OPINION ARTICLE

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Mind and matter

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In the View Point article of Reference 1, the editor of CIB was kind enough to let me express my views on the topic of Darwinian evolution. Since then and mainly through contacts generated by that article, I felt that there was more to be said on this topic. The editor was kind enough to allow me to air my views again.

I have no qualifications in biology or philosophy, so the readers of CIB may find that some of the material on evolution in this article is well-known territory to them, but for me it was a part of the unfolding story that informed my understanding and led me to some conclusions. My thesis is that the explanations based on the present materialist/reductionist views on how experiential qualities developed out of inert matter are unconvincing and that an alternative viewpoint offers a more parsimonious and logically coherent account. The article presents my rearrangement of material contained or taken from references 2, 4, 5, and 6 linked by my own commentary. For a better-argued and ultimately more convincing exposition of the views in this article the interested reader should study the references.

Background

We all have an intimate knowledge of our conscious experience. There is nothing more concrete than the existence of this experience, hence Descartes's dictum: "I think, therefore I am." All knowledge, scientific or otherwise, is communicated to us through personal conscious experience, and this is the fundamental core of our being. Matter and experience appear to us as qualitatively different; hence Descartes's belief that mind (our experiential self) and matter are distinct and of different nature to each other. This is the philosophical tenet of "Dualism," which asserts that the human mind is essentially immaterial and disembodied. If dualism is taken to be true, it is then not illogical to entertain the possibility of the mind surviving the death of the body, a basic tenet of many religions. The fundamental problem of Dualism is that it has no convincing explanation of how the two realms of mind and matter interact.

Science teaches us that our bodies are made of matter composed by a number of basic chemical elements out of the 90-odd available. It has also been established that the mind is inexorably linked to matter. Brain scans indicate that thoughts are intimately related to brain activity. Brain neurons interact through synaptic connections to generate mental phenomena, and damage to a part of one's brain affects mental functions.

Physical sciences have been extremely successful in analyzing the material world by reducing complex physical systems into their constituent parts. These parts can be selected to be so small and simple that they become comprehensible. This is the process of "Reductionism." Reductionist scientists believe that everything, including biology, can be accounted for at the most basic level by the physical sciences. Our experiential life, however, includes complex features such as consciousness, thought, perception, desire, action, perceived freedom of will, intentionality, meaning, purpose, beliefs, and value.

Reductionist science claims that all the above, however sophisticated, can be

accommodated in a universe consisting only of physical facts of the kind revealed by the laws of physics. It is confidently proposed that this process will ultimately provide an explanation of the cognitive capacities that enabled us to discover those physical laws.

Contemporary science asserts that reductive materialism is the only serious methodology capable of providing an objective understanding of ourselves. This scientific privileged world view is taken for granted by the large majority of scientists who are not aware of the implications of materialist reductionism, as more than often it has no bearing on the work they do. Among them a small number of prominent and articulate scientists promote this view very vigorously in the media with the explicit aim of liberating the world from alternative explanations such as those provided by religion. This is an understandable agenda if one were to examine history and our present predicaments, many related to conflicts caused by religious superstitions. Such scientists are driven by the laudable but untested belief that if humanity on the whole were to espouse the materialist/reductionist philosophy, the world would be a far better place. Perhaps they are right, but I personally doubt it.

The conundrum, though, persists. How can experiential phenomena be physical phenomena? Some philosophers and scientists take the materialist/reductionist agenda to be profoundly problematic. *This is the mind-body problem.*

Materialist/reductionist explanation of how biological complexity and mentality developed

The explanation given of our appearance on Earth assumes an undirected and accidental combination of the basic chemicals of life that resulted in a primitive organized physical system that was capable of reproducing itself. The reproduction was performed by means of a chemical code embedded in this primitive organized system or early life form. In the process of reproduction, occasionally errors were made in the code. The progeny that inherited errors that adapted it to cope better in the battle for existence survived; others perished. The slight reproductive advantages some organisms inherit over others is the core tenet of the Darwinian evolution by natural selection. This evolution process over millions of years has developed organisms vastly more complex than single cells.

The appearance of basic experiential functions and learning behavior in primitive organisms, i.e., the collection and processing of data from the environment and the response of the organism to absorb nutrition, excrete waste, avoid danger, and attack predators were all developed through the accumulation of these small, accidental, but advantageous changes. This primitive cell intelligence or mentality gradually developed into the more complex range of responses by higher animals (e.g., ant experience or pigeon experience) and the limited consciousness of primates such as chimpanzees. In humans, consciousness has developed into self-awareness that resulted in higher experiential functions, such as language, perceived freedom of will, intentionality, meaning, purpose, and value. This physico-chemical reductionism in biology is now confidently accepted by most scientists as a scientifically rigorous world view. The impression is given that the fundamental mechanism is settled and that only details need working out. Karl Popper referred to this situation as "promissory materialism."

