

APPENDIX G: Comments on Searles' New Book.

After the foregoing parts of this book were completed I chanced upon, and read, John Searles' new book *MiND, a brief introduction*. In it he describes briefly, in his usual lucid way, the chief topics of the philosophy of mind, namely the Mind-Brain Connection, Consciousness, Intentionality, Mental Causation, Free Will, Perception, and The Self. He sketches out his reasons for believing that the views of most other philosophers on these subjects are terribly mistaken, and then presents his own views. By and large, Searle's answers lead in the direction of the quantum approach described in this book. However, he develops his approach while adhering to the classical-physics conception of what basic science says. He admits that quantum theory may provide a way of dealing with the unresolved problems, and cites this book in that connection, but says he will ignore the quantum approach because he does not understand it. (p. 46)

Generally, one cannot understand a fundamentally new idea until one sees how to reconcile it with one's understandings of closely related topics. Thus Searle's new summary of the whole field of philosophy of mind from a viewpoint close to the quantum view provides me with a basis for expanding the reader's understanding of the quantum approach by explaining how the transition from quantum physics to classical physics impacts upon the entire array of mind-related issues.

I have focused in this book upon the key technical point, namely the fact that quantum theory does not merely introduce elements of randomness and uncertainty into physics. More importantly, in the present context, it entails the existence of human conscious choices that are not themselves fixed by any yet-known laws, but that strongly influence human behavior. The aim of this appendix is to explain the impact of this critical change in basic physics upon the various arguments put forth by Searle. Overall, the effect of this shift in physics is to support Searle's ideas by showing how they work in contemporary physical theory, and indicating how the remaining problems are resolved by replacing the known-to-be-false precepts of classical physics by the at-least-possibly-valid precepts of orthodox quantum physics.

In the first one-third of his book Searle gives a quick survey of the main ideas and arguments in contemporary philosophy of mind. He then notes that

In most philosophical subjects there is no sharp division between what the professionals believe and the opinions of the educated public. But on the issues discussed in this book there is an enormous difference between what most people believe and what the professional experts believe. I suppose most people in the Western world believe in some form of dualism. ...[but] Almost without exception, the professional experts in the field accept some version of materialism. (p.12)

The reason for this disparity is easy to see. Science and religion are the twin foundations of the beliefs of the educated Western public. Western science was erected upon René Descartes' separation of the human mind from the human brain, i.e., on a dualistic conception of human agents that is not incompatible with Christianity. Thus Western science, at least at its inception, and Western religion were united in their support of the dualistic idea that there are two differently described aspects of nature, the mental and the physical, which interact within human brains. On the other hand, professional philosophers, while essentially unified in their opposition to dualistic ideas, have been unable to arrive at a rationally coherent materialistic account of nature. Instead of collectively presenting to the public a clearly formulated materialistic theory of the world, they are incessantly demolishing each other's attempts to do so.

Searle has moved slightly beyond this obsession of philosophers with trying to explain how materialism can be true and dualism false. At the end of the survey mentioned above Searle concludes that "we know independently that both what dualism is trying to say and what materialism is trying to say are true. Materialism is trying to say that the world consists of physical particles in a field of force. Dualism is trying to say that there are irreducible ineliminable mental features of the world, consciousness and intentionality, in particular" (p. 106)

Searle's solution of the mind-brain problem is essentially to assert that nature is causally materialistic and ontologically dualistic. The dualistic aspect inheres in the fact that consciousness has a "first-person ontology" whereas its neural substrate has a "third-person ontology." Thus conscious activities and neural activities are ontologically different. Both are real, but the former cannot be eliminated or reduced to the latter because the two are ontologically different.

Searle's claim that nature is causally materialistic rests essentially on his recitation of "known facts": "We know for a fact that all of our mental processes are caused by neurobiological process" (p. 114): "We know for a fact that they [my feelings of thirst] are caused by neural processes" (p.115).

But what are these feelings of thirst exactly? Where and how do they exist? They are conscious processes going on in the brain, and in that sense they are features of the brain. ... Just so this does not sound like I am vaguely talking about how things might be as opposed to how they actually are in fact, let me nail the whole issue down to reality by summarizing some of what we know about how brain processes cause feelings of thirst. Suppose an animal gets a shortage of water in his system. The shortage of water will cause 'saline imbalances' in the system, because the ratio of salt to water is excessive in favor of salt. This triggers certain activities in the kidney. The kidneys secrete rennin, and the rennin synthesizes a substance called angiotensin 2. This substance gets inside the hypothalamus and affects the rate of neuron firings. As far

as we know the differential rates of neuron firings cause the animal to feel thirst. ... All conscious states are caused by lower-level neuronal processes in the brain ...and they exist as biological features of the brain system. (p. 112/113)

