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Revisiting Classical Physics World View: Descartes and Newton

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Abstract

This paper explains the Classical Physics world view of Descartes and Newton. The meaning of Classical Physics; in relation to Quantum Physics is also explained with Descartes and Newton world views. The differences between Classical Physics and Quantum Physics is also explained. Discussion includes the different principles given by Newton, on which world works. The result shows the implications or outcomes of Descartes and Newtonian world view, the three laws of motion and the criticisms that are given against Classical Physics of Descartes and Newton world view, in relation to their differences. These criticisms include the limitations and short-comings of Classical Physics.

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Introduction

Classical Physics is referred as the physics of macroscopic world. Quantum Physics is referred as the physics of microscopic phenomena. Through Classical Physics we are able to describe all natural phenomena that are directly observable by humans. Classical Physics is also known as Newtonian Physics. Quantum physics does not describe natural phenomena. There are many differences between Classical and Quantum Physics which are as follows:

1. Newtonian Physics breaks down when we enter the world of atoms, whereas in Quantum Physics it does not happen.
2. Newtonian Physics cannot be applied to small scales, whereas Quantum Physics can be applied to small scales.
3. Wave particle duality is an important distinction between Classical and Quantum Physics. Quantum Physics have the wave particle duality, whereas Classical Physics have not.
4. Classical Physics do not use the quantization paradigm whereas Quantum Physics uses the quantization paradigm.

Classical science origin came from Descartes philosophy. Descartes was a mathematician and an analytical philosopher. Descartes has both official and unofficial, philosophy of science. *The Discourse on Method; The Principles of Philosophy* is regarded as his unofficial philosophy of science. *The Meditations* is regarded as his official philosophy of science. The unofficial philosophy of science focuses on the practicing feature of science, whereas the official one focuses on the metaphysician feature. The metaphysician principle deals with theologians.

The practicing feature of science deals with the problem solving activity. The metaphysician feature deals with the technique of demonstration. Descartes made the distinctions between intuition and deduction, because he wanted to connect the official and unofficial philosophies of science. Intuition is regarded as instantaneous whereas deduction is regarded as the conscious prolonged mental vision of many different truths. We can say two things for Descartes science which are as follows:

- a. Descartes science is deduced from what can be intuited in a problem.
- b. According to Descartes, the deduction will collect together a whole series of things in the mind. It goes from simple to complex.

Descartes was regarded as the father of modern philosophy. Before Newton, Descartes was already there. Descartes brought rationalism, cause-effect relationship that is why he was regarded as the father of modern philosophy. Rationalism means

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the use of rational thinking whereas cause-effect says that both cause and effect are interlinked. Effect depends on cause and cause depends on effect.

For Descartes, certainty in philosophy is very important. He takes the help of deductive method, in order to have certainty in philosophy. Deductive method deals with axioms; rules and self-proved truths. Descartes reduced 64 rules into 4 rules which are as follows:

1. Accept as true only those things, which can be proved.
2. Divide every question into simpler form.
3. Start with the simplest issues, and then go to the more complex.
4. To retain the whole argument, we have given the needs for reviewing principle.

Through following these rules, Descartes is signifying a rationalistic approach to epistemology.

Descartes replaced Aristotelian philosophy. Aristotle assumed that motion was a mysterious complex for which causes are needed. But, according to Descartes, this view of Aristotle is wrong. Descartes said that motion was something like bodies, and for that we do not need cause. Descartes talked about uniform rectilinear motion. He said that physical world consists of inert matter in motion. For him, all that exists in the physical universe is only matter, which is defined by extension and that extension is seen in three dimensions. He regards the world as a great machine. His philosophy came to be known as the “mechanical philosophy”.

Descartes has given Cartesian methodology. Cartesian dualism means Descartes concept of dualism. He said that “Cogito Ergo Sum”, means I think therefore I am. According to him, the immaterial mind and the material body are regarded as two completely different types of substances but they interact with each other. The body could be divided up by removing a leg or arm, whereas the mind or soul was regarded as indivisible. For him, the motion of one body was regarded as invariably the result of a prior motion of another body.

He believed in two independent substances i.e. mind and matter and God was added to it later. Mind and Matter/Body are separate from each other. He was known as dualistic also, because he believed in these two substances. According to him, mind needs thinking power and body needs extension. The Cartesian world was a plenum. He believed in the notion of interactionism. The Cartesian thought divides the world into three areas of existence which are as follows:

- a. The world inhabited by the physical body.
- b. The world inhabited by the mind, and

c. The world inhabited by the God.

The whole world is regarded as huge, and complex, but is also reduced to atoms. The whole world works on those principles that can be reduced into simpler forms. For him, the whole complex is reduced to individualism and he explained everything including the world through deductive method. For him, the world which is regarded as mechanical was based on Christian methodology. Christian methodology, accepts the power of God. Descartes said that the cause of motion was God. God has created mind and body and body does not have consciousness. This statement of Descartes sets the background of philosophical view of Classical Physics.