The rest of us who are not biologists have been schooled through popular science literature, radio, and television to regard this reductive program as the undisputed and legitimate scientific explanation. Is, though, this "scientific" explanation that has now reached a hegemonic status credible? Can mental or experiential functions be the outcome of the laws of physics? Can the laws of physics capture the nature or essence of experience?

How do materialists explain the appearance of mind

There are a number of schools of thought that endeavor to explain how mind is derived from matter on the assumption that the latter is the only reality.

An early approach was to consider mentality as an "epiphenomenon," i.e., a by-product of brain activity. T.H. Huxley compared consciousness to "...the steam whistle that accompanies the work of a locomotive engine … without influence upon its machinery." In this approach, human beings are "conscious automata."

A more radical approach is to deny the existence of experience completely, thus avoiding the task of explaining it. D Dennett claims that subjective experience is illusory. This denial of the phenomenon whose existence is self evidently more certain than the existence of anything else is considered by a number of philosophers, to say the least, as bizarre. However, this view has considerable support as it bypasses the hard problem.

In "eliminative materialism," mental phenomena are considered to be an "aspect" of brain activity, i.e., they are basically physical phenomena talked about in a different way.

In "cognitive psychology," the brain is viewed as a computer and mental activity as information processing with experiential activity reduced to a computational processes.

Perhaps the most prevalent view among scientists is to consider experiential phenomena as "emergent." According to this concept, physical staff in its basic nature is wholly non-conscious and non-experiential. Nevertheless, when parts of it combine in certain ways so that some critical magnitude of complexity is reached, experiential phenomena "emerge." The most quoted example of emergence is the liquidity property of water. Liquidity is not a characteristic of individual water molecules, and yet when many of those are put together they exhibit liquidity, an "emergent" property. But is this analogy helpful in illuminating the mind/body problem? This "emergent" quality of water can be derived from the properties possessed by certain molecules that are so constituted that they do not bind together in a tight formation but slide past each other. So the phenomenon of liquidity is *wholly dependent* on phenomena that do not in themselves involve liquidity. In spite of its implausibility, this "emergence" idea is held by most scientific materialists as being at the bottom of the mind/body problem, ignoring the fact that for mentality to truly emerge from matter, matter must have something—indeed everything—to do with it.

Is there an alternative explanation?

The profusion of rival theories gives a flavor of the confusion underlying the attempts to derive mentality from passive matter. It seems logical that for experience to emerge from something such as matter, then matter must be experiential in some sense or other. It must be experiential in its essential and fundamental nature no matter what conventional materialism believes. This though, is not to ascribe to atoms consciousness in the way humans experience it. It is important to stress that this view in no way contradicts the fact that experience is associated with neurons firing. However, in contrast to the prevailing materialist view, the proposal is that there is a lot more to neurons than physics and neurophysiology.

Has quantum physics got anything to do with this?

At the very basic level, elementary particles are in continuous interaction with their neighbors. They are attracted or repelled by the surrounding charges and have many alternative futures. Physicists have developed mathematical theories to account for these behaviors.

Many phenomena in quantum physics are paradoxical. In the two slit experiment, elementary particles appear to communicate. The "entanglement" concept requires that quantum particles share information with their neighbors, and Bell's theorem postulates that this sharing is instantaneous and involves "spooky action at a distance," a property that was confirmed in laboratory experiments.

Freeman Dyson, the eminent particle physicist, wrote: "I think that consciousness is not just a passive epiphenomenon carried along by the chemical events on our brains, but is an active agent forcing the molecular complexes to make choices between one quantum state and another. In other words, mind is already inherent in every electron, and the process of human consciousness differ only in degree but not in kind from the process of choice between quantum states which we call 'chance' when they are made by an electron."

David Bohm developed a quantum theory[3] in which mind and matter are brought together. He writes: "A similar mind-like quality of matter reveals itself strongly at the quantum level, in the sense that the form of the wave function manifests itself in the movements of the particles."

Bertrand Russell said pithily: "We know nothing about the intrinsic quality of physical events except when these are mental events that we directly experience." And: "Physics is mathematical not because we know so much about the physical world but because we know so little: it is only its mathematical properties we can discover."

Finally, the following quote from A Eddington, the eminent British astrophysicist, carries considerable logical force: "Our knowledge of the nature of the objects treated in physics consists solely on readings of pointers (on instrument dials) and other indicators. This being so, what knowledge have we of the nature of atoms that renders it at all incongruous that they should constitute a thinking object? Absolutely none. Science has nothing to say about the intrinsic nature of the atom. The schedule of pointer readings is attached to some unknown background. Why not attach it to something of spiritual (mental) nature in which a prominent characteristic is thought (i.e., experience, consciousness). It seems rather silly to prefer to attach it to something of a so called 'concrete' nature inconsistent with thought, and then to wonder where the thought comes from."

