SOCIAL THEORY AS CARTESIAN SCIENCE:

AN AUTO-CRITIQUE FROM A QUANTUM PERSPECTIVE

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Social Theory of International Politics (*Social Theory*) has two parts, one substantive and one philosophical. The former develops a theory of the international system as an emergent phenomenon. The elements of the system are assumed to be states, which are treated as intentional actors or "people" (also see Wendt, 2004). The system itself is seen as an anarchy, the structure of which is defined in cultural rather than material terms. The culture of the international system can take at least three different forms – Hobbesian, Lockean, and Kantian – depending on whether states constitute each other as enemies, rivals, or friends. Progress from a Hobbesian to Kantian culture is not inevitable, but can result from historically contingent processes of collective identity formation among states. Anarchy is what states make of it.

Various parts of this argument have since been taken up by others. The claim that states are people too led to a lively symposium in Review of International Studies (2004); the three cultures of anarchy figure centrally in Barry Buzan's (2004) majesterial reworking of the English School, Dustin Howes' (2003) discussion of state survival, and Scott Bennett and Allan Stam's (2004) behavioral test of various international theories; Hidemi Suganami (this volume) sees collective identity formation as an idea particularly worth following up; and so on. But in light of IR scholars' strong interest these days in non-state actors, domestic politics, and globalization, *Social Theory's* concern with states and the states system looks admittedly a bit old-fashioned. Perhaps partly for this reason, even though the book challenges Realist and rationalist models of international politics in important ways, its substantive part has provoked relatively little criticism (though see Dale Copeland's review, reprinted here), unless to question the whole idea of doing states systemic theory.

The same cannot be said of the book's philosophical part. There I tried to do something that, in a justly classic paper, Friedrich Kratochwil and John Ruggie (1986) in effect said could not be done: find a *via media* between positivism and interpretivism by combining the epistemology of the one with the ontology of the other. This idea is not new, going back to Durkheim if not Kant, and continues in different forms today in Roy Bhaskar's (1979) The Possibility of Naturalism, John Searle's (1995) The Construction of Social Reality, and others. But after their "Third Debate" most IR scholars today seem to think the idea of such a *via media* is incoherent; one must be either a positivist or an interpretivist. Although greeted skeptically by many positivists, it seems especially to exercise interpretivists, who see it as not only philosophically but politically problematic, threatening, in their view, to foreclose important questions about world politics.

In one way or another such philosophical concerns inform most of the critiques collected in this volume.[1] Lacking space to do more, I shall consider just eight, in four groups. The first group deals with state agency: 1) that treating states as "agents" at all is intrinsically problematic (Cederman and Daase; Suganami; Zehfuss); and 2) that *Social Theory* under-theorizes the role of reflexivity in structural change (Drulak; Savary). The second focuses on the agent-structure problem: 3) that states are not ontologically prior to the states system (Behnke; Cederman and Daase; Kratochwil), 4) that the claimed mutual constitution of agent and structure is nothing more than two descriptions of the same thing (Suganami); and 5) that uncertainty about intentions is so profound that anarchy constrains states regardless of system culture (Copeland). The third addresses the relationship between ideas and material conditions: 6) that the distinction is "phony" because it presupposes a basis for making it in the first place (Behnke); and 7) that ideas

only matter when deeply internalized, and so power and interest do most of the work in world politics (Copeland). And finally, a fourth group makes various epistemological arguments specifically against the *via media* (Behnke; Kratochwil; perhaps Suganami).

In reflecting on these criticisms one could hardly ask for a better starting point than Stefano Guzzini and Anna Leander's outstanding précis of *Social Theory* that opens this volume. More than a précis, however, their essay suggests that the book is less a *via media* than an attempted synthesis of previously opposed positions – positivism and interpretivism, rationalism and constructivism, realism and idealism – which now appear as aspects or moments of a larger whole. Among other things this calls attention to the importance of metaphysical foundations that can ground such a synthesis. In *Social Theory* this was at least implicitly supplied by Cartesian dualism, according to which mind ("ideas") and matter ("rump materialism") are distinct, irreducible substances. If that dualist premise be taken as given, then I think the philosophical argument of *Social Theory* is still basically correct.

That said, I didn't spend much time in the book talking about its implicit dualist standpoint, which I only really became conscious of as a result of my critics. The virtue of dualism is that it accommodates what I take to be two fundamental truths: that ideas cannot be reduced to material conditions (the "interpretivist moment"), and that we can nevertheless achieve increasingly adequate knowledge of the world through the scientific method (the "positivist moment"). The problem with dualism is that very few scientists and philosophers take it seriously. Contemporary thinking about the mind is dominated by the materialist worldview of classical physics, according to which ultimately reality is

purely material. On that view, the mind is nothing but the brain, and *Social Theory's* claim that ideas are ontologically autonomous must therefore be mistaken.

Social science today shares this classical worldview. This is clearest in modern positivism, which is the direct heir to systematic efforts in the 18th and 19th centuries to model the social sciences on classical physics (see Mirowski, 1988; Cohen, 1994). For positivists, nothing in social life precludes the kind of objective analysis characteristic of classical physicists' observations of matter. A classical worldview is less apparent in interpretivism, with its explicit rejection of "social physics." But interpretivists have never doubted the classical assumption that ultimately reality is purely material, only that an analysis from such a point of view could capture what really matters in social life, namely meaning. As such, interpretivist work too has at least implicitly been structured by the mind-body problem as conventionally (i.e. classically) posed, which asks how the mind relates to a material base. It could hardly have been otherwise, since there has been no quantum revolution in social science, and these are the only two worldviews we have. Most social scientists would probably agree that physics should have the last word on reality, in the sense that if something seems incompatible with it, like fairies, ghosts or reincarnation, then it cannot be said to exist. To that extent physics is a reality constraint on our work, and the only alternative to quantum physics is classical.[2]

The track record of classical social science is mixed, at best. Although social scientists have made important strides in explaining social life, metaphysical disputes plague our work, and even our best theories face significant anomalies. But the track record of philosophy of mind is even worse, where the mind-body problem remains as much a "problem" as ever despite centuries of hard work. Thus, granting that dualism is

an inadequate basis for social science, there is little reason to think that materialism is much better. This prompts a heretical thought: what if the limitations of contemporary social science and philosophy of mind alike lie in their common assumption that the relationship of mind (ideas) to body (the material world) must be compatible with classical physics?

This is the starting point for a radical proposal in the philosophy of mind, that consciousness is a macroscopic quantum mechanical phenomenon. Human beings are in effect "walking wave particle dualities," not classical material objects. This possibility has been mooted by prominent philosophers and physicists since the quantum revolution in the 1920s, but it was only in the early 1990s – with ground-breaking work by Stuart Hameroff, Roger Penrose, Giuseppe Vitiello, and others – that serious scientific inquiry began. Even so, at this stage the "quantum consciousness hypothesis" remains highly speculative, and most philosophers and scientists would probably reject it out of hand. But it has some very attractive features, and given the failure to solve the mind-body problem by classical means it is being taken increasingly seriously.

In my current research, then, I am "betting" that the quantum consciousness hypothesis is true and exploring what its implications for social science might be.[3] That there are such implications is not guaranteed, since even if the hypothesis is true it might not scale up to the social level; at most psychology might be affected, not social science. So there are really two bets here, not just one. However, in my view if the first bet is justified then the second probably is as well, since consciousness is the basis of social life.[4] The implications for social science could be profound. A quantum social science would not wholly invalidate classical social theories, any more than quantum physics did

classical. But it would call into question many of our deepest assumptions about human beings and how we study them. In my own case, it would emphasize much more than *Social Theory* did the becoming ("wave") as opposed to being ("particle") aspect of social life, and the inherently participatory character of social science in this process. These claims will not be news to post-modernists, who have been saying such things for some time – but without a basis in natural science. A "quantum post-modernism" would be thoroughly naturalistic, challenging today's moderns and post-moderns alike.[5]

All this puts me in a rather awkward position in responding to *Social Theory's* critics, since I am already reconsidering its argument from the ground up. In some cases I now agree with them, while in others I still disagree but not for the old reasons. So to accommodate this awkward position this chapter will take the form of an "auto-critique" of *Social Theory* from a quantum perspective. This self-criticism will take up much of my time, leaving less to engage the critics directly – although I hope to show they are equally caught up in classical assumptions. But it should be more interesting for you, the reader, than a point-by-point defense of *Social Theory*, and with the quantum approach in hand I should be able at least to gesture toward a proper response.

In what follows I first define the mind-body problem and indicate its relevance to social science. I then offer a diagnosis of what is causing the problem and show how the quantum consciousness hypothesis solves it. In the third section I explore some general implications for social science, and then in the fourth turn to *Social Theory's* critics.

THE MIND-BODY PROBLEM AND SOCIAL SCIENCE

In this chapter I am suggesting that the mind-body problem is a fundamental problem of <u>social</u> science, not just neuroscience, and that consideration of it therefore

might shed light on important controversies in the study of world politics. This might seem a quixotic claim. Social scientists are not schooled in the mind-body problem as part of their training, and I have seen very few attempts to make a connection in print.[6] After all, doesn't each science have its own domain, with society the preserve of social scientists, and the mind of neuroscientists (e.g. Fodor, 1974)? What could one possibly have to do with the other?

On one level not much, since as I argued in *Social Theory* macro-level phenomena usually cannot be reduced to micro. To that extent, if we want to explain what is unique to social life we need to treat it as having its own structure and dynamics, far removed from neurons firing in the brain.

However, on a deeper level the answer is quite a lot. In order to do their work social scientists first have to make ontological and epistemological assumptions, even if only pragmatically, about the nature of social reality and their relationship to it. Crucial among these are what to do with two features of the human condition that differentiate us from ordinary physical objects, namely consciousness and meaning. Unfortunately, the nature of consciousness and meaning are the heart of the mind-body problem, and as such until it is solved we will not know for sure whether they matter, how they matter, or how we should study them. So, since social science can't begin without at least provisional answers to these questions, we in effect have to place bets on what are deeply contested philosophical issues. Predictably, this generates corresponding debates within social science over questions that implicate the mind-body problem, including the relationship between objective science and human self-understandings (positivism vs. interpretivism),

ideas and the material world (idealism vs. materialism), and agency and social structure (individualism vs. holism).

My larger argument in this chapter is that these debates are rooted in a problematic assumption, shared by all parties, that the mind is somehow a classical mechanical phenomenon. To set that argument up, however, I first need to say a few words about what the mind-body problem is, its traditional solutions, and how these solutions map onto different approaches to social science.[7]

In a nutshell, the mind-body problem is about how to explain the existence and workings of the mind in a way that is consistent with the modern scientific worldview, which assumes that ultimately reality is purely material ("all body" as it were). "Mind" here has two dimensions that bear on how the problem is understood: cognition, or how we know things about the world; and experience or consciousness,[8] the feeling of "what it is like" to have a mind (Nagel, 1974). Scientists have made substantial progress on explaining cognition, which David Chalmers (1996) therefore calls the "easy problem." But on explaining experience they have made none. We know we have experience from, well, experience itself, but there is no apparent way to reconcile this fact with modern science. By rights it seems consciousness should not exist, and as such neither should meaning, which presupposes consciousness. Chalmers calls this the "hard" problem. Difficult as the easy problems may be, the hard problem of consciousness is much deeper, and my sole concern below.

To be sure, philosophers have no shortage of ideas about how to solve it. There are three broad strategies: materialism (today usually called physicalism), the linguistic turn, and dualism – all of which as we shall see presuppose a classical ontology.

Most contemporary neuroscientists and philosophers of mind are materialists, who assume that consciousness can be explained in physical terms, where 'physical' is understood to mean the hard, material objects of classical physics. Modern materialism is a big tent, ranging from hard-core "eliminativists" at one end, who think the very idea of consciousness is pre-modern and should be eliminated from our discourse, to soft-core "emergentists" at the other, who think consciousness is an emergent phenomenon at high levels of material complexity. What all materialists share, however, is a belief that in the end it's "matter all the way down."