Most of this scenario is presented as completely known and certain. But one step is curiously different from the others. All the causal steps from molecules up and including neuron behavior, but not including the appearance of the *feeling* (of thirst), are described in terms of physical substances, composed of physical particles, and are presented as known certainties, presumably because such particles, and hence the structures built out of them, are controlled by the laws of physics, whereas the fact that the changed rates of neural firings “cause the animal to feel thirst” is qualified by “as far as we know”. Indeed, there is, according to the precepts of classical physics, a big difference between the claim that one physically described process *causes* another physically described process and the claim that a physically described process *causes* a psychologically described feeling to occur. The laws of classical physics directly specify causal connections between different physically described processes, but do not directly specify any causal connection between the physically described aspects of nature, as described in physics text books, and the psychologically described “feelings” that occur in our streams of consciousness. Indeed, the universally recognized great virtue of classical physical theory was precisely that its physical laws avoided any mention of psychologically described entities. But the claim that saline imbalances cause feelings of thirst seems, on the face of it, to suggest the need for causal laws of a different kind, laws that connect ontologically different kinds of things. Searle tries to dodge that conclusion, and get effective psychophysical causation from purely physical causation, by denying the idea (attributed to Descartes) that no reality can be both physical and experiential. I shall argue that this dodge fails: psycho-physical causation is needed, and quantum theory provides it.

Searle states his ideas about consciousness as four theses (p. 113):

1 Conscious states, with their subjective, first-person ontology are real phenomena in the real world. We cannot do an eliminative reduction of consciousness showing that it is just an illusion. Nor can we reduce consciousness to its neurological basis, because such a third-person reduction would leave out the first-person ontology of consciousness.

2. Conscious states are entirely caused by lower level neurobiological processes in the brain. Conscious states are thus *causally reducible* to neurobiological processes. They have absolutely no life of their own, independent of neurobiology. Causally speaking, they are not something “over and above” neurobiological process.

3. Conscious states are realized in the brain as features of the brain system, and thus exist at a level higher than that of neurons and synapses. Individual neurons are not conscious but portions of the brain system composed of neurons are conscious.

4. Because conscious states are real features of the real world they function causally. My thirst causes me to drink water for example. I will explain in detail how this works in chapter 7, Mental Causation.

Searle claims that “we know” all of these things to be true, but then asks: “Why then does this apparently obvious solution encounter so much resistance?” (p. 114). He answers that the difficulty is with “the traditional categories”: He claims, essentially, that the problem is with our language and the associated concepts. I shall argue that the error is rather than with the uncritical acceptance of the known-to-be-false concepts of classical physics.

One problem with Searle’s scheme is to understand why there is not “causal over-determination.” If the materialistic level of description is already, by itself, causally complete, yet “My [ontologically different] conscious thirst causes me to drink water” then the second set of causes must be redundant. In Searle’s words the problem is this: “supposing... that the mind did play a causal role in producing our bodily behavior, ... seems to get us out of the frying pan into the fire, because now it looks like we have too many causes. It looks like we have what philosophers call ‘causal overdetermination.’ It looks like there would be two separate sets of causes making my arm go up, one having to do with neurons the other having to do with conscious intentionality.”(p. 206)

Searle addresses this crucial issue in chapter 7, Mental Causation. He lists four propositions (p.207):

1. The mind-body distinction: the mental and the physical form distinct realms.
2. The causal closure of the physical: the physical realm is causally closed in the sense that nothing nonphysical can enter into it and act as a cause [in the physical realm].
3. The causal exclusion principle: where the physical causes are sufficient for an event, there cannot be any other types of causes of that event.
4. Causal efficacy of the mental: mental states really do function causally [in the physical realm.]

I have added the bracketed phrases [in the physical realm], because an action of mental states in the mental realm would not be pertinent in this context.

The final three propositions are set forth as essentially known or “accepted” truths. Proposition 2, the causal closure of the physical, is supposed to be what is known from (classical) physics. Proposition 3 denies causal over-completeness. And Searle accepts Proposition 4 on the basis of his direct impression of the causal efficacy of his conscious efforts to, say, raise his arm. (p. 203), buttressed by the evolutionary argument (p.233) that mental processes would have no natural tendency to develop---as they evidently have done during the evolution of our species---if they were causally inert in the physical world.

Searle notes that these four propositions are inconsistent, and claims that “The mistake is expressed in proposition 1, the traditional mind-body distinction.” Thus he uses the inconsistency of the four propositions to discredit Descartes’ idea that the mental and physical form ontologically distinct realms. This allows him to conclude that the traditional vocabularies, categories, and meanings must be redefined and restructured, in order to maintain the three “accepted” truths, which he finds more secure and defensible than the metaphysical proposals of Descartes.

Actually, Propositions 1,2, and 4, by themselves, are already inconsistent. If, in accordance with Proposition 2, nothing nonphysical can act as a cause in the physical realm, and, as asserted by Proposition 4, mental states do function causally in the physical realm, then mental states must be physical, and proposition 1 must be false. Thus Descartes is proved wrong, and we must, Searle concludes, abandon the traditional metaphysical categories.

