# On the Nature of Things

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# My Purpose

Is to Answer Two Questions:

1. What is the ontological nature of us conscious human beings?
2. How do we human beings fit into the rest of reality?

# The Main Background Information

René Descartes (1596-1650) suggested (in 1641) that reality consists of two very different kinds of things: Mind and Matter.

Mind consists of "*experiences*", such as your thoughts, ideas, and feelings, whereas

Matter consists of things that occupy regions of 3D space.

# Newton's Idea of Matter

Isaac Newton (1642-1727) described his idea of matter in the following words:

"*…it seems probable to me, that God in the beginning form'd Matter in solid, massy, hard, impenetrable, movable particles*."

# Classical Mechanics and Materialism

- Newton's ideas led to "*classical mechanics*".
- The core claim of this classical theory is that the evolving material universe is completely determined by its initial conditions plus laws of motion that involve only the interaction of matter with matter, with no input from any experiential or mental aspect of reality.
- This classical-mechanics-based idea that the evolution of matter is controlled by matter alone is the central feature of a world view called "*materialism*".

# Max Planck's Discovery of the Failure of Classical Mechanics

- In the year 1900 the physicist Max Planck discovered, on the basis of empirical evidence, that the world could not operate in the way conceived of in classical mechanics.
- This failure seriously undermines the concept of materialism, which **originally** had the strong backing of science, but is contrary to orthodox contemporary physics.

# The “answers” of science from the time of Isaac Newton until 1900 is:

- We conscious human beings are material mechanical robots. Our every move was pre-determined at the birth of the universe, and was propagated to the present purely by the actions of matter upon matter, with no added influence of any mental thing, such as an immaterial thought or intention.
- Our minds are thus, according to classical physics, causally inert witnesses to a course of mechanically pre-determined material events.

# Bohr's 1913 Model of Atoms

- A major step towards the creation of the hugely successful contemporary "*quantum mechanics*" was a model of atoms proposed in 1913 by Niels Bohr.
- In this model, electrons circle the nucleus much like planets circle the sun in our solar system.
- But each electron is confined to one of several favored orbits, apart from an occasional "*jump*" to another favored orbit, with the emission or absorption of a photon.

# Enter Werner Heisenberg

- Heisenberg (1901-1976) was born a year after Planck's discovery, and was 12 when Bohr proposed his theory. He worked first in Munich under Arnold Sommerfeld, then in Gottingen under Max Born.
- In September of 1924 Heisenberg arrived in Copenhagen to work with Niels Bohr.

# Conversations with Bohr

- Heisenberg said later that: “Bohr was more interested than anybody else in the inconsistencies of the [1913] quantum mechanics. Neither Sommerfeld nor Born had been so much worried about things…while Bohr couldn’t talk anything else.”
- “*I came to realize how terrible the situation was [in 1913 quantum mechanics] and how unavoidable the contradictions seemed to be. I realized how difficult it was to reconcile the results of one experiment with those of another*.”

# Influences of Empiricists and Idealists

- Long before Plank's discovery of the failure of classical mechanics many philosophers had been critical of the methodology of building science upon a conjecture about the nature of invisible matter, instead of upon what we actually know, namely our knowledge derived from measurements.
- The 1913 theory, like its predecessor, classical mechanics, is built on the Newtonian idea of particles. But there was no empirical evidence that such things really exist—that they are not mere figments of Newton's imagination.
- Heisenberg thus resolved to build his theory on empirical-evidence-based "knowledge", not on dubious conjectures about the nature of matter.

# Heisenberg's 1925 Discovery

- In June and July of 1925 Heisenberg discovered that if he assumed that there were probing actions (i.e., measurements) that reveal the position and the momentum of an electron, then such actions would not only provide "*knowledge*", but would, in general, change the value of the quantity being measured.
- Thus the process of acquiring knowledge about a material system is, in general, not just a trivial passive act of simply receiving information about that system. It is also an operation that acts nontrivially upon that material system.

# A Huge Game Changer!

- The advance from classical to quantum mechanics thus converts us from passive witnesses to active agents. In the words of Neils Bohr:
- "*In the drama of existence we are ourselves both actors and spectators!"*
- But if nature has created this added part of reality, namely "*our knowledge*" of the material world, and given us the capacity to acquire it, then it would be totally unreasonable that we should then be denied the capacity to use this knowledge.
- But to be able to use this knowledge, our choices of actions must be able to depend on that knowledge.
- But that would mean that our ubiquitous everyday experience that a chosen action is sometimes caused by a mental intentions is sometimes **veridical**: it is not necessarily always an illusion, as it had to be in classical mechanics.
- That occasional veridicality confutes materialism!

# The Meaningfulness of Life

- In classical mechanics we are mechanical robots, and our lives are meaningless charades based on an illusion.
- But in the orthodox quantum world the evolving psycho-physical reality is generated by a process that allows a person's bodily actions to be influenced by that person's mentally felt values.
- Then our lives can be meaningful!

# The Absurdity of Materialism in the Quantum Universe

- According to empirically successful orthodox quantum mechanics, your life can be meaningful because you are endowed with the capacity to create by your mental efforts an environment more conducive to the welfare of yourself and those you care about. It would be absurd to reject this successful science and to accept, instead, an empirically false theory in which your life is meaningless—because you have been reduced by that false theory to a helpless pre-programmed material robot.

# Francis Crick's 1994 Book "The Astonishing Hypothesis"

- "*You, your joys and your sorrows, your memories and ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules*."
- That statement is, in essence, a Materialist Manifesto!
- But it captures the core idea of contemporary neuroscience. That idea was already securely in place in 1994, and continues to reign today, virtually unchallenged by the professionals in that field.

# Promissory Materialism

- DNA co-discoverer Francis Crick advised neuro-scientists that steadfast adherence to the principles of classical mechanics would eventually lead to an understanding of the connection between mind and matter.
- British Philosopher Sir Karl Popper called this approach "*Promissory Materialism*".
- That promise is still notoriously unfulfilled.

# Which is more fundamental: Mind or Matter?

- Reality may seem to be composed of two very different kinds of things: Mind and Matter.
- But they cannot be completely different, for in that case they could have no common element that would allow them to connect to each other: there would be two disconnected universes, instead of a single unified one.

# Newtonian Matter Is Insufficient

- Collections of moving Newtonian particle's, no matter how large their number, and how complex their motion, do not entail, imply, or suggest, the existence of a conscious thought, idea, or feeling.
- The classical concept of moving particles is not such that, by sufficient compounding, it could produce consciousness!

# But Mind can Encompass Matter

- A mind is constitutionally "*about*" something besides itself, typically things conceived to be made of matter.
- And matter, according to quantum mechanics, is represented by a quantum state.
- But this quantum state behaves like an "*idea*": when new information is received it jumps to a new form compatible with the new knowledge!
- Thus, in QM, matter behaves like an idea!
- Consequently, only idea-like realities are needed in the quantum universe!
- Hence the quantum world could quite reasonably be an idea in a universal mind with each conscious entity being an aspect of that mental whole. That view elevates orthodox QM to a rationally coherent ontology in which All is Mind.