Consider now what kind of social science will ensue from such an assumption. If consciousness can be explained in material terms, then it is hard to see what difference it could make in the world. Even emergentists, who think consciousness is not reducible to matter, have difficulty with the idea of "mental causation" – that consciousness could somehow make things happen in ways over and above its physical basis in the brain. From a materialist perspective, in short, consciousness does not seem to "matter."

This I take to be the essence of positivism in the social sciences, which observes a "taboo of subjectivity" (Wallace, 2000). Its most extreme form is behaviorism, which eschews any reference to what goes on inside people's heads, but even positivisms that grant an explanatory role to the mind (understood as cognition) do not take consciousness (experience) seriously. Consider rational choice theory, which explains behavior by reference to desires and beliefs. How are these understood? As properties of the brain, no different in kind than other material objects.[9] The result is a "computational" model of man – human beings are nothing but sophisticated information processing machines, the subjective experiences of which make no difference and can therefore be ignored.

Such a purging of subjectivity from social science has an important epistemological implication, in turn, which is that human behavior can be fully accounted for, at least in principle, by the objective, third-person methods of natural science. "Understanding" can be reduced to "Explanation" (cf. von Wright, 1971; Hollis and Smith, 1990).

Of course, probably few rationalists would deny that human beings are conscious,[10] and as such may see computationalism as more a heuristic device than full-fledged metaphysical commitment. But the result is nevertheless to leave out of their theories an aspect of the human experience – experience itself – that seems fundamental to our existence. Charles Siewert (1998) argues that if given the choice between being conscious or being a zombie (someone just like ourselves but without consciousness), most of us would choose consciousness. So having consciousness somehow matters to us, a lot, yet it appears nowhere in the rationalist model; as far as the latter is concerned, we may as well be machines or zombies. This strange neglect stems, I suggest, from an implicit materialism telling us that consciousness is epiphenomenal.

Curiously, however, despite today's widespread consensus on a materialist approach to consciousness, there is little evidence it is true. As Jerry Fodor, a prominent philosopher of mind, describes the state of his art,

> "[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."[11]

Perhaps neuroscience will one day vindicate materialism, but increasingly skeptics doubt it. There seems to be an ineradicable "explanatory gap" between first- and third-person epistemologies (Levine, 2001), which suggests a corresponding ontological gap between consciousness and matter. To social scientists some form of emergentism might seem to

offer the best hope to bridge these gaps, but most philosophers think that at the crucial step in the argument it in effect says "and then a miracle happens…," which is no bridge at all. This is why there is still a mind-body "problem," and as long as there is, a taboo of subjectivity in social science will have no metaphysical basis.

Interpretivists think that consciousness and meaning matter in social life, so much so that ignoring them would be to strip it of precisely what constitutes its specificity as "social life." From this perspective turning social science into social physics makes little sense. Instead of Explanation we need Understanding, the recovery of the socially shared understandings that make actions meaningful. Social inquiry is more like reading a text than observing physical objects. Consciousness is the starting point of such readings, and since we know we have it does not really matter where it comes from; we can take it as given and proceed from there.

From this perspective the traditional mind-body problem is fundamentally mis-posed (see Bennett and Hacker, 2003). Consciousness and meaning are constituted inter-subjectively, in language, and as such the mind is <u>social</u> all the way down. Importantly, the linguistic turn does not challenge the assumption that the mind is dependent on the brain and thus at some level material. Rather, it changes the question: from how the mind, as some kind of interior, private phenomenon hooks onto the body, to how a public, shared language enables us to talk about the "mind" at all. Since shared language is an emergent, macro-level phenomenon, for purposes of <u>social</u> science Understanding can play an irreducible role, even if materialism is true.

Pragmatically there is much to be said for changing the question in this way, and in *Social Theory* I also argued for the social character of the mind. But side-stepping the

traditional mind-body problem still leaves us with the question of how consciousness and meaning are possible in the first place, given the materialist view that they are nothing but the motions of matter in the brain. The reason rocks don't have consciousness is not because they don't have language, but because they don't have brains. Language may be a necessary condition for human subjectivity, but it is not sufficient.

Given the failure of materialism and the linguistic turn, Cartesian dualism has been the traditional default approach to the mind-body problem. Taking as its starting point Descartes' *cogito* – "I think, therefore I am" – the Cartesian worldview makes at least four assumptions.[12] First, reality out there is not part of you or me in here, which means we must distinguish subject and object. Second, we can acquire knowledge of external reality through the scientific method. Success in science depends, third, on maintaining a distinction between fact and value. And finally, dualism itself: mind and matter are distinct, irreducible substances, "*res cogitans"* and "*res extensa*," each with its own laws of motion. Importantly, dualists share with materialists the view that matter is purely physical, and that minds are located within material bodies. This disposes both toward methodological individualism, or the belief that social facts must be reducible to facts about individuals. But against materialism dualists think that the mind is not itself a material phenomenon, and therefore has its own conditions of knowledge.

Social Theory is a "Cartesian science" in "3½" of these four respects (cf. Bramhall, 1986). It makes a subject-object distinction, is committed to the scientific method, distinguishes facts and values, and at least implicitly assumes a dualism of mind and matter. On the other hand, I embraced the interpretivist view that social facts help constitute the mind and so cannot be reduced to facts about individuals (methodological

holism), in which "half" respect the book is decidedly anti-Cartesian. Thus, even though I have been criticized for not taking seriously the specifically linguistic aspect of social life, as Guzzini and Leander point out, I end up in much the same place, emphasizing the irreducible role of shared meanings in social life.[13] This difference notwithstanding, however, by virtue of its dualist ontology in particular *Social Theory* is fundamentally Cartesian in its worldview.

Regrettably, this ontology is probably false. There is no evidence that the mind is a substance distinct from matter. As far as mainstream neuroscience is concerned we are nothing but brains, and as such materialism must somehow be true. But as we have seen there is no evidence that it is, either. Given the manifest importance of consciousness to human beings this result is a serious embarrassment for modern science, and raises deep questions about its underlying ontology.

THE ROAD TO QUANTUM CONSCIOUSNESS

Faced with such an intractable problem, it makes sense to step back and ask why explaining consciousness in scientific terms is so "hard?" From a quantum perspective it may be the materialist assumption, shared by all sides of the debate, that matter is purely material. 'Purely material' here means that the elementary foundations of subjective experience have no phenomenological or subjective aspect of their own. Consciousness does not go all the way down, but is either reducible to, identical with or emergent at high levels of material complexity. This is unlike reduction, identity, or emergence anywhere else in nature, however, since it requires squeezing a qualitatively novel form of being – subjectivity – out of purely material objects. It is this qualitative novelty that makes the hard problem so hard.

The proposition that matter is purely material is a metaphysical assumption, not a scientific one, but is so taken for granted by the modern mind as to seem almost trivially true. To deny it seems absurd, reason enough to reject whatever might follow. And yet, the materialist view of matter might not be true. It is rooted in classical physics, which does indeed describe matter in materialist terms. But in the early 20th century classical physics encountered significant anomalies at the sub-atomic level that led to the quantum revolution. Quantum mechanics enables us to manipulate sub-atomic reality with an extraordinary degree of precision, and is arguably the most well confirmed scientific theory in history. What it shows is that the classical description of matter clearly breaks down at the micro level; in effect, classical matter itself does not go all the way down. At bottom it is replaced by the quantum.

However, what the quantum is, nobody knows. Which is to say, even though physicists know how to use quantum theory, they do not understand it, what it is telling us about the nature of reality. Quantum metaphysics is "under-determined" by its physics (French, 1998), and as such requires an "interpretation" of the theory. Philosophers have been intensely debating which interpretation is correct since the 1930s, and show no signs of stopping soon. Over a dozen interpretations now exist, with metaphysics that are not only wildly different, but simply wild. Quantum theory is so counter-intuitive that even mainstream interpretations are quite bizarre, like the "Many Worlds" Interpretation that every quantum event splits the universe into countless other unobservable universes. Yet, because the various interpretations are empirically equivalent,[14] even though the debate has clarified their implications and swings of fashion have occurred, none has been ruled out. (This uncertainty poses a second-order problem for social scientists, in turn, since

some interpretations may have many social implications, and others none).[15] In short, the nature of the quantum is no less a mystery than consciousness. All we know for sure is that, as the great physicist John Bell once said, whatever picture of reality eventually emerges from quantum theory will surely "astonish" us.

The quantum consciousness hypothesis suggests that the two mysteries have a common solution, namely that the quantum in effect is consciousness, which in some form goes all the way down in matter. Against the materialist view of matter shared by traditional approaches to the mind-body problem, this implies a "panpsychist" ontology, according to which matter has an intrinsically subjective aspect at the sub-atomic level. Consciousness neither reduces to matter nor emerges from it, but is present in matter all along. In the rest of this section I summarize this proposal, starting with a back-of-the-envelope introduction to quantum theory and then turning to the quantum consciousness hypothesis itself.

Quantum Theory[16]

Quantum theory is perhaps best introduced by the classical worldview that it overthrew. Like quantum metaphysics, the classical worldview is an interpretation of physical theory, in this case classical physics, and as such essentially metaphysical. It makes five basic assumptions: 1) that the elementary units of reality are physical objects (materialism); 2) that larger objects can be reduced to smaller ones (reductionism); 3) that objects behave in law-like ways (determinism); 4) that causation is mechanical and local (mechanism); and 5) that objects exist independent of the subjects who observe them (objectivism?).[17] In philosophy of mind these assumptions are shared by materialists,

dualists, and proponents of the linguistic turn alike, and thus by extension by most positivists and interpretivists in social science.[18]

Quantum theory challenges all five. At the sub-atomic level physical objects dissolve into ghost-like processes; wholes cannot be reduced to parts; the world does not behave deterministically; causation is non-local; and objects do not exist independent of the subjects who observe them. Importantly, these findings do not necessarily invalidate the classical worldview at the macro level, since quantum states normally "decohere" into classical ones above the molecular level, which is why the everyday world appears to us as classical. Decoherence has been a barrier to developing a unified quantum theory encompassing both micro and macro levels,[19] and is a fundamental obstacle to the quantum consciousness hypothesis in particular (see below). But at least at the micro-level the quantum revolution has decisively overturned the claim of the classical worldview to provide a complete description of reality.

Although the formal structure of quantum theory is highly esoteric, its basic experimental findings are relatively straight forward, if counter-intuitive, and clearly described in a number of good, popular books.[20] The philosophical literature is also accessible, being concerned with the theory's interpretation, not its formalism.[21] Thus, while I can claim no understanding of quantum physics, with some hard work I think I have gained some of its metaphysics, which is what matters here. Since understanding the quantum consciousness hypothesis requires some physics, however, let me start with four findings from quantum theory: wave-particle duality, wave function collapse, the measurement problem, and non-locality.

1) Wave-particle duality refers to the fact that sub-atomic phenomena have two irreducible and non-equivalent descriptions. Under some experimental conditions they are best described as waves, in others as particles. Importantly, these descriptions are not just different but mutually exclusive. This leads to Heisenberg's famous Uncertainty Principle, according to which we cannot know the position and momentum of a particle at the same time. A complete description of quantum systems must therefore include both descriptions, standing in a relation of what Niels Bohr called "complementarity," where each is inherently partial.[22]

Wave-particle duality challenges two assumptions of the classical worldview. One is that science can achieve an integrated, unitary Truth about the world. Quantum theory seems to be true, but its truth requires contradictory narratives – much like the situation with Explanation and Understanding in social science, as I suggest below.