However, Proposition 2, as stated, is unsatisfactory. The concept of something nonphysical “entering into” the physical realm is obscure. How can a nonphysical thing enter the distinct realm of physical things. That is a contradiction. The apparently intended meaning of Proposition 2 is simply that “nothing nonphysical can act causally in the physical realm.” This form of proposition would still allow the contradiction to follow. But, like the earlier one, it renders Proposition 3 superfluous: Yet the argument was supposed to address the problem of causal over-determination. Hence Proposition 3 needs to enter.

Another problem with Proposition 2 is that it does not express the usual classical meaning of the “causal completeness of the physical,” which is simply that the physical description is causally complete by itself This is what is usually meant by the causal completeness of the physical. No explicit mention is made of nonphysical realities.

A rational argument that does use Proposition 3 is obtained if, in accordance with Searle’s overall stance, one accepts classical physics, and simply takes the “causal closure of the physical” to mean what it means in classical physics:

- 2’. The causal closure of the physical: the physical world is causally closed, in the sense that all physical events

are entirely determined (from earlier physical conditions)
by physically described causes,

This proposition, taken from classical physics, combines with the other *three* to give a contradiction.

But why is Proposition 1 the mistake, as Searle claims? The neurobiological and mental aspects are asserted by Searle to be realities that are *ontologically* different. But then they belong to different *ontological* realms, and hence to different (distinct) realms, in agreement with Proposition 1. That is, Proposition 1 apparently follows directly from Searle's main thesis that mind and brain are ontologically different. Searle wants to maintain also Proposition 3, that there is no causal over-determination, and Proposition 4, that our conscious intentional thoughts really do affect our actions. On the other hand, Propositions 2 and 2', although true in the classical-physics approximation are both *false* in contemporary physics. Thus Searle's argument backfires; it leads not to the drastic conclusion that our basic categories of thought must be abandoned, but rather to the simple conclusion that the classical-physics approximation, which renders all psychologically described realities causally inert, is not adequate in the treatment of a conscious brain. Thus the solution to the problem of causal over-determination is very simple: stop using the inapplicable classical approximation!

As regards Searle's tactics, the point is this. Even supposing, with Searle, that consciously experienced feelings exist only as real attributes of certain special kinds of high-level neurological processes, and are entirely inseparable from those biological processes, being features of them, and supposing also that the physically described properties are themselves causally complete, then it is not proper to say that these special real features of the biological process *cause* the physically described action. If the causal processes are indeed entirely specified by the physically described aspects alone, without any acknowledgement of the existence of the attached special features, and the characteristics of these special properties enter in no way into the complete causal account, then it conflicts with the normal theoretical idea of "causation" to say that those unmentioned realities are *causing* the physical effect. The mind-body problem is not solved by merely altering the normal meaning of the word "cause" in this way.

It is useful to compare Searle's position to the "identity theory" of the mind-brain connection. According to the Oxford Companion to Philosophy (1995) "The contemporary mind-brain theory, developed in the late 1950's, is that mental events are (that is, are identical with) physical biological processes in the brain. Pain, for example, is nothing over and above a neural state in the central nervous system." Searle quotes Grover Maxwell, who calls his view the identity theory, as saying, "the way is entirely open for speculating that some brain events are just our joys, sorrows, pains, thoughts, etc., in all their qualitative, and mentalistic richness." (p. 58). Searle then says that "This is quite similar to what I think is the

correct view and will explain in Chapter 4. But it is not the typical view among identity theorists.”

Let this idea that each mental occurrence is (identical to) a physical occurrence in the brain be called “Naïve identity theory” to distinguish it from others that Searle refers to. Then Searle’s view is *similar*, he says, to naïve identity theory. This naïve theory neatly “solves” the problems of the apparent redundancy of mental causation---which arises from the claims that mental causation (in the physical) is real and that material causation (in the physical) is also real and moreover deterministically complete---by saying that the two causes, mental and physical, are *the very same thing*. However, two things cannot be absolutely identical if they are ontologically different, namely if one exists as a “feeling” and the other exists as a pattern of motion of physical particles, assumed to be accurately represented by the concepts of classical physics. Thus Searle cannot fully accept “naïve identity theory” and hence cannot use its simple solution to the problem of causal over-determinism.

Searle mentions that “many---maybe most---of my colleagues are strongly in disagreement with my claim to have a ready solution to Descartes’ problem.” (p. 17) I have described here some possible reasons for these doubts. However, replacement of the known-to-be-false precepts of classical physics with their quantum counterparts eliminates the problem of causal over-determination by eliminating the claim of the causal completeness of the physical. This switch provides a secure foundation in basic science for most of the rest of Searle’s arguments.

Searle enunciates later on what he takes to be conclusive arguments against dualism (p. 132):

1. No one has ever given an intelligible account of the relationship between these two realms.
2. The postulation is unnecessary. It is possible to account for all of the first-person facts and all the third-person facts without the postulation of separate realms.
3. The postulation creates intolerable difficulties. It becomes impossible to explain how mental states and events can cause physical states and events. In short, it is impossible to avoid epiphenomenalism.