Panpsychism

Panpsychism is the philosophical position that confers a mental quality to all the elements of the physical world. This has been a time-honored scientific and philosophical tradition espoused in some way or another by Heraclitus, Empedocles, Bruno, Cardano, Leibniz, Spinoza, Schopenhauer, Priestly, William James, Mach, Bergson, Whitehead, Eddington, Broad, Bohm, Waddington, Dyson, and recently, Strawson, Nagel, Skrbina, Hameroff, Chalmers, Seager, Rosenberg, Schooler, and others.

On the plausible basis that elementary particles enjoy a rudimentary experiential quality, physical aggregations of them as in rocks and non-biological systems have no discernible increased coherent unified mentality. It is with biological self-organizing systems that complex forms of experience develop out of the aggregated "micro-mentality" of the atoms. One of the organizing processes is evolution through natural selection.

Like all viewpoints, panpsychism is not problem-free. The question is how in biological systems the micro-mentality of elementary particles combines in a coherent way to generate higher levels of experiential properties as we move up the evolutionary tree from prions to cells to plants to animals to human beings. We can only authoritatively make statements about our own human experiential quality, which we perceive as unified and not fragmentary. An analogy from physics may shed some light. The core of an unmagnetized piece of iron consists of a great number of microscopic magnetic domains with their axes distributed in a haphazard way that renders this piece externally non-magnetic. If, however, an appropriate external magnetic field is applied, the domains align themselves along its direction. The combined effect of the micro-magnets caused the iron piece to become a permanent magnet. The two states of the magnet may be loosely thought to represent haphazard non-organic and coherent organic matter respectively. The panpsychist process of enhanced levels of experiential quality in organic systems through the combination of lower levels is, though, still a mystery but not one that offends logic.

To conclude

Science is driven by the assumption that the world is intelligible, but likely to be wrong in its certainty that we know enough about the physical to claim that the experiential cannot be physical. The intelligibility of the world is no accident. Nature is such as to give rise to conscious beings with minds, and it is such as to be comprehensible to such beings. Mind is not just an afterthought or an accident or an add-on, but a basic aspect of matter. The possibilities were inherent in the Universe long before there was life. If evolution is to produce sentient beings, the roots of consciousness in some shape must have been present at the very origin of things.

A speculative teleological hypothesis is that evolution may be determined not merely by value-free chemistry and physics but also by a cosmic predisposition toward

complexity, connectivity, the formation of life, consciousness, increased awareness, and the value that is inseparable from such qualities. Our dominant scientific culture of materialist reductionism is heavily dependent on traditional Darwinian explanations and resistant to alternative views. This has discouraged from the scientific and philosophical mainstream any alternative view such as panpsychism, even if this view is the most parsimonious account available to resolve the mind/matter conundrum. Panpsychism does not require an explanation of how so ontologically different a quality as consciousness emerged from matter where none existed before. It also obliquely recognizes that purpose is inherent in all nature.

Finally, it is important to assess the psychological impact on humanity of the present predominant reductionist worldview. It is not illogical to blame this materialist mindset as one of the primary causes of our present social, consumerist, and environmental problems. Mechanistic materialism can be viewed as having been originally of benefit, one that liberated at least part of humanity from stifling theology and religious superstition, and yet now seems to have reached the end of its useful life. The raping of the planet's fauna, flora, and earth resources appears to be permissible in a world dominated either by a utilitarian/materialist or a human-centered religious world view. This would be corrected if matter were to be accepted as having an experiential quality. Panpsychism may be able to provide the foundation for a new paradigm that addresses the root issues of our dislocation from nature.

Postscript by Erwin Schrodinger[7]

"But now let us assume that in a particular case you eventually observe several efferent bundles of pulsating currents, which issue from the brain and through long cellular protrusions (motor nerve fibres), are conducted to certain muscles of the arm, which, as a consequence, tends a hesitating, trembling hand to you to bid you farewell—for a long heart rendering separation; at the same time you may find that some other pulsating bundles produce a certain glandular secretion so as to veil the poor sad eye with a crape of tears. But nowhere along this way from the eye through the central organ to the arm muscles and the tear glands—nowhere, you may find, however far physiology advances, will you ever meet the personality, will you ever meet the dire pain, the bewildered worry within this soul, though their reality is to you so certain as though you suffered them yourself – as in actual fact you do!"

Disclosure of Potential Conflicts of Interest

No potential conflicts of interest were disclosed.

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