The other challenge is to the materialist view of matter. To see this it is necessary to understand the peculiar nature of waves in quantum theory. Classical waves, like ripples on a pond, are caused by the interaction of physical objects (water molecules), and as such pose no problem for materialism. Quantum waves, in contrast, refer to the <u>probability</u> of finding physical objects (particles) at various locations. These probabilities are not determined by an underlying distribution of particles,[23] since the Uncertainty Principle tells us that as long as an electron propagates as a wave we have no basis for saying it remains a particle at all. Unlike classical waves, then, waves in quantum theory do not refer to actualities but <u>potentialities</u> – events that <u>could</u> happen, which is a much broader class than those that actually do.

2) Wave function collapse refers to the fact that the transition from wave to particle is instantaneous in time and has no apparent physical cause. Such "quantum leaps" challenge the determinism of the classical worldview, and as such have caused much angst among physicists, with Einstein famously complaining that "God does not play dice."[24] But their anomalous character also points toward a possible solution, since wave function collapse is strongly analogous to our experience of consciousness, which involves free will and also does not seem to have a physical cause – an analogy that the quantum consciousness hypothesis will exploit.

3) The measurement problem refers to the fact that it is impossible to measure quantum phenomena without disturbing them: the process of measurement inevitably leads to a change in the appropriate description of sub-atomic particles. As long as we don't measure them they appear as waves, and as soon as we do as particles. This challenges another basic assumption of the classical worldview, the subject-object distinction, and with it the possibility, even in principle, of true objectivity. In quantum measurement observer and observed initially constitute a single system, rather than two as they are classically. Far from being just a given, the subject-object distinction is now emergent from the process of measurement itself, which makes a "cut" in a previously undivided whole. Within social science post-modernists, feminists, and others have made similar critiques of the subject-object distinction at the macro-level, but generally without a quantum basis. A quantum connection would give these critiques additional force, and point toward the necessity of a "participatory epistemology" in social inquiry.

4) Finally, nonlocality refers to the fact that when wave functions are "entangled" they have effects on each other in the absence of any apparent causal connection, in what

Einstein called "spooky action at a distance."[25] When one wave function changes as a result of measurement, the appropriate description of the other instantaneously changes as well. This challenges the classical worldview's mechanical theory of causation, but more fundamentally its atomism. Entangled particles do not behave as if they were distinct objects, but rather as parts of a "superposition" of particles that absorbs their individual identities into a larger whole. This makes quantum theory radically holistic,[26] and again intriguingly similar to social life, at least on my argument in *Social Theory*.

Findings like these overthrew the classical worldview at the micro-level, but not at the macro, where classical thinking still dominates. The reason is decoherence. As we have seen measuring sub-atomic systems interferes with them, collapsing quantum waves into classical particles. Importantly, this applies not just to measurements in physicists' laboratories, but in nature everywhere. Whenever particles interact they are in effect "measuring" each other, inducing decoherence. That's why in everyday life we see only material objects, not wave functions; quantum effects quickly wash out beyond the molecular level, leaving classical mechanics as the appropriate description at the macro.

Decoherence seems to constitute a decisive objection to the quantum consciousness hypothesis, and by extension to a quantum social science. The human brain contains over 100 billion neurons, and zillions of sub-atomic particles. In this unimaginably complex environment particles are performing countless measurements on each other, seeming to rule out any possibility of sustaining a coherent wave function in the whole brain.[27] Unless this problem can be overcome, philosophers and social scientists are right to continue treating human beings in classical terms instead.

The Quantum Consciousness Hypothesis

The quantum consciousness hypothesis purports to solve the problem of decoherence, enabling a quantum explanation for human consciousness. The hypothesis has two parts: quantum brain theory and a panpsychist metaphysics.

Quantum brain theorists are trying to bridge the yawning gap between sub-atomic particles and the whole brain in such a way that quantum coherence might be transferred from the former to the latter. The key problem is identifying physical structures in the brain whose properties will insulate particles from measuring (and thus collapsing) each other, while simultaneously enabling them to be entangled (and thus having coherence). Such a balancing act is extraordinarily difficult to accomplish. Human beings are now attempting to do it artificially in the race to build a "quantum computer," but to date we have managed to handle only a very few particles at a time (<100), whereas the brain must do it with zillions. Undaunted, quantum brain theorists have developed a variety of preliminary models of how it might do so. While not all compatible,[28] in general they approach the problem from two directions.

Mari Jibu and Kunio Yasue (1995), Giuseppe Vitiello (2001) and others are working from the top-down, trying to identify the existence and physical underpinnings of quantum behavior at the level of the whole brain. For this purpose they are using quantum field theory – a generalization of quantum theory that deals with macroscopic phenomena – to model brain activity. Working from the bottom-up, in turn, Stuart Hameroff and his colleagues are trying to understand the micro-foundations of this activity.[29] Neuroscience today is based on the "neuron doctrine," which assumes that neurons are the smallest parts of the brain relevant to explaining consciousness. Yet

neurons themselves are fantastically complex, each made of thousands of "microtubules," which in turn consist of ten million "dimers." By focusing on the meso-level between sub-atomic particles and neurons the Hameroff approach seeks to show how quantum coherence in particles might "percolate upward" or "amplify," first to neurons and then the whole brain (cf. Glymour, et al., 2001; Gabora, 2002).

Experimental evidence for these models is slender and hard to come by with current technology, but the first barrier to their acceptance is theoretical: overcoming objections in principle to the idea that a structure as profoundly complex as the brain could prevent decoherence among its parts. In virtue of this problem most scientists and philosophers today reject quantum brain theory *a priori*, on the grounds that "it can't be true therefore it isn't." On the other hand, it has become increasingly recognized in the literature at least as a serious conjecture, even if the general view remains that it

> "consists of merest possibility piled upon merest possibility teetering upon a tippy foundation of 'might-be-for-all-we-know's," and is "no better supported than any one of a gazillion caterpillar-with-hookah hypotheses." (Grush and Churchland, 1995: at 12 and 28 respectively)

In a further sign of "acceptance," skeptics are now beginning to take the idea seriously enough to bother criticizing it in detail, although to my mind the rebuttals have been decisive.[30] Apart from the pioneering work of its advocates, however, an important reason for the growing interest in the quantum hypothesis is that its skeptics face a fundamental problem of their own, namely the lack of a plausible alternative basis for consciousness. As we have seen, after three centuries of hard work their classical approach has failed to produce any progress whatsoever on the "hard problem" of consciousness. In light of this – really quite remarkable – fact, a growing number of scholars seem willing to bet on a quantum approach.

Quantum brain theory suggests that the mind is a quantum computer, rather than the classical machine assumed by most social scientists today. However, it does not yet explain consciousness, "what it is like" to be a quantum computer, since there is nothing in the theory which requires that quantum brains have subjective experiences.

For that we need to replace the materialist view of matter that underlies classical approaches to the mind-body problem with a panpsychist ontology, which is the view that something like human consciousness goes all the way down to the sub-atomic level. This should not be confused with the idea that reality is reducible to consciousness (idealism), or that mind and matter are distinct substances (dualism). The claim of panpsychism is rather that the elementary constituents of matter have an intrinsically subjective aspect, and thus two irreducible manifestations – material and phenomenal, outside and inside.[31] As Goethe put it, "no matter without mind, no mind without matter."[32] Matter, in short, is an active, "minded" phenomenon, not the inert, mindless substance of materialism. The question of how consciousness emerges from matter is therefore spurious, since in some sense it is there all along. What is emergent is rather the distinction between consciousness and purely physical matter from an underlying reality that is neither.[33] David Bohm (1980) calls this underlying reality the "implicate order," as distinct from the "explicate" order of physical matter and consciousness.[34] As such, panpsychism might also be described as a "dual aspect" or "neutral" monism.

Panpsychism is a venerable thesis in Western philosophy – counting Spinoza, Leibniz, and Whitehead among its adherents[35] – but to the modern mind, steeped in materialism, it may seem absurd. Are we to believe that rocks have consciousness? However, in my view, panpsychism merits serious consideration for at least two reasons.

The first is the existence of gradations of consciousness in nature. Panpsychism hypothesizes that "something like" human consciousness goes all the way down, not that electrons have the same quality of consciousness that people do; what they share is only some level of subjective experience or interiority.[36] By this minimal standard, most of us would agree that dogs have consciousness, and probably mice. Intuitions will diverge the farther down the evolutionary ladder we go (do amoebas feel pain?), but even many non-panpsychists believe that all organisms have some kind of inner experience.[37] This gets consciousness down to the organic/inorganic boundary, but of course still leaves the hard part, of getting it all the way down, to lifeless matter itself.

This brings us to the second reason to take panpsychism seriously, which is that it is consistent with quantum theory, and several interpretations of quantum theory explicitly embrace it as their metaphysical framework. When asked what causes wave functions to collapse, for example, Paul Dirac, one of the founders of quantum theory, answered "Nature makes a choice," a suggestion he seems to have taken literally (Malin, 2001: 127). Freeman Dyson is even more explicit:

> "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."[38]

Bohm's interpretation of quantum theory is also panpsychist, and so on.[39] The reason that otherwise sober physicists have turned to panpsychism is that it makes compelling sense of the otherwise inexplicable behavior of matter at the quantum level.

But are we then to believe that rocks have consciousness? No, because of decoherence. From a quantum perspective, part of what constitutes life may be the ability to maintain coherence in a multi-particle system. This can only be done by

physical structures that enable quantum entanglement among their elements while insulating it from the environment through a protective boundary or skin.[40] Rocks and other inanimate objects lack such structures, and so their elements quickly decohere. Organisms (by hypothesis) do have them, and thus are able to sustain quantum states at the macro level. Arguments like these, along with the continuing failure to solve the mind-body problem in materialist terms, have increasingly led scholars in a variety of disciplines to give panpsychism a serious look.[41]

In sum, the quantum consciousness hypothesis is a kind of "double movement." Quantum brain theory takes a phenomenon known to exist at the sub-atomic level, the quantum state, and projects it upward to the whole brain. Panpsychism, in turn, takes a phenomenon known to exist at the macroscopic level, consciousness, and projects it downward to sub-atomic particles. In this way two of the great mysteries of modern science – the nature of the quantum and of consciousness – solve each other, and raise the question of a quantum social science.

TOWARD A QUANTUM SOCIAL SCIENCE

If the quantum consciousness hypothesis is true then the elementary units of social life, human subjects, are quantum systems – not just metaphorically or by analogy, but really <u>are</u>.[42] This is a strong claim, and it might be asked why it is necessary. Why not take the weaker but perhaps more plausible metaphorical view instead, which opens up the same interpretive possibilities? In IR this has been done by Dimitris Akrivoulis (2002), who uses a sophisticated understanding of metaphor to develop an innovative, quantum post-modern reading of world politics.[43] I admire this work, but believe it would be more compelling still with a naturalistic foundation. Metaphors are optional

and may be contested, whereas if the quantum consciousness hypothesis is true then we really have no choice but to go quantum if we want to fully explain human behavior. Of course, at this point we don't know if the quantum hypothesis is true, and so in one sense a realist interpretation is not yet warranted – at most we can say that human beings are "as if" quantum systems. But we have more reason to follow this conjecture up if the suspicion is that we "really are" quantum.

I now want to explore what this might mean for social science in general, focusing first on ramifications for our model of man and then for our model of society. I will limit myself here to ontological implications, deferring epistemological ones until the next section, where I turn to *Social Theory* and its critics.

Toward a Quantum Model of Man[44]

Having gotten over physics envy decades ago, few social scientists today would emphasize how their models of man are rooted in classical metaphysics. But it follows from the above discussion that all such models – whether "*homo economicus*" or "*homo sociologicus*" alike – must somehow be informed by the classical worldview, since what else could their basis be? Metaphysically we only have the two choices, and an explicitly quantum social science does not exist. Thus, despite their many important differences, contemporary models of man in social science must at least implicitly share certain basic classical assumptions: that human beings are ultimately material objects, that we have determinate properties, that our behavior is caused by processes in the brain, and that we do not have free will. A quantum approach calls all four into question.