Point 2 is falsified by the fact that, in order to account for the third-person empirical facts of atomic physics, physicists found it necessary to introduce into the internally complete and deterministic third-person dynamics the (Process 1) interventions of the effects of conscious intentional first-person choices. These interventions were needed to secure empirical predictions that matched the data.

Point 3 is falsified by the detailed account given in this book of how Process 1 allows epiphenomenalism to be avoided. Point 1 will be falsified in this appendix. What has been blocking progress in understanding the mind-brain relationship is not the impossibility of figuring out the relationship between these two interacting aspects of nature, but rather the impossibility of understanding this relationship within a classical-physics approximation that completely eliminates the effects of mind on matter that the full theory mandates.

Heisenberg's uncertainty relations destroyed the sort of certainty that classical physics was based upon. In order to recover predictive power, the founders of quantum theory formulated their theory pragmatically, not solely in terms of theoretically postulated minute particles and local fields, but rather in terms of an interplay between a physically described world and a community of active agents who probe nature in ways of their own choosing. In particular, contemporary atomic physics requires---in order that it be able to produce empirically verifiable predictions---the existence of observing agents that can make nontrivial *choices* from among the array of possible probing actions allowed by the physically described laws. These probing actions, made always *within* the physical latitude opened up by the Heisenberg uncertainty relations, partially close the causal gap engendered by those relations. But the predictions are dependent upon these choices, which are not fixed by the known laws. This intrusion into the dynamics of observed physically described systems of the effects of uncontrolled conscious choices destroys the causal closure of the physical. However, the form of the psychophysical laws ensures that the causal effects of mind on matter never lead to causal over-determinism.

Searle recognizes that dualism and materialism, as classically conceived, are mutually incompatible. In order to retain the elements of truths he sees in both he claims that "we have to abandon the assumptions behind the traditional vocabulary." (p.106) He says he wants "to suggest that we should not accept the traditional terminology and the assumptions that go with the terminology. Expressions like 'mind' and 'body', 'mental' and 'material' or 'physical' as well as reduction,' 'causation,' and 'identity,' as they are used in discussions of the mind-body problem are the source of our difficulty and not the tools for its resolution." (p. 108)

This linguistic approach is in line with the notion of "philosophy as linguistic analysis" that dominated philosophy during much of the twentieth century. However, the source of the vexing problems in philosophy of mind is not the language. It is rather that most philosophers of mind are committed to trying to build an understanding of nature upon a conception of the physical world that is known to be false, and false particularly with respect to the central issues they are considering, namely the essential characters of the physical and mental aspects of nature, and of their connections to each other. The old words can be used in a normal way with normal meanings, without contradictions or difficulties,

provided that nature is understood in the way specified by von Neumann quantum ontology.

What is von Neumann quantum ontology? I mean by this ontology the conception of nature obtained by considering the physical state of the universe, and also the mental realities described by quantum theory, to be not just tools invented by quantum physicists to help them form expectations about their future experiences on the basis of their past experiences, but instead an accurate representation of the physical and mental *aspects* of nature herself, assumed to evolve in accordance with the psychophysical dynamical rules of quantum theory formulated by von Neumann. These rules include rules that connect the evolving physical state of the universe with the streams of consciousness of observing agents. The most radical break of quantum theory with classical physics is the occurrence of the Process-1 physical effects of our conscious choices upon the physical state of the universe. These choices are our conscious choices about how we probe the physical universe, and they are essential elements of orthodox quantum theory.

The quantum state of the universe is connected in a specific way to the physical states of the universe that occur in classical physics. In classical physics one can contemplate, in principle, at each moment of time, the set of all the *possible* classical physical worlds that could exist at that time. Only one of these worlds is considered to be real. The rest are regarded as unrealized possibilities, at least as far as one's own personal stream of consciousness is concerned. But the quantum state takes *all* of the possible classical states to be simultaneously "real", in a certain sense. Specifically, *each possible classical state* is assigned a pair of (real) numbers, *a* and *b*, such that the square of *a* plus the square of *b* is a statistical weight associated with that classical possibility, and *a* divided by *b* is the tangent of a certain angle called a *phase* angle. In quantum theory the numbers *a* and *b* associated with *each* of the classical possibilities *are equally real*, because, in principle, all of these numbers enter in complex ways into the determination of the relationships between various experiences in the streams of consciousness of the agents.

The question, now, is this: How does the change from the classical materialist conception of reality to the psychophysical conception of reality just described affect the arguments about the relationship between mind and matter presented in Searle's book?

Viewed from the quantum perspective most of the general problems mentioned in Searle's book simply disappear, or are directly answered by the features of the quantum ontology already described. However, some problems arise from the details of the history of Western philosophy such as Descartes' search for *certainty*. The attitude of the founders of contemporary physics (e.g., Einstein and Bohr) is that our physical theories are free inventions of the human mind, which we evaluate in terms of their capacities to supply predictions, explanations,

and understandings that work well for us. Fully adequate theories should conform to the demand for unity of science, which requires the different disciplines to be coherent components of a rational whole. A rationally coherent theory that explains a potentially unlimited set of regularities in terms of a small number of causal laws is more useful to scientists than a compendium of [Humean] regularities. Thus the concept of physical *causation* is scientifically useful, and hence scientifically acceptable. The shift from a pragmatic stance to an ontological one represents a tentative trial of the idea that our currently best theoretical invention provides a faithful picture of reality itself.