For Descartes, the quantity of motion was conserved. He establishes the laws of impact which is based on his conservation principle. This was advanced by Newton in *The Waste Book* (Herivel, 1965, pp. 133-9).

Classical Physics was started by Newton. He displays a number of features which were missing from the work of Descartes. He explained universe, which was already explained by Descartes. He was a scientist and believes in experiments only. He insists on the primacy of empirical, experimental data in the established form of scientific truth. The main aim of Newton is to explain how bodies could and did move in a universe. Aristotle said that different bodies moved in ways that are appropriate to their nature, within a universe; Descartes said that the motion of one body was the result of a prior motion of another body, but Newton adds a third alternative, which says that bodies moved under the influence of a force. He identified a universal force operating upon bodies.

Newton said that everything can be explained through matter only. Matter is predictable. Matter in form of individualism is used. Matter is regarded as the reality of universe. Newton was a mathematician first. Matter is a component of universe. The world view which underlies Classical Science may be called Newtonian or mechanistic physics. The complex things are reduced to simplest things, but only in a form of scientific method. He said that we can predict future through certainty. The story of past with accurate certainty can be predict.

The concept of creation is regarded as a problem for Newtonian physics. He says that scientist in Classical Physics are not saying that they are creator. They only say that they are discoverers. *The Mathematical Principles of Natural Philosophy* (known as *the Principia*), published in 1687, was known as the primary vehicle that promulgated Newton's vision of nature and science.

Methodology

I used qualitative and analytical method for this paper. I also take the help of

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many books for this paper.

Discussion and Results

In discussion I discuss about the different principles of Newton world view are as follows:

- a. **Ontology:** - Ontology is also known as the theory of reality. Ontology of Classical Science is matter only. Matter in its primary form is discussed. According to this principle, all phenomena, whether physical, biological, mental or social are ultimately constituted of matter only. He said that the elements are matter, and that matter moves in the absolute space and time. The matter is also governed by forces. He said that we can predict our future and can also know our past. Accurate principle of certainty is needed which is based on some rules.

The task of science is to map the universe through observation only and that observation or experiment is regarded as a tool which uncovers that, which is already there. The universe is like a machine, and if it is a machine, then we can predict its future and past using certainty principle. Newton says following things:

1. Space is something distinct from body and exists independently of the existence of bodies.
 2. The matter as the given body moves.
 3. The true motion of a body cannot be defined in terms of, its motion that are relative to other bodies.
- b. **Epistemology Principle:** - It is based on the reflection-correspondence view of knowledge. Our knowledge is regarded as merely an imperfect reflection of the particular arrangements of matter which exist outside of us. The correspondence between the external, material objects and the internal, concepts or cognitive elements are needed. And for that we need our simple observation technique. Classical Physics believes in Correspondence theory of truth. Correspondence theory is applicable to everybody because its knowledge corresponds to reality.
 - c. **Principle of Distinctive Conservation:** - Everything is distinct. Distinct character is necessary for everyone. Every matter has distinctive characteristic, only configuration changes. Distinct character of material is maintained. We need possible and precise distinctions between the different components of the system and for this, we also need observation. These distinctions are regarded as absolute and objective.

The evolution of the system conserves all these distinctions. Every matter distinctive character should be conserved. Newtonian world view says that everything that exists now has existed from the beginning of time and will continue to exist. It is eternal; if anything is eternal then its energy will be maintained till its eternity. Knowledge is regarded as a distinction which conserves mapping and that mapping takes us from object to subject.

- d. Principle of Deterministic: - This universe is deterministic, because it has its own distinction. They follow their own rules which are already fixed and determined. We can know the past and can predict the future. This universe is regarded as mechanical.
- e. Principle of Causality: - The root cause of Classical Physics lies in cause and effect relationship. This universe is regarded as given and objective. This universe is regarded as deterministic also because it is depended upon causation. The principle of causation is very essential for scientists. Scientists believe in perceiving experiments only.

It has been asked that if universe is run by cause and effect relationship, then experiments should give same results every time. The answer shows that the same result will come out. The same result will come out because of reproductivity. But if this is true, then what about an inductive problem that arises? Inductive problem does not guarantee the future. No certainty is found there. In this problem, new claims will come out.

David Hume was associated with the problem of induction. He described the problem in *An Enquiry Concerning Human Understanding*. He says that causal relations are found only by induction and not by reason. The problem of induction is concerned with the uncertainty of conclusions that are derived by induction. It also doubts the very principle through which those uncertain conclusions are derived. The custom or belief is needed for induction.