First, it suggests that consciousness plays an essential and irreducible role in human behavior. The "difference that consciousness makes," in other words, is that we

are quantum rather than classical systems. Although there is disagreement among quantum consciousness theorists about where precisely consciousness is "located" in human beings, in my view the most plausible answer is in the collapse of our wave functions. This process happens continually as we interact with the environment, providing a basis for our experience of a "stream" of consciousness. Our wave functions themselves, then, would correspond to our unconscious, understood not in the narrow, Freudian sense of something repressed, but the more general sense of all the background knowledge we have about ourselves and our environment of which we are not aware when we are conscious.[45] According to the computational model of man that dominates contemporary cognitive and social science, it is on this level that human beings do most of their thinking. However, in contrast to the usual assumption that the unconscious engages in only classical computation, here it would engage in quantum, with its exponentially more powerful capabilities.[46]

Second, as an important part of our wave function, our knowledge of ourselves – our identity or sense of Self – does not have determinate properties at any given moment, but only becomes determinate when we act into the world (collapse). In other words, the desires and beliefs which the rationalist model of man sees as causing behavior actually do not exist until behavior takes place – before that point the Self is a superposition of multiple and mutually incompatible desires and beliefs. This does not mean identities are completely open-ended (in which case they wouldn't be "identities"). Wave functions are highly structured sets of possible and probable states, making some behaviors and thus identities more likely than others. But these identities only become actualized in wave function collapse, which itself is undetermined by a physical process. This perhaps

counter-intuitive idea is supported by both everyday experience and academic research. In speech, for example, we cannot be absolutely certain what we are going to say, and thus who we are going to be, until we say it. And recent experimental work on "preference reversals" and public opinion has shown that individuals' desires and beliefs are highly sensitive to context and framing effects, which is what we would expect if they are quantum rather than classical beings.[47]

This argument points toward a post-modern, performative model of subjectivity (Butler, 1997). Against the traditional view of subjectivity as a material or ideational substance, performativity treats it as a process all the way down (cf. Jackson and Nexon, 1999). There simply is no agent before agency; we only become agents in and through performances. Since quantum theory is often seen as implying a process as opposed to substance ontology, it provides a natural basis for such a view. Of course, it might be doubted whether performativity theory needs a quantum basis, having been developed without it. However, recalling my naturalist assumption that social theories should be constrained by what physics tells us about the world, it is unclear how else performativity theory could be justified. If consciousness is not a quantum phenomenon, then agents are nothing but classical brains, and brains have determinate properties first, before they cause behavior.[48] Ultimately, classical agents must preexist agency. In part for this reason some advocates of performativity theory have questions about how it relates to (classical) material reality.[49] The dual-aspect quantum ontology answers these questions in a way that gives performativity theory a coherent metaphysical foundation, without sacrificing its essentially non-foundational character.

Third, reasons are constitutive of action, not causes. This follows from desires and beliefs only becoming well-defined in consciousness or wave function collapse. Since collapse is spontaneous and instantaneous, it cannot "cause" behavior. Instead, collapse realizes a continuous stream of two non-causal, constitutive effects: phenomenal effects of determinate desires and beliefs (reasons), and physical effects of bodily states (behavior).[50] These two effects are irreducible but correlated aspects of one underlying reality. Mere behavior is thereby made intrinsically meaningful "action," or behavior-for-someone.

The quantum model suggests further that reasons are not only constitutive but teleological as well (cf. Schueler, 2004). In a teleological process the end-state of a system helps explain how it gets there.[51] While anathema to the classical worldview, "final causation" makes sense if the emergence of a distinction between physical and phenomenal states involves temporal symmetry breaking, with the former moving forward in time and the latter backward (see footnote 33 above). On this view, human action is fundamentally "anticipatory," not in the conventional sense that we act on expectations about the future, but in the radical sense that in intentional action we literally "feel" the future through a kind of "temporal non-locality."[52]

Finally, quantum man should have free will. The experience of free will has always been a problem for the classical worldview, which assumes that the entire world is deterministic. This problem is mirrored in social science, where the goal is to explain human behavior as deterministically as possible, and unexplained variance in behavior is chalked up to random error rather than free will. As such, various thinkers have looked to the inherently non-deterministic character of quantum mechanics to ground our sense

of free will. Yet, as critics of this move have pointed out indeterminism is not enough, since seemingly random behavior could indeed just be random, rather than purposive or "willed." So at most quantum indeterminacy is necessary for free will, not sufficient. On the other hand, however, with a panpsychist interpretation quantum theory might enable us to go farther. Indeterminacy describes the situation facing an objective observer: we on the outside of a wave function cannot predict its collapse. What about someone on the "inside"? If the quantum consciousness hypothesis is true, then action could appear non-deterministic from the outside and yet freely willed from the inside.[53] Novelty would then be an essential feature of human action, and perhaps so of society.

Toward a Quantum Model of Society

The quantum consciousness hypothesis suggests that individual psychology should incorporate quantum thinking, but what about the social sciences? We know that without a suitable physical infrastructure – in the human case a brain – quantum states immediately decohere into classical ones. Since societies don't have brains it would seem they can't be quantum systems, and so social science should remain classical. In short, by tying quantum effects to individual consciousness I seem to be engaging in a kind of reductionism that I eschewed in *Social Theory*, and foreclosing the possibility of a quantum social science.

In what follows I challenge this skeptical conclusion, arguing that quantum consciousness not only supports but deepens *Social Theory's* holism about society. This is not to deny the specificity of the social level. Social systems do not have brains in the same sense that people do. However, I argue that if we really are quantum beings, then our interactions will necessarily have quantum aspects that cannot be reduced to classical

considerations. I offer three conjectures along these lines: 1) social systems have wave functions that constitute a collective unconscious; 2) these wave functions collapse by a process of "intra-action" described by quantum game theory; and, most speculatively, 3) social systems are super-organisms with collective consciousness.

The Collective Unconscious. Earlier I defined the unconscious broadly, as all the background knowledge about self and other possessed by an individual of which she is unaware when conscious. In that case, if social systems could be said to possess shared knowledge, then it seems reasonable to think they have a kind of unconscious as well, a collective one. The collective unconscious would perform similar functions in social life that the individual unconscious does, including structuring action, providing memory, and engaging in computation. My argument suggests that these processes might be quantum in character, making social systems in effect quantum computers.[54]

The importance of shared knowledge or meaning to human interaction is at least implicitly recognized by all social theories, since without it society would be impossible. However, there are different ways to conceive the nature of this "sharing." In much of contemporary social science the sharing is individualistic or "internalist," in the sense that thoughts are assumed to reside first inside in the individual's head and only then become common knowledge. In a metaphysical sense, therefore, thought precedes language. In *Social Theory* I defended the rival holist or "externalist" view, which is currently the mainstream in philosophy of meaning and used also in the linguistic turn. Against internalism, externalists argue that the meaning of our thoughts is intrinsically social, constituted literally by thoughts in other people's heads. In a metaphysical sense, therefore, language precedes thought.

Quantum theory strongly supports externalism.[55] The theory tells us that at the moment of measurement, observer and observed are entangled non-locally and as such participate in a single wave function. It is only in making a "cut" between them, with the act of measurement itself, that subject and object acquire completely distinct identities. If such entanglement exists even in our measurements of sub-atomic particles in the lab, then it should be present all the more so in our measurements (perceptions) of other people, who are themselves quantum systems. This is at least highly reminiscent of externalism, and as such suggests that shared meanings are the primary form that quantum entanglement takes at the human level. Social systems, in short, have[56] "collective wave functions" – superpositions of information states held jointly by individuals (see Arfi, 2004). As in individuals collective wave functions are not conscious, since it is only in collapse that consciousness emerges. But they do structure action, provide collective memory, and engage in computation.[57]

This suggests a "holographic" model of the relationship between the individual and society. In a hologram each part mirrors the whole, such that one could reconstruct the whole from any of the parts.[58] This implies a fundamentally "participatory" ontology radically at odds with both "flat" ontologies that try to reduce society to individuals, like rationalism, and "hierarchical" ontologies that treat social structures as emergent and even constitutive of agents, like *Social Theory*. From a quantum perspective neither looks right, since both at least implicitly assume, classically, that individual minds are at some level ontologically distinct. Given quantum entanglement at the unconscious level, the mind relates to society not through reduction, emergence, or even mutual constitution, but by in a sense being society, all the way down. Instead of being distinct entities minds

participate in each other's reality. In effect, they stand in a relationship of identity.[59] At the same time, however, this identity is "incomplete" by virtue of having two different and irreducible aspects – individual and collective, subjective and objective, inside and out.[60] Like "monads" in Leibniz' metaphysics, individuals in a hologram retain their own points of view on the collective, even while they mirror its properties.[61]

Intra-action and Quantum Game Theory. Individuals and collectives are alike, then, in both having wave functions, and thus an unconscious. But in collapse they are essentially different. In contrast to the collapse of individual wave functions in a unitary consciousness, social ones collapse in a dispersed or "distributed" fashion into physically separate consciousnesses. The specificity of the social is rooted in this essential physical difference, and as such quantum theory will have to play a correspondingly different role. Instead of producing a unity of consciousness, it must produce difference.

To see what this might mean, consider first the traditional game theoretic analysis of interaction. Game theory assumes a classical, individualist ontology in which actors have determinate properties by virtue of their bodies, which are physically exogenous to interaction. Thus, before interaction begins identities are given as already different, as a brute fact of nature. As interaction gets under way, then, it is indeed "inter"-action, or action between different minds. From this perspective the quantum idea that difference in any deep sense could be produced in interaction seems clearly wrongheaded. All that can change in interaction are the attributes of a previously given identity.[62] This leads to a bottom up approach to social science, which attempts to reduce social systems to their micro-foundations in the interaction of ontologically primitive elements.

In a quantum approach actors lack determinate identities before they are measured. Identity emerges from interaction itself, not before. What is ontologically primitive is not a substance (the brain) but the process of wave function collapse in measurement, which fixes determinate identity.[63] In the case of collective wave functions this process of collapse has two aspects, collective and individual. On the one hand, since what is collapsing is a shared wave function, it seems the collective itself must be helping to choose outcomes through a kind of "internal measurement" (Matsuno, 2002) or "downward causation" (cf. Wendt, 2003). This reinforces and deepens an argument made by some classical social theorists that groups can have "collective intentionality" irreducible to their members (Searle, 1995). On the other hand, since collective wave functions are instantiated in separate brains, their collapse is mediated by individuals, who remain a locus of control in the process. Although the way in which collective intentions unfold therefore depends on how individuals express them, however, our consciousness of those intentions only emerges with our action (collapse). It is always in relation to the whole, in short, that consciousness of "difference" is produced.

The classical concept of "inter"-action, presupposing as it does physical separability, seems clearly inadequate to describe such a holistic view of social life. Thus, a plausible quantum replacement might be what Karen Barad (2003) calls "intra"-action, which she uses to solve some problems in how performativity theory relates to material reality.[64] Intra-action describes two features of collective wave function collapse. First, in relating to each other through shared meanings human beings are relating to something internal ("intra") to themselves of which they are only a part, which captures the sense in which at the unconscious level individuals are entangled. Second, at

the conscious level they only become individuated through their actions, which captures the sense in which collective collapse is mediated by distinct bodies. The two together make it possible to see constitutional difference as emerging from an underlying unity.