Searle raises early on (p.18) the questions “How can brain processes cause mental phenomena at all?” and conversely “How can minds influence physical events?”

The quantum rules specify how, according to the theory, minds *do* influence physical events. But the question of “*how*” minds *can* do what these rules say they do is a question that physicists normally do not consider. They generally focus on the rules that specify *how certain descriptions of aspects of nature seem to be related*, rather than on the question of how it is possible that these rules could hold: i.e., on the question of what is the nature the underlying basic reality that *makes* these rules hold. The great quantum physicist Wolfgang Pauli was perhaps looking for such a reality in his attempt to find a “neutral language” that would encompass both the mental and material aspects of nature, but very few physicists engage in such endeavors

A hint as to the nature of such an underlying reality is obtained by examining the character of the physical state in the von Neumann ontology: This state represents the probabilities or tendencies (potentialities) for mental events to occur, and also *our knowledge* derived from the occurrence of such events. All of these aspects are often viewed as essentially “subjective” in character. Yet the state is described also in terms of a collection of numbers attached to space-time points. Thus insofar as the character of our descriptions is a guide to the character of some underlying reality, that reality would appear to be intrinsically psycho-physical.

To summarize: Because of the raging controversies in philosophy of mind about how to avoid dualism and make materialism work Searle takes the point of view that he can start afresh with what he thinks he knows, and then let theory and language conform to these “known facts”. The first problem with this strategy is that one of his “known facts”, namely the causal completeness of the physical, contradicts contemporary science. The second problem is that his materialistic conception of the physical world is also contradicted by contemporary science.

Searle bases his inquiry into “free will” on an examination of the conscious process of deciding to act in a certain way on the basis of “reasons.” (p. 212) He

emphasizes that the results of our human deliberations involving reasons are not conclusive, in the way that the conclusions that follow from the precepts of classical physics are conclusive. He notes that “It is essential to see that the functioning of human intentionality requires rationality as a structural constitutive organizing principle of the entire system.” (p. 213)

The classical-physics (materialist) answer to the problem of free will is simple: all physical actions are entirely determined at the microlevel by the motions of mindless particles being mindlessly pushed around by other microscopic mindless entities. Hence any notion that we are “free”, in the sense that reasons or feelings can *intervene* and *influence* the course of physical events is pure fantasy: the notion that mind can influence what matter does is simply an *illusion*:

Quantum theory gives an altogether different answer. The Heisenberg uncertainty principle injects uncertainty into the proceedings. This is countered by bringing human agents into the dynamics not as passive observers, but as conscious choosers that inject certain fixed elements into the dynamical system, and hence control the unfettered explosion of rampant uncertainty. These choices are not themselves determined by any yet-known laws, statistical or otherwise, and hence are called “free”. But this opens up the key question: how are these choices to be understood? Where do they come from? What controls them? I shall answer these questions later. But I need first to dispel some possible misconceptions about the nature of the quantum world by commenting on Searle’s analysis of free will.

Searle admits at the outset of his discussion of the problem of the nature of free will that he has no solution.(p. 215) But he tries to delve into this basic question in order to clarify it.

Searle begins by saying:

There is a special problem about free will because we have two absolutely irreconcilable convictions, each of which seems to be completely correct and, indeed, inescapable. The first is that every event that occurs in the world has an antecedently sufficient cause. Our second conviction, that we do in fact have free will, is based on certain experiences of human freedom. We have the experience of making up our mind to do something and then doing it. It is part of our conscious experiences that we experience the causes of our decisions and actions, in the form of reasons for those decisions and actions, as not sufficient to force the actual decisions and actions. (p. 216)

The origin of the “conviction” that each definite happening has an antecedently sufficient cause is evidently some metaphysical idea, such as the idea that classical physics is true, or the idea that no definite happening can just simply

pop into being without there being some “reason” why this particular thing happens instead of something else.

The origin of the conviction that we have free will is directly experiential. Searle notes that an experienced reason to act in a certain way *may or may not* be followed by a decision to act on the basis of that reason. Moreover, there is, within the stream of consciousness, also *the experience of a causal gap*: the antecedent reason is not experienced as being coercive or sufficient with respect to the choice that follows. That is, *within the realm of experience* there is no determinism: there are causal gaps. The actual making of the decision seems to be infected by an element of indeterminateness: we feel uncompelled to decide in accordance with the dictates of the antecedent reasons. Searle presents an analysis that ties this indeterminateness, *regarded as a bona fide reality*, to the randomness in quantum theory.

