkannen (2007), Hiley, others.
- ⁷⁰ CITATION
- ⁷¹ Known as the "combination problem" in the literature; see Seager (1995).
- ⁷² See especially Humphreys (1997).
- ⁷³ As we will see there is emerging scientific evidence to this effect.
- ⁷⁴ Quoted in Jacquette (2005), p. 84.
- ⁷⁵ What Chalmers (1996: ##) jokingly refers to as the "law of the maximization of mystery."
- ⁷⁶ The phrase is Hameroff's (199#).
- ⁷⁷ CITATIONS; Bortoft (####) and other book on Goethe; M-P and Jonas cites;
- ⁷⁸ See Montero (2001: 71).
- ⁷⁹ Wigner (197#).
- ⁸⁰ And all other organisms, for that matter, except perhaps for the walking part.
- ⁸¹ Although even in that context classical phenomena remain ultimately quantum mechanical.
- ⁸² See Neurath (1932) for a challenging early exception, this from a physicalist point of view.
- ⁸³ See for example Mirowski (1988), Cohen (1994), and Redman (1997).
- ⁸⁴ Cohen (1994).
- ⁸⁵ Munro (1928).
- ⁸⁶ Mirowski (1994).
- ⁸⁷ Albeit one already partly begun by Mirowski and others.

⁸⁸ For an early exception see Apel (1976), who conceives of the relationship between Explanation and Understanding as one of quantum complementarity. More recently there is the important work of Arkady Plotnitsky (19##) and Karen Barad (200#), which I will visit later, although interestingly both come from the humanities rather than the social sciences.

⁸⁹ As in Wendt (1999); for a critique, Wendt (2006).

⁹⁰ Monteiro and Ruby (2009).