This idea might help unlock the potential for social applications of quantum game theory, which has recently been developed by physicists but with the exception of Badredine Arfi (2004) in IR and a few others, so far ignored by social scientists.[65] Quantum game theory is just like classical game theory, except that its players are "quantum decision-makers" (Zak, 2000), with indeterminate and entangled properties and strategies before action. It turns out that the effect of these changes on the outcomes of strategic interaction is significant: when non-cooperative games like Prisoner's Dilemma or Chicken are played under quantum rules cooperation is much easier to achieve than in the classical case. This could help explain the finding that in real life people (and states) cooperate much more than they "should" according to classical game theory (see Ostrom, 1998). Quantum game theory was not developed with such social scientific applications in mind, however, and we currently lack concepts to translate much of its formalism into social analysis. The idea of intra-action might be one place to start.

Super-Organisms and Collective Consciousness? Up to this point I have argued only that collectives have an unconscious, not consciousness. This conforms to our common sense, Cartesian intuition that only brains can be conscious, which underpins social scientists' disdain for the concept of collective consciousness, eventually abandoned even by Durkheim himself (Nemedi, 1995; cf. Burns and Engdahl, 1998).

Nevertheless, I wonder whether the quantum argument should not be pushed further, to the conclusion that collectives do have a kind of consciousness. One reason to

explore this possibility is that we talk this way all the time, most notably in IR in how we routinely attribute emotions – which in people involve consciousness – to states and other groups. Our discourse about world politics is replete with "angry" and "fearful" states, "traumatized" and "resentful" societies, and so on. How can we make sense of such emotions talk? Conventional wisdom treats it only "as if," as merely a useful fiction for something else – aggregate emotions of individuals. (Perhaps as a result IR scholarship on collective emotions is almost completely lacking).[66] Yet, these "fictions" seem to do important explanatory and interpretive work in our lives, and are hard to do without. Understanding this work would be easier if we could take collective emotions literally.

By way of concluding this section, therefore, let me briefly revisit from a quantum perspective the concept of collective consciousness. I first conceptualize collectives as super-organisms, which gives them a kind of material body, and then explore what kind of consciousness such a body could support.

Super-organisms are systems that have the functional integration and purposiveness of organisms, but whose elements are biological individuals. Insect colonies are the textbook example, but human societies have been suggested as well.[67] The concept of super-organism has long been eschewed because of its association with group selection, which evolutionary theory was thought to preclude. But in recent years it and group selection have made a big comeback (see Sober and Wilson, 1998), and, importantly, from a classical evolutionary perspective. Super-organisms display a degree of common fate and collective purpose that are hard to explain in reductionist terms, and thus are increasingly seen as biological realities in their own right.

Since the problem with collective consciousness is that collectives don't seem to have the physical infrastructure for consciousness (a material body), the concept of super-organism is an important first step in the argument. The body of an insect colony is not as unitary or coherent as that of a regular organism, but it is a single material system nonetheless. Moreover, we already know from recent classical scholarship that these bodies engage in collective cognition and decision-making, making them "forms of life" in almost every sense. A quantum view would support this argument and take it further. Quantum theory's radical holism could help dispel any classical unease about the reality of super-organisms, and allow for non-local communication among their members.

But are super-organisms conscious? Even granting the materiality of super-organisms attributing consciousness to them still seems a stretch. On the other hand, I have argued that something like consciousness goes all the way down in nature. If something as simple as an electron has a kind of consciousness, then why can't much more complex beehives? Panpsychism suggests that consciousness already comes in at least three distinct degrees or forms – that of sub-atomic particles, plants, and organisms. From this perspective the notion that super-organisms might have another, fourth type of consciousness, looks less crazy.

Indeed, we have more evidence for collective consciousness than we do for electron or plant consciousness, since we participate in it every day. We identify with each other, understand each other's meaning, and feel each other's pain. We have "We-feeling." Is this not precisely what collective consciousness would be like, if it existed? Moreover, many social scientists are already willing to grant the reality of collective intentions, and although it is contested, some philosophers think that intentionality

implies consciousness (see Siewert, 2002). On this view, then, collective intentions might instantiate a collective consciousness. Again, this would be distributed across individual consciousnesses, making it essentially different from the latter. But if we are monads in a social hologram then this is what we should expect: the experience of each mirrors the experience of the whole.

Much more would need to be said to make a persuasive case for such a counter-intuitive proposal, so I am merely gesturing here in the direction of an argument. My point is only that from a quantum standpoint such an argument is at least conceivable, while it is not from a classical one, suggesting that the *a priori* rejection of collective consciousness is a classical prejudice. Perhaps the prejudice is justified, but until we understand even individual consciousness the jury on collective consciousness should remain out.

My discussion in this section obviously raises more questions than it answers, and there are certain issues – like the teleological implications of quantum consciousness, and participatory epistemology – that I have barely touched on at all. But it should be clear even at this stage that a "Heisenberg cut" would lead to a very different picture of social life than a Cartesian one (Atmanspacher, 1997). With this new standpoint in hand I now turn to my critics.

A RESPONSE TO THE CRITICS

In light of the foregoing discussion it is striking that none of *Social Theory's* critics questions its implicit assumption that social life must somehow be consistent with the reality constraints of the classical worldview, suggesting they too accept this premise. As long as we continue to do so, I believe the resources for deflecting or accommodating

most of their concerns can be found within the book itself. The reality constraints of the quantum worldview are quite different, however, and from this perspective some of the criticisms have more force, though not necessarily for the reasons given. With this in mind, in responding I shall first do so from a classical standpoint, and then in each case reflect on the exchange from a quantum one. As noted in the introduction, I shall address eight issues in four groups, relating to state agency, the agent-structure problem, the relationship of ideas to material conditions, and the epistemology of the *via media*.

State Agency

Are States People Too? *Social Theory's* claim that states are actors to which we can attribute human qualities is criticized by Cederman and Daase, Suganami, and especially Zehfuss, but their skepticism is probably widely shared among IR scholars. Although the discourse of state personhood pervades IR scholarship, few of us seem willing to say that states really are persons. We treat state personhood as a useful fiction, a convenient metaphor for the actions of individuals, not a description of how the world really is. The ultimate basis for this skepticism lies, I think, in a tacit commitment to a physicalist view of the mind as something that can reside only in brains.

Even if we accept physicalism such a conclusion is unwarranted for at least one aspect of state persons – their intentions. As I suggested in *Social Theory* and have argued at more length elsewhere (Wendt, 2004), states are structured, self-organizing systems whose intentions are every bit as real as those of individuals. Importantly, this does not preclude conflict within states about what their intentions should be, since macro (state) level outcomes are multiply realizable at the micro (individual) level. Thus, as Zehfuss shows in the German case, states may exhibit significant internal contestation

over their identities, a proper understanding of which requires a close study of domestic politics. However, *Social Theory* is not a book about state identity but about the states system, which is irreducible to individual states. All that is necessary for the assumption of state personhood to be justified at the system level is that domestic contestation be sufficiently structured that it produces unitary collective intentions toward other states at any given moment. To be sure, were those intentions wildly chaotic over time it would be difficult to say much of interest about the international system. To that extent Zehfuss is right that systemic IR theories depend on relatively stable state identities. But in the real world we do not usually observe such chaos, even in the German case. If Germany's identity were truly chaotic it would be impossible for Germany to act coherently on the international stage, and for others to inter-act with it. This may describe "failed states," but not most states in the system.

That said, Zehfuss makes an important point, which is that even if collective intentions are relatively coherent their identities might never be complete, or "identical with themselves" (Bartelson, 1998). However, does this vitiate a realist view of state agency? Perhaps a classical one, since it assumes that the properties of entities must be well-defined, but from a quantum perspective such a criticism is moot. Even though quantum systems do not have determinate properties, they still have an identity in the sense that their wave functions are structured such that some outcomes are more probable than others. It is this structure that enables us to distinguish "this" quantum system from "that" one, and to make (probabilistic) predictions about their behavior, which is all that we minimally need for an identity statement. Thus, the fact that quantum states are not

"identical with themselves" does not preclude their having intentionality, anymore than the fact that individuals' identity is never complete precludes their being intentional.

Reflexivity. Drulak and Savary criticize *Social Theory's* treatment of state agency on different grounds, that it inadequately theorizes the role of reflexivity in international politics, such as Soviet "New Thinking," and thus the possibilities for structural change. States seem reduced to automatons or cultural dopes, condemned to repeating the structural logics to which they have been socialized. Drulak links this failure to the book's over-reliance on the epistemology of Explanation, which he argues is incapable of theorizing reflexivity. Only a turn toward Understanding – and thus implicitly consciousness – can grasp the importance of reflexivity in international life.

In one sense this objection seems misplaced, since systemic theories are intrinsically ill-equipped to explain agency, and as such it misunderstands what *Social Theory* is about. Theories of international politics should not be confused with theories of foreign policy (Waltz, 1979). Each has its respective domain, and accounts developed to understand one may tell us little about the other.

However, unlike Waltz (and following Buzan, Jones, and Little [1993]), in *Social Theory* I added the interaction level of analysis to the purview of systemic theorizing, as "micro"-structural theory. This still excludes the truly unit- or domestic level, and with it a full theorization of state reflexivity. But given the addition of the interaction level, and its use in Chapter Seven to think about structural change, it seems reasonable to expect my approach at least to permit reflexivity, and even speak to its conditions of possibility. In this *Social Theory* is only partly successful. On the one hand, its distinction between role-identities and roles – the I and the Me – creates distance between the subjective and

objective aspects of identity, enabling states in principle to reflect on and change their behavior. But the subjective aspect of this picture is inadequately theorized – in part because Understanding has an ambiguous status within *Social Theory*, and in part because dualism is not an adequate metaphysical foundation for consciousness.

A quantum approach could help here in three ways, and in the process take Drulak and Savary's criticisms further. First, as I argued above a quantum social science might justify attributing consciousness to collectives, and specifically self-consciousness, which is essential if we are to think of reflexivity at the social rather than just individual level. Second, it would justify Drulak's emphasis on Understanding as an irreducible epistemological stance (see below). Finally, the quantum approach to the Self is also promising. Rather than a well-defined classical reality that behaves deterministically, the Self as quantum wave function is a structure only of possibilities, the realization of which is non-deterministic. From this standpoint we might think of reflexivity as the conscious measurement of the state's unconscious wave function, or "measurement of itself," which induces a collapse toward novel outcomes. The potential for such self-measurement is always there, even if not actualized in a given case.

In sum, by highlighting the role of classical assumptions about the mind in the critics' case, a quantum perspective supports *Social Theory's* assumption that states are people too, while potentially deepening it with greater reflexivity. If we are to treat such a "useful fiction" as nothing more than that, we at least need to work harder to do so.

Agency and Structure

This discussion has implications for how we might also respond to criticisms of *Social Theory's* treatment of the relationship between state agents and system structure –

the agent-structure problem. I take up three specific criticisms in this context: Behnke, Cederman and Daase, and Kratochwil's contention that states are not ontologically prior to the states system; Suganami's belief that my claim that states and system cultures are mutually constitutive amounts to two descriptions of the same thing; and Copeland's claim that uncertainty about intentions is so profound that anarchy will constrain state action regardless of its cultural content.

On the Essential State. The criticism that state identity is "social all the way down" points toward an even more holistic ontology than *Social Theory's*, and since that is very much in the book's spirit I welcome the opportunity to consider it. Although the critics make the point in different idioms, their argument comes down to the idea that to be a state presupposes a boundary between itself and the environment, and as such even its corporate identity is constitutionally dependent on other states or "difference." I agree that this important fact is neglected in *Social Theory*, and so the ontological priority given there to the state is too strong. Even the "essential state" exists only in virtue of ongoing processes of differentiation from its environment.