According to Searle, “Our experience of the gap [in strict causation] is the basis of our conviction that we have free will” (p. 218) i.e., it is the basis of our conviction that our willful conscious choices are in fact “free”. Of course, a natural explanation of our experiencing of a causal gap is that our stream of consciousness grasps only certain high-level features of the fundamental causal process, and that these features alone will be insufficient to specify completely the causal progression, which, however, is (or can be) strictly determined at the basic level. So the causal linkages that we directly experience must be expected to be non-coercive, even if the fundamental causal process is fully coercive. This simple causal explanation of “our experiencing of a causal gap” would seem to render the whole matter unworthy of further serious attention.

Of course, this mechanistic explanation *could* be wrong. It cannot be ruled out that the indeterminateness we feel is veridical. The physically described brain just conceivably might not completely determine our every thought and action. But “*If freedom is real then the [causal] gap has to go all the way down to the level of neurobiology.*” (p.228)

Searle argues, in effect, that this possibility needs to be seriously explored for the following reason: our real lives are based on the presumption that our choices are “free” in the sense of not being mere products of mindless mechanical processes churned out by unknowable and unknowing tiny bits of matter.

Whenever we decide to act voluntarily, which we do throughout the day, we have to decide or act on the presumption of our own freedom. Our deciding and acting are unintelligible to us otherwise. (p. 219)

Arguing on the basis of the need for the intelligibility of our lives is not completely unreasonable. In the end a theory of nature is more useful to us if it makes things intelligible. There is a certain unintelligibility and irrationality about adopting, in our real lives, as opposed to our philosophical posturings, a conception of nature

that asserts that we are mechanical robots, completely at the mercy of automatic mindless neuronal processing, and yet acting as if the conscious choices that we struggle so hard to make are made by *us*, instead of by unthinking atoms. Hence a theory that is based securely on contemporary science and that allows us to understand how our decisions are made by us, as we know and understand ourselves, rather than by mindless atoms, would be a worthwhile improvement upon the turmoil that has engulfed philosophy since the invention by Isaac Newton of classical physics, the blind acceptance of which renders our lives unintelligible.

Motivated by this consideration Searle is led to consider, in contrast to the following favored hypothesis, the more radical, in his view, second one.

Hypothesis 1: Determinism and the Mechanical Brain

On the first hypothesis we have to assume that the brain is a machine in the traditional old-fashioned sense of car engines, steam engines, and electric generators. It is a completely deterministic system, and any appearance of free will is an illusion based on our ignorance, so that this hypothesis fits well with what we tend to believe about nature and biology in general. The brain is an organ like any other, and it has no more free will than do the heart or the liver or the left thumb. (p.229/30)

Hypothesis 2: Indeterminism and the Quantum Brain

Hypothesis 1 is comforting in that the brain turns out to be a machine like any other. But on hypothesis 2 it is not at all clear what kind of mechanism the brain will have to be for the system to be nondeterministic in the right way. But what exactly is the right way? We have to suppose that consciousness plays a causal role in determining our decisions and our free actions, but we also have to suppose that that causal role is not deterministic. That is, it is not a matter of sufficient conditions. Now the creation of consciousness at any instant of time is a matter of sufficient conditions, so what we are supposing is that the left-right movements of neurobiological processes through time are not causally sufficient. That is, each stage of the neurobiological process is not sufficient by itself to determine the next stage by way of causally sufficient conditions. Suppose that the explanation of each stage by the preceding stage depends on the fact that the whole system is conscious and has the particular type of consciousness that manifests a gap, that is voluntary consciousness. But what would such a system look like? We are assuming that the brain is, at its most basic level, nondeterministic; that is, the (causal) gap that is real at the top level goes, so to speak, all the way down, down to the level of the neurons and subneuronal processes. Is there anything in nature that suggests even the possibility of such a non deterministic system? The

only part of nature that we know for a fact today, at the time that I write this, is the quantum mechanical part. However, it is a bit misleading to call that a part because it is the most fundamental level of physics, the most basic level of the physical particles. At the quantum level the state of the system at t_1 is only causally responsible for the state of the system at t_2 in a statistical, nondeterministic manner. Predictions made at the quantum level are statistical because there is a random element.(p. 230/31)

I have included this long passage because it indicates how, in Searle's thinking, the demand that life be intelligible leads to the need to bring quantum effects into the understanding of mind. Most neuroscientists and philosophers of mind fiercely resist the idea that quantum effects, which seem so remote from their fields as they are practiced today, could really be essential to the solution of the mind-brain problem. But this passage is Searle's step-by-step reasoning, starting from philosophy of mind considerations, and the demand for the intelligibility of our real lives, that leads him *reluctantly but rationally* to the conclusion that quantum effects may be important to an understanding of the connection between mind and brain.

Searle then goes on to say: "It has always seemed to me in the past that the introduction of quantum mechanics into the discussion of free will was totally irrelevant for the following reason: free will is not the same as randomness. Quantum mechanics gives us randomness but not freedom. That argument used to seem convincing to me, but now it seems to me that it commits the fallacy of composition." The fact that there is randomness at some atomic level does not entail that the entailed lack of determinism is manifested at high-levels also as randomness. "In a word, the randomness at the microlevel...does not imply that the [resulting indeterminate] conscious phenomena are random." (p. 232) Then, after summarizing the input assumptions, Searle says "we have to suppose there is a quantum mechanical component in the explanation of consciousness. I see no way to avoid this conclusion." (p. 232)

However, then he says, immediately "Of course, Hypothesis 2, the hypothesis that the random indeterminacy at the quantum level leads us to an indeterminacy of a nonrandom kind at the conscious level, seems very unlikely and implausible ... given all we know about nature Hypothesis 1 seems much more plausible."