In return, it has been said that the charge of induction cannot be claimed against scientists because scientists claim deductive reasoning only and are not interested in inductive reasoning. Descartes uses deductive method. In deductive method, conclusion is derived from premise. In results I discuss the implications or outcomes of Descartes and Newtonian world view. The outcome of Newtonian physics says that world is eternal that is why chemical principle works on it. The following impacts are as follows:

A. Individualistic: - Society is an outcome of individuals. A person becomes individualistic. Depression or suicide comes out because of individualistic behavior.

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Social relationship is disturbed the more and more individualism is increased and we have affluent ourselves from others. All this is showing negative effect on the society. Materialism has been increased. In terms of money, we are using humanity. Sense of possession has been increased. We need spiritual approach. Nuclear family exists because of individualism doctrine.

B. Environmental problem: - Relationship is contractual in Newtonian physics. We are not connected naturally. We disturb ecological system for our selfish motives. We become enjoyer of so-called others.

C. Globalization: - We have experienced so-called globalization but not experienced real globalization. Real globalization means consumerism or commercialization. Our emotions have become commercialized. Environmental problem leads to globalization problem as well. Ecological system is disturbed. The medical system is using animal or trees existence for making money. In today's century, sense of possession has dominated nature very badly. The conservation of products has been lost. The differences that exist between Descartes and Newtonian Physics are as follows:

- a. Newton does not accept the existence of God, whereas Descartes accepts the existence of God.
- b. For Newton, force was important whereas for Descartes force was not important.
- c. Newton believes in experiments, whereas Descartes believes in reason only.

There are Newton's Three Laws of Motion which are found in *PRINCIPIA (1687)* are as follows:

1. The Law of Inertia:- "Every body continues in its state of rest or uniform motion in a right line, unless it is compelled to change that state by forces impressed upon it." This law was first formulated by Descartes in his *PRINCIPIA PHILOSOPHIAE (1644)*. He offered three illustrations i.e. the motions of projectiles; spinning tops and planets in support of this law. This law is incomplete, because it deals only with the case of moving bodies.
2. The Primary Experimental Basis of Dynamics: - "The change of motion is proportional to the motive force impressed; and is made in the direction of the right line in which that force is impressed". This law was first found in Newton's writings in *The Waste Book*.
3. Equal Action-Reaction Law: - "To every action there is always opposed and equal reaction or, the mutual actions of two bodies upon each other are always equal, and directed to contrary parts."

The Law of Inertia shows the means for verifying, that the bodies do indeed interact with each other, whereas the second law shows that there is no net force on either one which comes from any external source.

The criticisms against Classical Physics are as follows:

- a. Indeterminism is found in Classical Physics. Determinism is regarded as a failure in Classical Physics and Quantum Physics sometimes provide a cure to it. Some fault modes of Determinism in Classical Physics are found which are as follows:
 1. Failure of uniqueness for solutions to the initial values problem for ordinary differential equations.
 2. The breakdown of solutions.
 3. Systems with an infinite number of particles.
 4. Fields and fluids in Newtonian Physics.
 5. Fields and fluids in special relativistic physics.
- b. Time is regarded as irreversible in Classical Physics. The time reverses an escape solution and that will lead to a violation of determinism which can be seen in future.
- c. Newtonian physics taught Non-Advaita. By Advaita, we mean that we are non-different. Newtonian physics talked about difference only. Advaita is essential for society, because in Advaita, no caste, group and religion exist. Newtonian physics gives wrong impact on society in form of environmental and individualism problem.
- d. Newtonian physics gives an economical problem also. His physics is based on reasoning and experiment only, whereas Advaita philosophy does not require reasoning and experiments. It needs only spiritualism, unity and love.
- e. Newtonian physics does not solve moral problem. It does not explain every relation. Advaita Vedanta and Quantum Physics deals with relations.

Quantum physics overcomes the failure of uniqueness for solutions that goes to the initial value problem for ordinary differential equations; the breakdown of solutions; the indeterminism in systems with an infinite number of particles and failures of determinism that arises due to non-global hyperbolicity.

It says that Quantum Physics are indeterministic more than Classical Physics in certain respects. The phrase “quantum indeterminism” goes with the collapse of the state vector. Collapse has been regarded as a solution to the measurement problem. A stochastic mechanism introduced quantum state of indeterminism. It has been

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said that the quantum state determines those observables which have deterministic values and also does not fix those values.

Conclusion

The whole universe is matter according to Newtonian physics the whole universe works on certain physical principles and axioms of cause and effect. The universe is known till its eternity because it is deterministic according to Newton. The universe is individualistic and also has distinctive character. If Newton physics is right then whole world and human beings are taken as material only. If human being is taken material only then there is no place of free will or separate consciousness. Scientists try to explain every consciousness through the means of materialism. Classical Physics can be associated with Carvaka school. Both try to explain human consciousness in terms of material world.

Classical Physics says that free will is regarded as the result of our past experience. According to me, we are going from objectivity to subjectivity. According to me, we need Advaita Vedanta only at practical level.

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