On the other hand, none of my critics comes to grips with the main reason I stopped short of a fully socialized state, namely, that states are self-organizing systems. Like the human body, states are internally structured processes that can persist even if they are not recognized by their fellows (think of Taiwan). In short, state identity is not only about the production of difference from without, but of sameness within. The latter cannot be reduced to the former, and indeed can be expected to resist outside efforts to destroy the boundary (by attempted conquest, for example). To that extent even as it is constitutionally dependent on difference, state agency is also exogenous to it. This is

clear even in Cederman and Daase's effort to endogenize corporate identities within systemic theory. While their framework offers insight into how the specifically spatial aspects of state identities are constructed at the system level, it does not show how states acquire the internal structures that give them spatial identities in the first place. Of course, this is not to say that we cannot study how these internal structures reproduce themselves, just as we can study how the body sustains itself. But *Social Theory* is a theory of the states system, not the state. Reality is organized hierarchically, and states are simply lower in the hierarchy than the states system. Relative to the latter, therefore, their identity must at some level be taken as given, precluding a more radical holism.

Importantly, however, the idea that reality is hierarchical is a classical assumption. In the classical worldview parts necessarily have priority over wholes, since ultimately the latter consist of tiny physical objects whose identity does not depend on other objects. As we saw above, this hierarchical model of part-whole relationships is called into question by quantum theory, in two ways. First, the identity of the elementary units of reality is no longer constituted only physically but also by their wave functions, and as such they are no longer "identical with themselves." And second, wave functions are constantly becoming entangled with other wave functions. This means that at the sub-atomic level the parts of reality are no longer fully separable, which undermines their privileged ontological status in part-whole relationships. This not to say they lose their individuality completely, since entanglement does not pertain to the physical aspect of quantum systems: if we measure them they will still appear as separate particles. But in their wave aspect the elementary units of reality are no longer "elementary."

The decoherence of wave functions that accompanies the transition from the quantum to classical world might be thought to make such a radical holism moot for IR. However, if consciousness is quantum mechanical, and individual consciousnesses are entangled through shared meanings, then the argument would extend to world politics. In their subjective or wave aspect states are not prior to the relationships in which they are embedded, and as such state identity is indeed social all the way down, as my critics have argued. At the same time, however, in their objective or particle aspect the ontological priority of the state remains, as I argued in So*cial Theory*. As happens so often in quantum thinking, in short, both descriptions are necessary to capture the whole truth.

On Mutual Constitution. Turning now from states' essential, corporate identity to their contingent role identities, Suganami argues that my description of state agents as, for example, enemies is equivalent to describing a structure as a Hobbesian culture, and as such they cannot be mutually constitutive. If this were true it would be a significant problem for *Social Theory's* argument. I agree with Suganami that in an important sense role identities and system structure presuppose each other, and indeed, that is the whole point of mutual constitution. But does this mean they are equivalent? I don't see how it could, for precisely the reason that Suganami himself identifies, namely that one is about units and the other about the system. The example he uses to make his point, a wedding, is instructive in this respect. A wedding is not a macro-level structure like a Hobbesian culture, but a micro-level one and thus more akin to "enmity." Even enmity is not strictly equivalent to being an enemy, since it describes a relationship between two actors rather than a property of just one (role vs. role identity), but given that both are micro-level phenomena the connection is tighter. The connection becomes much looser, however, if

we take a more appropriate analogue to a Hobbesian culture, namely marriage. Marriage and weddings are mutually constitutive, but they are not equivalent. Like a Hobbesian culture, marriage describes an institution, the existence of which does not depend on whether any particular individuals engage in it. By the same token, as long as states collectively see the international system in Hobbesian terms, it will have a Hobbesian logic even if a given bilateral relationship is friendly. What Suganami is missing here is the supervenient relationship between the micro and macro levels, which enables them to be mutually constitutive without being identical. Thus, at least from *Social Theory's* classical standpoint Suganami's concern seems unwarranted.

From a quantum perspective, however, the picture looks different, since my response to Suganami presupposed a hierarchical ontology of micro and macro levels. In quantum theory parts and whole are related by entanglement, not supervenience,[68] which calls into question the possibility of "mutual" constitution. 'Mutuality' suggests an underlying separateness of identity, with separable parts interacting to constitute an emergent whole. In entanglement, in contrast, there is an important sense in which the parts do not retain a separate existence at all. This does not mean there is no sense in which they are separate, since if we measure them they will appear as separate particles. But as long as their entanglement is preserved they will form a single system, and to that extent a discourse of "mutual" constitution will be inapt.

This suggests that in one sense Suganami is right, that being enemies and being in a Hobbesian culture are indeed two descriptions of the same thing. The idea of society as a hologram is relevant here, where parts instantiate and mirror the whole. However, this does not mean the relationship between the two levels is one of causal interaction, or that

there are even two "levels" at all. Insofar as enmity is entangled with a larger Hobbesian culture, then at the level of the collective unconscious they form a single undifferentiated system. What to do then with the fact that states experience themselves as differentiated agents that "inter"-act? That happens at the level of consciousness, which I have argued is distributed. Squaring this circle is what the concept of "intra"-action can capture – that the differential experiences of parts emerge only from "cuts" in a preexisting whole.

The Problem of Other Minds. Copeland's concern about my treatment of agency and structure is rather different. In his view, present and future uncertainty about others' intentions – the Problem of Other Minds – is deep and ineradicable. Given the dangers in anarchy of misplaced trust, states are forced to assume the worst about each other even if they would prefer to cooperate. In this way "structure" (anarchy) might constrain state action regardless of history or culture. Copeland claims that I provide no mechanism by which states can overcome this problem, and as such I "cannot argue" that they might escape the world of *realpolitik*.

The Problem of Other Minds is an important philosophical problem even when violence is not an issue, and it is exacerbated by anarchy. So Copeland is right to raise the question, which I did not address in *Social Theory*. However, on both empirical and theoretical grounds his discussion is fatally flawed. The fact is that states do know each other's intentions most of the time, and there are good reasons – contained in the book – for why this should be so. Were Copeland correct international life as we know it would be impossible.

Let us begin on classical grounds with uncertainty in the present. How often are states uncertain about each other's intentions? Rarely. Consider other states' uncertainty

about U.S. intentions today, which given its overwhelming material capabilities should, on Copeland's view, be a source of great anxiety. States in the "axis of evil" – North Korea, Iran, Iraq before the recent war, perhaps Cuba and Syria – are indeed worried about U.S. intentions. Yet they have every reason to be, not because they are uncertain about U.S. intentions, but just the reverse: because of its demonstrated hostility. What about the other 190-odd states in the system? I see no evidence that they are worried about an impending U.S. attack, and a similar trust pervades the vast majority of bilateral relationships in the states system today. In short, empirically, far from facing profound uncertainty, states are confident about each others' intentions almost all of the time.

How is so much epistemic security possible? Are states irrational? Most IR scholars would probably say no – that the trust states have in each others' intentions is perfectly rational, and indeed that to assume otherwise would itself be irrational. Past experience has shown that they can usually afford to reason probabilistically about each other's intentions, rather than adopting worst-case, possibilistic thinking. This points to one classical mechanism, discussed at length in *Social Theory*, by which states can solve the Problem of Other Minds: learning through reflected appraisals. By adjusting their expectations to the responses their actions elicit from Others, over time states have developed a deep reservoir of common knowledge about who they are and what they want. Had this not occurred the international system today would be far more chaotic and conflictual than it is – indeed, there would not be an "international system" at all.

This learning process has taken place against the background of the norms and institutions of international society. These not only help states draw correct inferences about each other's intentions, but help constitute their own intentions. In this light we

can see that Copeland's underlying picture of the international system is atomistic and physicalist. Like atoms in the classical worldview, in Copeland's view states exist and have intentions on their own, constitutionally independent of shared meanings at the system level. This ignores the fundamental point of Chapter Four, namely that the mind is fundamentally social, and as such one cannot know even one's own mind if the Problem of Other Minds is not solved. In short, states need a high degree of certainty about each other's intentions to be "states" at all.[69] This is true even in the Hobbesian culture, where states know who they are (enemies) by virtue of the shared understandings that constitute that identity. Although Hobbesian states assume the worst about each other, they do so not because they are uncertain but precisely because they know that others are out to get them (cf. Mitzen, 2004). Thus, even in this hard case, "structure" (anarchy) does not constrain state action independent of culture.

The problem of future uncertainty does not change this conclusion significantly. True, even if they can plausibly trust the Other today, states must now also be concerned he might change his mind in the future, or that a revolution will change it for him. But how often does this happen? Are state intentions highly unstable over time? Not as far as I can tell. Despite changes in administration national interests seem quite stable, in some cases over centuries. How those interests are pursued varies more, but normally within predictable constraints. Revolutions can produce dramatic changes in intentions, but they are uncommon, and revolutionary states are subject to socializing pressures that usually bring their intentions quickly into line with established norms. Copeland is right that states must be more concerned about the future than the past, since agency is always into the future, but in moving forward they are always looking back, using what they

have learned about each other to guide their actions (cf. Wendt, 2001). Not to do so would be irrational.

On the other hand, although he does not invoke quantum theory, Copeland's argument actually looks more promising from such a perspective, for two reasons. First, in quantum theory uncertainty is not merely epistemic but ontic (cf. Hardin, 2003).[70] One irony of Copeland's analysis is that in his classical worldview there is no ontological uncertainty, in the sense of intentions being actually uncertain. The uncertainty states face is only a limit to their knowledge about others, not whether their intentions really are indeterminate.[71] In contrast, if states are wave functions then they do not even have definite intentions until they collapse. Second, quantum actors have free will, and as such there is always a chance they will act in unexpected ways. This means uncertainty cannot be reduced beyond a certain point, no matter how much learning states do. Both the present and the future are radically open.

While this confirms Copeland's view that uncertainty about others' intentions is ineradicable, it does not warrant his conclusion that states should ignore past experience and assume the worst, because cultures of anarchy impose considerable structure on states' thinking. Even as wave functions cultures make some outcomes more likely than others. Knowing you are in a Hobbesian culture leads to one set of plausible inferences about others' intentions, in a Kantian culture to quite another – and indeed, it is only by participating in such cultures that states could know their own intentions, which only become determinate through ongoing cuts in their web of entanglement. In short, even the radical indeterminacy of a quantum world does not change the fundamental point that anarchy is what states make of it.

Ideas and Material Structure

A focus on the power of ideas is perhaps the most distinguishing feature of all constructivist IR scholarship. Yet many rationalists also think that ideas matter, and so in *Social Theory* I worked at length to clarify the relationship between the two approaches, highlighting several ways in which rationalism could be subsumed within a broader constructivist approach to world politics.[72]

I still think that is broadly right, but I now see an important difference in how ideas can be conceptualized which requires some rethinking. The difference is between treating ideas as informational states of a machine or zombie vs. as meaningful states of consciousness. Rationalism defines ideas as information, which means they are objective phenomena knowable through a positivist epistemology. In *Social Theory* I embraced the alternative definition of ideas as meanings, but failed to clearly distinguish it from ideas-as-information, or to take seriously the fact that meanings presuppose consciousness, which poses problems for a positivist epistemology. In approaching anew how ideas relate to the material world, therefore, I want to frame the question more explicitly as how that world relates not to information but to "meaningful states of consciousness."

A Phony Distinction? It is from this new starting point that I take up Behnke's claim that the question of what relationship obtains between ideas and material conditions is "phony" because it neglects the conditions of possibility for distinguishing them in the first place, the notion of a distinction being itself an idea. Of course, in one sense this is trivially true, since only an intelligent species could formulate the "idea" of a distinction. Thus, unless Behnke means to endorse philosophical idealism, in which it is ideas and nothing but ideas all the way down, the fact that the distinction between ideas and

material conditions is itself an "idea" is beside the point. However, his question of how we can justify the distinction is still important, since if by ideas we mean conscious ideas, then there simply is no basis for it in the classical, physicalist worldview. On that view, ideas can be nothing more than informational states of the human machine, which eliminates any fundamental distinction between them and the material world.