It is not clear who the "we" are that know all about nature, and to whom the application of the classical-physics approximation to the dynamics of a conscious brain seems much more plausible. Physicists undoubtedly are not included. What his arguments do suggest is that there is a conflict between what most philosophers of mind believe and the demand for a rational intelligible understanding of our real-life actions, and that the latter seems to lead to the conclusion that quantum mechanical effects are important to an understanding of the mental side of our being.

Of course, quantum theory is constructed to be a rationally coherent theory---compatible with all empirical data, and highly explanatory and predictive---of conscious agents acting in the way we actually do act in an imbedding physically described world. So it is surely to be expected that quantum mechanics will do the better job of representing us, as we actually are, than a theory based on an approximation that completely eliminates the capacity of our conscious choices to affect in any way our own bodily actions.

Searle goes on to say that Hypothesis 1 “fits in with the way that the brain is described in standard text books of neurobiology.” However, quantum theory reduces to classical physics under the conditions considered in those books, insofar as they do not deal with the effects of our conscious choices upon the behavior of our neurons. So that “fit” with Hypothesis 1 probably carries no weight at all.

Searle does emphasize one important argument in favor of Hypothesis 2: “An enormous amount of the biological economy is devoted to conscious rational decision making.” Hence these decisions must surely, for evolutionary reasons, make a behavioral difference: causally inert consciousness would have no impact on survival, and would not be worth the huge biological costs.

I now move toward my own account of what fixes our conscious choices by first returning to Searle’s main objections to Hypothesis 2. He said “Of course, Hypothesis 2, the hypothesis that the random indeterminacy at the quantum level leads us to an indeterminacy of a nonrandom kind at the conscious level, seems very unlikely and implausible. “

That scenario would indeed be unlikely and implausible. But it is based on a serious and extremely common misunderstanding of quantum mechanics. It assumes that the randomness of quantum mechanics comes in at the atomic level. That is not correct! In quantum theory the dynamics at the atomic level is deterministic and nonrandom, as it is at all the levels that are described exclusively in purely physical terms, The randomness enters in principle only in connection with outcomes of observations. An observation is described in a different kind of language, and involves either a measuring device, whose physical response can be “sensed” by an agent, or a brain, whose physical response can be “sensed” by the agent to whom the brain belongs. On the other hand, the “element of freedom” in quantum theory concerns the agent’s choice of which observation to make. This freedom of choice is not conceived to be built out of the random elements associated with the *outcomes* of the “freely chosen observation”. Within the framework of the laws of contemporary quantum theory this freedom of the agent to choose what his probing action will be is a simple lacuna: the quantum rules simply say nothing about it.

The possibility of there being such choices is a consequence of Heisenberg’s uncertainty principle, but the free choice on the part of the agent and the random

choice on the part of nature are two reductions of the Heisenberg uncertainty that operate *in tandem*: the former does not arise out of the later.

But, then, the core free-will question is: From what considerations, or reasons, or causes, do these free choices arise? Before giving an answer I must describe a quantum theory of perception that is an essential component of the von Neumann ontology, as I understand it.

Searle has a chapter on perception in which he first describes the huge disparities in the views of other philosophers on the nature of perception, and then presents his own opposing (perhaps idiosyncratic) view. No progress on the quantum theory of free-will is possible until those multifarious issues are cleared up, and a quantum theory of perception is pinned down.

Searle emphasizes that certain events in the brain that are described in physical terms---that is, in terms of mathematical properties tied to points in space-time---are associated *also* with realities that have the ontological character of feelings. Following William James, I use the term “feelings” broadly to cover thoughts, ideas, impressions, and perceptions, as well as pains, joys, sorrows, efforts, etc.. The differences between these different kinds of feelings have to do with their quality, texture, and complexity.

In the von Neumann ontology there are, from time to time, events that intervene in the orderly deterministic dynamics of the physically described brain. These events have two kinds of description: a description of the abrupt change in the physical state of the brain; and a description of an associated feeling. One might say that the one event has two aspects, a physical aspect and a mental aspect. Certain aspects of the abrupt physically described change in the brain of an agent are supposed to be felt in the psychologically described stream of consciousness of that agent. Thus the event might be deemed to be both physical and mental, in accordance with Searle’s idea that it should not be assumed that all natural occurrences must be either mental *or* physical but never both.

In the von Neumann *ontology* the physically described aspect and the psychologically described aspect are both real. The event involves the occurrence of a real change in the physical state and the occurrence of a real feeling.

