

Research Essay

The Nature of Cause & Effect in a Classical & Quantum View: Scientific & Upanishadic Thoughts

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Abstract

The nature of cause and effect was scientifically explained by Isaac Newton during late seventeenth century. It was a classical mechanistic view. These ideas went through some changes with the evolution of quantum mechanics during twentieth century. However, Sage Kanada had scientifically discussed the nature of 'Cause and Effect' in his 'Vaisesika Sutras' more than two thousand years ago. This article will deliberate on the thoughts expressed by Sage Kanada which account for both classical and quantum views and then discusses their correlation with modern scientific ideas.

Keywords: Cause & effect, Newtonian mechanics, quantum mechanics, Upanishads, Vaisesika Sutra.

1. Introduction

Influenced with the thoughts of Francis Bacon and Rene Descartes, the great European philosophers of 16th and 17th century, Sir Isaac Newton (1642-1727), an English Physicist and Mathematician developed the foundations of 'Principles of Mechanics', popularly known as 'Newtonian Mechanics', which became the back bone of scientific thought in 'Physical Sciences' for the next two centuries. Newton discussed the nature of cause and effect in his deliberations of the principles known as 'Newton's Laws of Motion', talking about the nature of forces acting between two bodies. If there is a cause, there will be an effect exactly proportional to it. This was a statement based on linearity and determinism. This statement was perfectly fine on the macroscopic level and worked extremely well on the grosser plane. The principles of 'Newtonian Mechanics' helped in the development of 'Engineering Sciences', which immensely benefited society in improving the quality of life of people at large.

However, it became difficult to explain the behaviour of sub-atomic particles based on the principles of 'Newtonian Mechanics', because their behaviour was found to be non-linear and indeterministic. It was not possible to find out the 'position' and 'velocity' of a particle exactly, as discussed by Heisenberg in his 'Principle of Uncertainty'. Moreover, it was even harder to ascertain the behaviour of 'electron', one of the most important and fundamental sub-atomic particles. Incidentally, it is the behaviour of an electron which decides the properties of matter on the grosser level. It was even more difficult to ascertain that what is an 'electron'? Is it a particle or a wave? Or, is it both, depending on its pleasure, however, exhibiting only one property at a time. An electron has indeed both, a particle as well as a wave-like property, and so is everything

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else in nature, but how and where such a particle is located is dependent on the very act of observation. This ‘quantum uncertainty’, was considered quite weird. A particle could only be described by a ‘wave function’. The particle actually exists only in a blurry state of possibility until its wave function collapses during observation. The behaviour of a particle could only be defined as probabilities. No particle could, therefore, assume a particular motion or place till the collapse of its wave function. This was the weirdness of quantum science which was becoming extremely difficult to comprehend, literally impossible to visualise. This has been discussed in detail by the author in one of his recently published papers ¹.

Sage Kanada has discussed the nature of ‘Cause and Effect’ in his Sutras. Vaisesika Sutras of Sage Kanada ² have been considered as one of the initial expositions on physical sciences in Indian philosophy. These Sutras probably present one of the earliest discussions on the thought of ‘atomicity’, and on the true nature of knowledge which is supposed to comprise of dravya (substance), guna (attribute), karma (action), samanya (generality), visesa (particularity), samavaya (inherence) and abhava (non-existence). Vaisesika-Sutra sets up an ontological system. Vaisesika is a materialist system but differs a lot from the Western materialist system in its structure (like many other Indian systems). The Indian materialism is indeed transcendental materialism. To understand Indian ontological thinking, it is necessary to study Vaisesika, Sankhya and Vedanta in conjunction with each other.

Before we discuss the Vaisesika Sutras concerned with the ‘Cause and Effect’, it is necessary to deliberate on the fundamental philosophical system of Vaisesika Sutras of Kanada.

2. Vaisesika-Sutra of Kanada -A Philosophical System

Historians of philosophy have encountered difficulty to say the date of this ancient text with certainty. Some scholars say that these were written before Nyaya-Sutra, which were supposed to be known to Kautilya in 300 BCE. However, some scholars contend these to be pre – Buddhist period texts, an opinion also shared by some Chinese scholars as well, such as Chi-Tsan. It seems that there is ample evidence to prove that these were written sometimes between 600 BCE to 200 BCE.

Vaisesika is *niriswara* (Godless) school of thought; it does not posit ‘God’ as an ontological category. However, it is *astika* because it accepts Vedas as valid epistemology. The purpose and nature of any philosophical enquiry is directed towards overcoming suffering. The suffering is inevitable, but what is important is to seek the wisdom to rationalise suffering and reduce its potential to damage the *Self*. Vedanta talks that suffering is the property of material body (*jad-tattwa*) and ignorance in the form of imposition of the body on the Self (*Atma*) is its cause. If one is able to completely delink one’s Self from the body and establish oneself in one’s self, one may be able to constitute the state of absence of suffering. Hence to achieve and establish oneself in one’s self, one needs to gain knowledge of the ‘Universal self’ or the ‘Life Principle’ (*paramatma-tattwa*), which is totally alien to the principle of sorrow. The central concept of Vedanta is *Brahman*. Vedanta has a great insight and considers energy as not separate but immanent in the matter. Therefore, *Brahman* is that one principle which subsumes energy and

matter, and described as substratum, *Brahman* being the efficient cause (*nimitta*) and the pervasive principle of the entire universe. This establishes the oneness of all beings.