So how can we know there is one? The answer is 1st person experience. There is "something it is like" to have my ideas, which is essentially different from my experience of material objects. As a warrant for knowledge 1st person experience has no standing in a positivist epistemology, according to which I should be a zombie. But I see no reason to believe that. Perhaps my positivist colleagues are zombies, but I have access to my own experience that they don't, which tells me that my ideas are qualitatively different from the material objects around me. It would be ironic if Behnke, a post-modernist, did not accept the evidence of his own experience and reach the same conclusion; but perhaps he is a zombie too.

This epistemic warrant for a distinction between ideas and material conditions still leaves us, however, with the question of how such a distinction is possible in the first place. In *Social Theory* I thought dualism was the answer, but a quantum approach offers a better solution, treating them as two aspects of one underlying reality. This ontology is compatible with both the 3rd person epistemology of positivism and the 1st person epistemology of subjective experience, while avoiding the reduction of either. Instead, ideas and materiality stand in a relation of complementarity: individually incomplete, mutually exclusive descriptions of the same phenomenon.

Power and Interest vs. Ideas. This speaks to Copeland's realist argument that ultimately it is material factors – power and interest – that determine world politics, not ideas. Importantly, this assumes their relative weights can be meaningfully compared in the first place, as if variables in a regression equation, which in *Social Theory* I argued makes little sense. Material power is only "power" insofar as it is meaningful, as shown by the relative threat to the U.S. posed by 5 North Korean nuclear weapons versus 500 British ones. And interest is only "interest" insofar as it is given content by ideas, as shown by the U.S. failure to conquer the Bahamas. In each case, realism's ostensibly material factors turn out to be constituted largely by ideas; at best we are talking here about how one set of ideas ("realist" ones, perhaps) relates to another ("idealist"). As I argued in Chapter Three, the only fair way to compare the relative importance of ideas and material conditions would be to first strip power and interest of their constituting ideas, isolating their brute or rump materiality (technology, geography, and human nature), and then seeing to what extent the latter constrains or causes the former. Were we to do this in IR, however, with its non-material corporate actors interacting in a space of shared meaning, it seems clear that ideas would be more important.

Nevertheless, there is a residual sense in *Social Theory* that at least in principle the relative importance of ideas and (rump) material conditions could be compared. This residual stems from the book's dualist ontology. From a quantum perspective this looks problematic. Instead of distinct substances that somehow interact, mind and matter are now complementary aspects of an underlying reality that is neither. When thinking about world politics from the standpoint of ideas we are in the realm of wave descriptions, and from a material standpoint in the realm of particle descriptions. Each is essential in IR

scholarship, since human beings live in both worlds simultaneously. The relationship between the two is therefore not one of interaction (dualism) or reduction (materialism), but correlation. From this perspective it makes no more sense to compare the relative importance of ideas and material conditions than to compare that of waves and particles.

Problems of Epistemology

Social Theory attempts to combine a positivist epistemology with an interpretivist ontology. In this last section I consider whether such a position is coherent in light of a quantum approach to social life, but first let me reiterate in what sense precisely *Social Theory* is "positivist," since the term has two distinct meanings. It can refer broadly to a commitment to science, understood as an method for gaining knowledge about the world out there; or it can refer narrowly to a particular philosophy of science that privileges Humean causation, lawlike generalizations, deductive theory, and so on. *Social Theory* is positivist only in the first, "small-p" sense. Regarding the second it advocates an anti-positivist, realist philosophy of science, which privileges causal mechanisms, inference to the best explanation, and methodological pluralism. Although in *Social Theory* I thought I had kept these two meanings separate, the question of whether it is possible to combine "positivism" and scientific realism continues to dog the book (e.g. Wight, 2002; Brglez, 2002). In the broad, small-p sense of the term the answer is clearly yes,

The most sustained and systematic critique of *Social Theory's* epistemology is mounted by Kratochwil, who argues that I overlook the decisive role that sociology of knowledge considerations play in determining scientific truth – considerations stressed even by other scientific realists like Bhaskar. Thus, he suggests that rather than a neutral procedure for revealing an objective truth about Nature, science should instead be likened

to a "court," where socially determined burdens of proof are what count and truth is a function of consensus.

Kratochwil is certainly correct that accepting an important role for social factors in science is compatible with scientific realism. This is because even though it implies a correspondence theory of truth and as such is foundationalist, its foundationalism is relatively weak. A strong foundationalism would be that scientists simply "read off" the truth from reality, their discourse playing no role in producing the truth. Scientific realism rejects this naïve position in favor of the view that all observation is theory-laden, which concedes an important role to discourse.

On the other hand, Kratochwil neglects the fact that it is also a fundamental assumption of scientific realism that reality constrains or regulates truth. Indeed, this is the case even in judicial proceedings. The notion that courts should try to ascertain and be governed by "the facts" is a crucial assumption in modern judicial practice, and can lead to earlier court decisions being overturned if new facts come in; a court that refused to be constrained in this way would be a "kangaroo" court, not a real one. To be sure, the facts may be hard to see through the fog of existing theory, and Kratochwil is correct that theories can be successful even if they do not refer correctly to reality (also see Wendt, 1999: 65-7). But it is also the case that reality sometimes resists theories, and by probing this resistance scientists can bring the deep structure of reality more clearly into view. It would be hard otherwise to explain the quantum revolution; ultimately sub-atomic reality simply would not permit a classical description. In this light it is strange that Kratochwil sees my epistemology as "monological" and his as "dialogical." I would say just the opposite. His view may be dialogical <u>among scientists</u>, but with respect to reality it is

monological, since truth seems to be a matter for scientists alone to decide. Scientific realists would argue that just because something counts as true for us does not make it true: Nature too has a say.

For scientific realists the holy grail of this dialogue is a perfect 3rd person representation of Nature. Although perhaps never achievable in practice, we can approximate it through the discipline of objectivity, of making our measurements of Nature as passive and value free as possible. That there is at least the possibility of such an approximation is guaranteed by the classical assumption that subjects and objects are categorically distinct. If so, then we can expect that when we ask a question of Nature in the proper way, we will get a true answer.

All of this assumes, however, that Nature only has one answer to give, that in the end there is a unitary truth because Nature can only "be" one way. In the quantum world this is not the case. Quantum systems can "be" two ways, particle and wave, which are irreducible, mutually exclusive, and individually incomplete. Quantum reality, it seems, always has "two stories to tell" (cf. Hollis and Smith, 1990), and so does not constitute the unitary reality constraint presupposed by even weak foundationalism. Instead, what we have is a kind of "non-foundational foundationalism."[73]

When applied to social science the "non-foundational" aspect of quantum theory points in two directions. First, we need to take more seriously the complementarity of Explanation and Understanding.[74] On the one hand, this means that the *Methodenstreit* between positivists and interpretivists is based on a false, classical premise. In quantum theory it would be absurd for the "particle guys" to fight with the "wave guys" about who has the truth, since the knowledge each offers is understood to be inherently partial, and

so must be complemented with the other for a complete description. The "Hobbesian" epistemological mentality one often sees in the social sciences today assumes that either Explanation or Understanding must constitute The One True description, which from a quantum perspective is simply not the case. Instead, what we need is an "epistemological Westphalia," in which positivists and interpretivists recognize the other's contribution to their shared goal of comprehending social life.

More specifically, given that social science today is dominated by the positivist concern with the particle aspect of social life, what this means is taking the wave aspect – consciousness and meaning – seriously as well. In retrospect I do not feel I did that in *Social Theory*, where despite my concern with the role of ideas in international life, I never mentioned consciousness and treated meaning as an object. To take consciousness and meaning seriously would require answering some hard methodological questions, given that consciousness is unavailable to objective, 3rd person inquiry. In particular, it would require coming to grips with the epistemological specificity of 2nd and perhaps even 1st person[75] knowledge as ways of apprehending the social – in short, with the distinct requirements of a "science of the subjective" (Jahn and Dunne, 1997).[76] Of course, this has long been the argument of interpretivists, so in one sense I am saying nothing new here. But in my view most contemporary interpretivists do not take consciousness seriously either; since the post-modern "death of the subject" they have observed the "taboo of subjectivity" just as faithfully as positivists (cf. Freundlieb, 2000). Were we to break it with the help of quantum theory, it would lead in the direction of a truly phenomenological sociology, along the lines of a Schutz, Merleau-Ponty, or even Collingwood, which at least in IR is not the dominant métier of interpretivists today.

The second direction in which quantum theory's non-foundationalism points is to take seriously the inherently participatory relationship of social science to its objects of inquiry. In quantum theory measurement is always productive: when we measure a quantum system we necessarily alter it.[77] This is because before the act of measurement the observer and observed are non-locally entangled – in the social context, by shared meanings – and as such parts of a larger whole. The "cut" of measurement destroys this whole, and in so doing creates the distinction between subject and object, in what Erwin Schrodinger (1959) called the process of "objectivation." When the discipline of IR observes world politics, therefore, it is in effect also observing itself (cf. Albert, 1999). This vitiates the positivist goal of perfect objectivity, but, importantly, it does not vitiate objectivity altogether. Rather, what it does, as feminist epistemologists have argued, is make objectivity inherently situated, or relative to a standpoint.[78]

I have only just begun to think about what such a participatory epistemology might entail for my own work, but it is clear that among other things it raises important normative questions. If IR scholars are irreducibly participants in the super-organism that is world politics, "performing" (Weber, 1998) or instantiating it holographically in our work, then we have ethical responsibilities to the other subjects of those politics in measuring them, responsibilities which we do not necessarily have if facts and values can be clearly separated as in the classical worldview. But with those responsibilities comes a capacity for collective self-consciousness that is otherwise largely missing in day-to-day international life, and as such is a basis for reflexivity and progressive change.

None of this will be news to post-modernists, and indeed the non-foundational aspect of quantum epistemology points strongly in their direction – although I'm not sure

that quantum game theory is what they had in mind. But that quip also highlights the sense in which a quantum social science would still be foundationalist. For despite all the philosophical controversy that has surrounded quantum theory, there has never been any question that quantum physicists were doing science, understood as a method for gaining knowledge of the world out there. All physicists agree upon certain practices of scientific inquiry, and upon the principle that reality is a constraint on truth. It turns out that in the quantum context the reality constraint – the foundation – is not unitary, that there are always "two stories to tell." But this does not change the fact that in doing physics, physicists are not only engaged in a monologue among themselves, but also in a dialogue with Nature, by which they feel constrained. In the social sciences matters are more complicated because our participation in "Nature" is more immediate, but there too society constitutes an external reality to which proper scientific practice can provide epistemic access. Perhaps post-modernists would not reject foundationalism in this non-unitary sense, but it does imply positivist forms of "rigor" that some have been unwilling to embrace in the past.

CONCLUSION

It is common in social science today to disparage "social physics" as a naïve way of approaching social life, one that has not proven fruitful for the development of theory and even been positively misleading. Besides, from a systems-theoretic standpoint like *Social Theory's* there seems little reason to think physics should be relevant to social science anyway, since reality is stratified into multiple levels, each with its own laws of motion. Much better, then, to abandon physics envy and its implicit reductionism, and get on with theorizing about social life on its own terms. Or, if we must look to another

science for foundations, let it be biology, which at least is concerned with life, not physics (Bernstein, et al., 2000).

In dismissing social physics, however, what usually goes un-remarked is that the models in question – corporate actors as billiard balls, utility as energy, rational actors as computational machines, and so on – are all taken from classical physics, not quantum. Thus, their perceived failure in social science could be one merely of the wrong kind of physics, not of physics *per se*. Indeed, if the argument of this chapter is right, then we should expect classical models to fail, since social life is not a classical phenomenon in the first place. Whether quantum models might do better therefore remains an open question.