Causal connections between the physical world and the physical state of the brain of an observer are used during the agent’s growth and development, in association with his recognition of correlations between his *feelings of effort* and his *feelings of the feedbacks that follow* these efforts. Each intentional conscious event in the stream of consciousness of the agent will be accompanied by an associated event in his brain, which, in a well developed brain, will single out a pattern of neural (brain) activity P that will, through the causal laws, tend to bring

the intended feedback into being. The psychologically described aspect of the psychophysical event is a feeling, or grasping, of the functional significance of the pattern of brain activity P. This pattern P exists in the state of his brain just before the event and also just after the event, and is delineated in the brain event by the elimination from the new state of the brain of all features of the prior state of the brain that conflict with that pattern P. [I am trying to describe in ordinary words what Von Neumann says in the mathematical language that he is using.] In perception, this grasping of the functional significance of the brain pattern P constitutes an effective grasping of the features of the external world that are part of the causal loop that cycles from (attentional) conscious event to brain event to external physical property to brain event to conscious event.

This understanding of perception is in line with von Neumann's theory of measurement, described in his book *Mathematical Foundations of Quantum Mechanics*. This quantum theory of perception makes perceptions the mental grasping of (observed) features of the external world. Intentionality, in the sense of "aboutness" is thereby accommodated and explained directly in terms the basic dynamical laws of quantum theory, which include both causal connections between the brain and the rest of the physically described world, and developed correlations between the felt and physical aspects of the causally efficacious psychophysical events.

The underlying idea is that the complex feeling of an agent grasps the functional significance of the pattern of brain activity that is specified by the physical side of the psychophysical event, which eliminates the conflicting physical possibilities. This connection is naturalistically understood to be a consequence of trial and error honing, over both the evolution of the species and the life of the agent, of the agent's capacity to deal successfully with the world. The natural development of this linkage between minds and brains, and thence the world, is based crucially on the fact that there is, according to the dynamical psychophysical laws of quantum theory, a *two-way causal connection* between the psychologically described feelings in the agent's stream of consciousness and the physically described behavior of agent. That is, there are not only *perceptions*, there are also *influences of feelings upon physical actions*. The central content of this book has been an explanation of the second of these two causal linkages, namely how the dynamical laws of quantum theory can account for the influences of the agent's conscious choices upon his brain, and thereby upon his body.

With the general structure of the quantum model of mind-brain dynamics now in place I can finally turn to the question of how the agent's free choice of which action to take comes to be what it comes to be.

Following Searle I take the example of election day. Knowing that I must go and cast my vote I decide to review my options, my reasons for voting one way or the other. I recall that Bush is firm and resolute on the war on terror, but Kerry flip-flops. Yet Kerry can eloquently expound on every side of every issue, and sees

all the dangers in every possible action, whereas Bush can hardly speak at all, and is a brash and cocky Texan who can get us into a lot of trouble. Kerry will help the down-trodden masses, and make the rich pay for it, and is a war hero to boot, unless the Swift Boat Veterans for Truth are telling the truth, in which case he's a scoundrel.

My feeling about what is happening, as I review these thoughts, in order to make my choice, is that I can feel a weight for each idea, and am able to make an evaluation based on the net weight of all of them together. This evaluation causes a choice to be made about how to act in the polling booth. Later, at the polling booth, I will act in accordance with that choice unless I decide to reconsider, and the re-evaluation causes me to decide to act differently.

The conclusion seems clear. The function of our feelings is to allow complex collections of ideas to be evaluated in unison, in order to trigger a definite choice of how to behave. Thus, according to the quantum model, the free choice about how to act in a given situation is not indeterminate, as Searle seemed to be suggesting. But it is determined by *evaluations based on feelings*, rather than on local mechanical processes. In quantum mechanics the local mechanical processes generate only the *range of possibilities for actions*, not the choices of which actions will actually occur, or of when they will occur. Those choices, if they are determined at all, are determined by a process that is not described contemporary physical theory. Quantum theory makes room for such a process, by virtue of its essential difference from its classical approximation, namely the fact that in quantum theory the physically described aspects are not causally complete. This causal incompleteness of the physical makes room for causally efficacious inputs from the psychophysical events..

These events are, on their physical sides, nonlocal: each one naturally singles out an entire large-scale pattern of brain activity, whose functional meaning is grasped by the associated psychologically described feeling. Such a structure allows for the causal intervention of an evaluative process that is based, at least partially, on psychologically described realities rather than entirely on the physically described variables. Such a process would give these psychologically described realities a causally efficacious role in the unfolding of our lives. That would allow us to evade the incomprehensibility of our lives that Searle described, together with the irrationality of acting as if we, as we know ourselves, are choosing the courses of our lives while believing that mindless atoms determine everything.

The presence in a logical system of two inconsistent premises renders the whole system nonsensical: anything can be proved, along with its converse. That may explain the roots of the malaise, or even crisis, that grips Western culture. The voices of our intellectual leaders proclaim a message that makes our lives unintelligible and our actions irrational. Hope for the future lies in the fact that respect for science may move these thinkers beyond known-to-be-false

nineteenth century materialism, which is the source of the problem, to the verities of third millennium science.