The fundamental principle of Vaisesika is *karya-karnavada* (cause-effect principle), which is also known as *parmanu-vada* (atomistic principle). Sage Kanada has developed a theory of atomicity, discussed the theory of sound and adopted an empiricist view of causality, which happens to be somewhat in the spirit of modern scientific enquiry. This asserts that everything has a cause to exist. The subtle sub-atomic particles (*parmanu*) are the ultimate cause or constituents of all the gross material objects. *The material cause of this universe is nothing but the conjunction of these sub-atomic particles in a hierarchic structure.* Kanada's Vaisesika Sutras is a theistic text which does not believe in the existence of God but deals with physics and metaphysics. The Vaisesika Sutra is one of those texts which form the basis of the syncretic Nyaya-Vaisesika system. The Vaisesika ontology admits repeatable properties and is realistic in nature because it conceptualizes this universe as created from timeless entities, spatial points and temporal events. Vaisesika debates in accordance with the tenets of the system of 'logic'.

Through its atomic theory, the Nyaya-Vaisesika system attempts to explain only the composite objects of the universe that are non-eternal. It is definitely considered one of the earliest theories in Indian philosophy to view the concept of 'Atomicity'. Yet the Vaisesika Sutras may not completely stand the scrutiny of the modern scientific enquiry of the atomic theory or the atomic structure in the established modern empirical fashion. The great Indian philosopher of twentieth century, Sarvepalli Radhakrishnan has commented very pointedly on the atomic theory of the syncretic Nyaya-Vaisesika system, as follows:

*"In its attempt to explain the origin and destruction of the world, it reduces all composite objects to the four kinds of atoms of earth, water, fire and air. So, it is called the atomic theory of the world. But, it is not a mechanistic or materialistic theory like atomism of Western science and philosophy. It does not ignore the moral and spiritual principles governing the processes of composition and decomposition of atoms."*³

In the first chapter itself, Kanada's Sutra enumerates the principal categories such as substance, attribute, action and their common properties and differences etc. Then, he discusses the concepts of 'Cause and Effect', generality and specificity, and being in substance, attribute and action. The further chapters discuss on the nature of the nine substances, which are earth, water, fire, air, ether, time, direction, self and mind, with a discussion on non-eternality of sound and detailed examination of self and mind. Further, there is description of 'Nature', establishing the eternality and existence of atoms, and then explaining that how the sensory perception leads to knowledge. There is discussion on the type of bodies, on action, and even on subjects such as giving, receiving, renunciation, seen and unseen deeds producing merit, and on attributes. There is further discussion in detail on 'Atomicity', on ether, mind, time, direction, and 'Inherence' as a subject. There is deliberation on various types of cognition and negation, finally dwelling upon the notions of pleasure, pain and study of cause. Kanada has concluded the Sutras with the reassertion of the authority of the most ancient scriptures 'Vedas', existence of 'Soul' and finally that feeling of 'I' as a proof of direct perception of the 'Self'. It is generally accepted that as Panini's grammar is indispensable to have the proper knowledge of linguistic science, Kanada's

Sutra is indispensable to obtain the knowledge of categories. We will now deliberate upon some of these 'Sutras', which discuss the nature of 'Cause and Effect'.

3. The Nature of Cause & Effect: Samanya & Visesa

These Sutras are reproduced from Chapter 1-Second Ahnika:

Sutra 32. "*Karnabhavat Karyabhavah*" II 1 II (In Sanskrit)

Meaning thereby, '*In the absence of Cause is the absence of Effect*'.

This is reasonably simple to understand. If there is no 'Cause', there is no 'Effect'. That is to say that to have an effect, there needs to be a cause. This is typically 'Newtonian Mechanics'. All three of Newton's laws of motion represent the cause and effect phenomenon. On a broader perspective and on macro level, this is what operates the 'Physical World' as we understand. This is linear, deterministic and causal and operates in 'Cartesian Co-ordinates'. This is the fundamental principle governing almost all the laws of modern science and the basis of the development of modern technology. Incidentally, people generally try to understand the 'Human Behaviour' as well in these terms, but it may not be quite true. Actually, it is far from truth. Human behaviour can never be linear, deterministic and causal.

Let us now understand the next Sutra.

Sutra 33. "*Na tu karyabhavat karnabhavah*" II (In Sanskrit)

Meaning thereby, '*But in the absence of Effect, there is no absence of Cause*'.