Perhaps, but why do today's sophisticated social scientists need to bother with any physics, whether classical or quantum? What about the stratification of reality into multiple levels? The answer is that social life takes place in the physical world. Our bodies are physical and so is our material environment, which constrains and enables human behavior in important ways. Physics is our best description of that world, and one that I suspect almost all social scientists, even post-modernists, would defer to in thinking about what is possible in social life (no ghosts, no reincarnation, no telepathy and so on). In this sense we are all philosophical naturalists. To be sure, this does not mean we can "read off" social theories from physical ones, since society is an emergent phenomenon with its own specificity; and it may be that the methods of social science must differ in important ways from those of natural science. The relationship of physics to social science is one of under-determination, not determination. But as a metaphysical constraint it nevertheless plays a fundamental role in our work.

The question, then, is how to assert the autonomy of social science while giving physics its due? That is what this chapter, and indeed *Social Theory*, was about. Like most other social scientists, in my book I took for granted the classical description of reality as defining the metaphysical framework within which I had to work. The problem for me was that classical physics implies a materialist ontology, which does not – indeed cannot – take seriously that which is most uniquely social, namely consciousness and meaning. *Social Theory's* solution was a Cartesian dualism, but dualism is probably wrong, and the going alternatives – also at least implicitly classical – not much better. Hence the attraction of a quantum approach, with its fundamentally different reality constraint. The quantum turn here, then, is ultimately problem-driven, rooted in an inability to otherwise reconcile consciousness and meaning with the material world.

That said, the quantum consciousness hypothesis is a radical, even desperate conjecture, for which there is only the most slender evidence so far. Despite its elegance as a solution to both the hard problem of consciousness and the problem of interpreting quantum theory, it will be years before we know whether it is true, or whether it scales up to the social level. This is a bet with long odds, in short, and so I am not advocating that quantum theory now be required reading in our graduate programs. However, given the track record of social science to date it is not clear the classical bet is any safer. Thus, until the natural sciences solve the mind-body problem the social sciences should keep their options open, and develop a quantum approach alongside its existing classical ones.

As can be seen from this chapter, a quantum social science would sometimes simply recapitulate or support existing social theories, perhaps especially post-modern ones like performativity theory. Indeed, such redundancy is to be hoped for – if quantum

ideas did not map at all onto existing social science, which is the best description we have of social life, then that would suggest that social life is not quantum mechanical. But skeptics might nevertheless see it as a problem, that quantum social science is just "old wine in new bottles." This value added question is an important one, and we will not be able to answer it until after a quantum social science has been developed. Nevertheless, there are several reasons to think that the transformative implications of such thinking could be profound. Long-standing metaphysical and methodological disputes might be resolved; substantive theorizing might benefit from new formalisms like quantum game theory; empirical anomalies might be explained; and, as a bonus, if a quantum social science proved to be a success, it would be evidence that its foundation, the quantum consciousness hypothesis, is true.

However, the most basic contribution of a quantum perspective would be to enable social scientists to take consciousness and meaning seriously within a naturalistic worldview. At the moment social scientists are faced with a Hobson's choice between a positivism in which consciousness makes no difference and an interpretivism in which it has no naturalistic basis. Both approaches at least implicitly assume that human beings are classical systems. My argument in this chapter has ultimately been very simple: the difference that consciousness makes is quantum. In a sense this quantum naturalism reaffirms the goal of the *via media* between Explanation and Understanding, but in so doing jettisons the need for a "path between" altogether, replacing it with a relationship of complementarity.

Let me close on a personal note by saying that, although hard work and at times wrenching, whether right or wrong I have very much enjoyed thinking about the

possibilities raised in this chapter. For that I want to thank *Social Theory's* critics, whose pointed questions forced me to reexamine its foundational assumptions, and Anna Leander and Stefano Guzzini, who gave me the opportunity to do so in a systematic, written form.

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ENDNOTES

[1] Also see the Forum on *Social Theory* in Review of International Studies (2000).
[2] Which is not to deny that there is considerable variation within each, but these variations are structured by agreement on certain first principles.
[3] See Wendt (n.d.).
[4] The idea of a quantum social science was first proposed by William Munro in his presidential address to the American Political Science Association in 1928. It has since been taken up by Matson (1964) and Becker, ed. (1991), although mostly at the level of metaphor. Zohar and Marshall's (1994) more popularly oriented text is an important exception.
[5] The affinities between quantum theory and post-modernism have been noted before by Major-Poetzl (1983), Plotnitsky (1994), and Akrivoulis (2002), among others.
[6] Though see Viale (2000), Sawyer (2001) and Smith (2003).
[7] For an overview of contemporary scholarship on the mind-body problem see Block, et al., eds. (1997).
[8] The term 'consciousness' is sometimes used in the literature to cover both cognition and experience, but this can be confusing, and as such I shall use it to designate only experience, reserving the term 'mind' for both.
[9] See especially Davidson (1963), although he believes this ontological position is compatible with the epistemological autonomy of the social sciences.
[10] Although the view that consciousness is an "illusion" is growing in popularity; see the special issue of Journal of Consciousness Studies (2002) devoted to this topic.
[11] Quoted in Kirk (1997: 249).
[12] I use the term 'Cartesian' here in the broad sense customary today, which includes ideas from other early modern thinkers like Bacon and Newton.
[13] E.g. Fierke (2002) and Kratochwil (this volume); see Guzzini and Leander (this volume), p. XX.
[14] More or less. One of the issues in the debate is whether it is legitimate to modify quantum theory to accommodate certain interpretive desiderata.
[15] Complicating matters further is the danger of bogus interpretations of quantum theory being perpetrated on naïve social scientists, as we saw in the Sokal Hoax.
[16] For a fuller treatment see Wendt (n. d.), Chapter Three.
[17] A sixth assumption, that space and time are absolute, is challenged more by relativity theory than quantum mechanics.
[18] Radical interpretivists have doubts about (5), which as we shall see are best justified in quantum terms.
[19] Although physicists are hard at work on this problem, which includes the integration of quantum theory with relativity, which describes matter at the ultra-macro level.
[20] The best is probably still Zukav (1979).
[21] See, for example, Home (1997), Laloe (2001), and Ruetsche (2002).
[22] On the nature of complementarity see Held (1994). Bohr's Copenhagen Interpretation interprets the principle in epistemological terms only, which would not pose an ontological challenge to the classical worldview.
[23] At least on most interpretations of quantum theory.
[24] Although the evolution of the wave function is deterministic as long as it remains a wave.
[25] On non-locality see Nadeau and Kafatos (1999).
[26] See, for example, Bohm (1980), Teller (1986), and Esfeld (2001).
[27] The warmth and wetness of the brain are also problems for quantum consciousness.
[28] For overviews see Atmanspacher (2004) and Davies (2004).
[29] See Hameroff and Penrose (1996), Hameroff (2001), and Hagan, et al. (2002). Satinover (2001) is a good overview of quantum brain theory, though skeptical of its ability to explain consciousness. Still other approaches to quantum consciousness include Lockwood (1989) and Stapp (1996).
[30] The most widely cited critique is Tegmark (2000), which was responded to by Hagan, et al. (2002).
[31] See Chalmers (1996), Velmans (2000), and Gabora (2002).
[32] Quoted in Skrbina (2003: 25).

[33] There are various accounts in the literature of how this distinction emerges, but a particularly attractive one is that the process involves a "temporal symmetry breaking" in the collapse of the wave function (see Atmanspacher, 2003 and Primas, 2003), which helps make sense of the teleological, backward-referring character of human action.
[34] The underlying reality might also be identified with the "vacuum" or "zero-point field"; see McTaggart (2002).
[35] On the history of panpsychism see de Quincey (2002) and Skrbina (2003).
[36] As such, panpsychism might be better described as "pan-experientialism" (Griffin, 1998).
[37] See Margulis (2001), and also the literature on "biosemiotics" (Hoffmeyer, 1996).
[38] Quoted in Miller (1992: 362).
[39] See Bohm (1980; 1990), and Hiley and Pylkkanen (2001).
[40] See Ho (1993), Seager (1995), and Davies (2004).
[41] See, for example, Nagel (1979), Seager (1995), Chalmers (1996), Griffin (1998), Malin (2001), de Quincey (2002), Velmans (2002), Mathews (2003), and Skrbina (2003); cf. Litfin (2003) and Bennett (2004).
[42] That said, quantum mechanics was developed to describe the behavior of sub-atomic particles, and as such strictly speaking does not apply to human beings. What we are really talking about here, therefore, is a generalized, "weak" version of quantum theory, structurally isomorphic with the original but modified to take into account the properties of macroscopic systems; see Atmanspacher, et al. (2002).
[43] Other good analogical accounts include Matson (1964), Becker, ed. (1991), and Rosenblum and Kuttner (1999).
[44] Feminists have convincingly criticized classical models of man for being literally about men, so I use 'man' here as a friendly provocation to consider whether the same holds for the quantum model. My proposal is that it would not.
[45] On various models of the unconscious see Ekstrom (2004).
[46] See Penrose (1994), Latsch (2003); cf. Smith (2003).
[47] See, respectively, Slovic (1995) and Zaller (1992).
[48] Though see Hosek and Freeman (2003), who attempt to ground performativity in a non-linear classical theory of the mind.
[49] See Barad (2003); cf. Bennett (2004).
[50] On the distinction between causal and constitutive effects see Wendt (1998).
[51] For further discussion see Wendt (2003).
[52] On anticipatory consciousness see Jordan (1998) and Wolf (1998), and on temporal non-locality Nadeau and Kafatos (1999) and Malin (2001).
[53] Cf. Hodgson (2002).
[54] The idea that social systems engage in classical computation is relatively well-established; see Mirowski and Somefun (1998) and Clark (2003).
[55] See especially Esfeld (2001).
[56] I say 'have' rather than 'are' wave functions because social systems are also patterns of actual behavior, which only take place in collapse.
[57] "Mirror neurons" in the brain may provide the physical basis for this entanglement of shared meaning; see Gallese (2001).
[58] See Bohm (1980).
[59] See Humphreys (1997); on the problem of identity in the quantum context see Castellani, ed. (1998).
[60] This should allay any concerns that a holographic society would be like the "Borg" on *Star Trek*, the individual members of which had no experience or will of their own.
[61] On "quantum monadology" see Nakagomi (2003).
[62] Despite challenging methodological individualism in other respects, *Social Theory* reflects this view insofar as it treats the essential state as constitutionally prior to international life, as Suganami (this volume) points out.
[63] This might provide a quantum basis for Foucault's disciplinary view of power, of which individuality is a primary effect.
[64] Also see Rouse (2002). There are also parallels here to Dewey's "transactional" approach to action; see Khalil (2003).

[65] Note that Arfi does not use the wave function formalism, preferring instead a more general, non-Boolean quantum logic. For an introduction to quantum game theory see Piotrowski and Sladkowski (2003).
[66] Though see Hall (2003).
[67] For discussion and references see Wendt (2004).
[68] See Teller (1986), Humphreys (1997) and Belousek (2003).
[69] For an extension of this idea using the concept of ontological security see Mitzen (2004).
[70] At least arguably; the Copenhagen Interpretation resists drawing any ontological inferences about the quantum world, whereas other interpretations do.
[71] On the relevance of this distinction in social science see Khalil (1997); cf. Hardin (2003).
[72] Also see Fearon and Wendt (2001).
[73] I thank Andreas Behnke for this language.
[74] On quantum complementarity in the social sciences see Apel (1984) and Rasmussen (1987).
[75] For some suggestive thoughts on this case see Rudolph and Rudolph (2003) and Petranker (2003).
[76] On the role of these different kinds of knowledge in quantum theory see Matsuno (2002).
[77] Although there is debate between instrumentalists and realists about what precisely this entails.
[78] See Haraway (1988), and for a recent generalization beyond feminist theory Heikes (2004). Cf. Rouse (2002).