This is rather interesting and needs deeper introspection. It probably means that if no 'Effect' is observed, it does not mean that there is no 'Cause'. It might also mean that the 'Cause' could still be there but not let the 'Effect' be perceived. The 'Effect' might be subtle, if at all. This may need a little more deliberation. This governs the microscopic world and also the 'most complicated human behaviour'. We normally find this concept hard to understand, and difficult to visualize. This is nothing but the essence of 'Quantum Science'. This is what Professor Heisenberg discussed in his 'Principle of Uncertainty'. (The thoughts on quantum science were actually developed in the first half of the twentieth century by a large number of scientists). This is nonlinear, in-deterministic and probabilistic. This operates the 'Micro World'. It is likely that this goes to the 'Consciousness' level, where the normal 'Physical Laws' as established by modern science (mainly Newtonian mechanics) do not hold well. This is the realm of subtlety where observer affects the observed. This also governs the 'Human Behaviour' most of the time.

It is thought that Heisenberg, and many other European scientists of early twentieth century were very influenced with 'Indic Thoughts', and the knowledge of our scriptures, 'Vedas and Upanishads'. Heisenberg visited India, stayed for few weeks and discussed with Rabindra Nath Tagore (Nobel Laureate) on the beauty of the knowledge in Indian scriptures. This was the time while he understood the concept of 'Maya', 'Advaitism', and the great thoughts of 'Adi

Shankracharya'. Heisenberg has expressed his thoughts in his book titled, 'Physics and Philosophy'. Similarly, Fritjof Capra's views expressed in his books ('Tao of Physics', 'Turning Point, and 'Uncommon Wisdom') are great ideas on the subject which also indicate how these thinkers viewed the 'Eastern Mysticism' and 'Western Scientific Thoughts' in a relative perspective.

These philosophical thoughts are in resonance with the, 'Principles of Bio-Centrism',^{5,6} recently talked by Robert Lanza MD, one of the most celebrated Bio-Scientists. It may be worthwhile to put forward these 'Principles of Bio-Centrism', here to complete this discussion:

First Principle - What we perceive as reality is a process that involves our 'Consciousness'.

Second Principle - Our external and internal perceptions are inextricably intertwined. They are different sides of the same coin and cannot be separated.

Third Principle - The behaviour of all the particles - subatomic or even objects - is inextricably linked to the presence of an observer. Without the presence of a 'Conscious Observer', they only at best exist in an undermined state of 'Probability Waves'.

Fourth Principle - Without consciousness, 'matter' dwells only in an undermined state of probability. Any universe that could have preceded consciousness only existed in a probable state.

Fifth Principle - The very structure of the universe could be explained only through bio-centrism. The universe is fine tuned for life, which makes perfect sense as life creates the universe, not the other way round. The universe is simply the complete spatio - temporal logic of the self.

Sixth Principle - Time does not have a real existence outside of animal sense perception. It is the process by which we perceive changes in the universe.

Seventh Principle - Space, like time, is not an object or a thing. Space is another form of our animal understanding and does not have an independent reality. We carry space and time around with us like turtles with shells. Thus, there is no absolute self - existing matrix in which physical events occurs independent of life.

In the next Sutra, the Sage states,

Sutra 34. "*Samanyam visesa iti buddhapeksam*" II 3 II (In Sanskrit)

Meaning thereby, '*(Both) Samanya and visesa depend on Buddhi (Intellect)*'.

This is a very interesting thought. The 'Samanya' (ordinary / universal / general) and 'Visesa' (special / extraordinary / particular) is the matter of personal 'Buddhi' or Intellect or individual perception. 'Vaisesika' as such has been interpreted in two ways. One explanation is derived from the category 'Visesa', which has been used in the sense of 'particularity', while another

view is that the name of the system is derived from the category 'Visesa', on which the concept of 'Atomic Theory' is based. In this case, 'Visesa' is interpreted as 'Special'. Whatever it may be, 'Visesa' is considered diametrically opposite to the 'Samanya' (universal). *'Visesa' is actually that underived peculiarity which explains the differences of part-less eternal substances like space, time, souls, minds and atoms of similar kind.* There is a view that 'Visesa' is as imperceptible as the atom itself.

Let us deliberate on three more Sutras on 'Generality' and 'Specificity' after mentioning them, which are as under:

Sutra 35. *Bhavo 'nuvrttereva hetutvat samanayameva* II4II (In Sanskrit)

Meaning thereby, *Being/Existence being the cause of continuity is 'samanya'.*

Sutra 36. *Dravyatvam gunatvam karmatvam ca samanyani visesasca* II5II (In Sanskrit)

Meaning thereby, *Dravya, guna and karma are both Samanya and Visesa.*

Sutra 37. *Anyatrantyebhyo visesebhyah* II6II (In Sanskrit)

Meaning thereby, *Visesa, being (the constituent of) ultimate differences, exists independent (of any percipient).*

As discussed above, Vasesika sutras has divided the entire knowledge in seven categories which are: *dravya* (substance), *guna* (attribute), *karma* (action), *samanya* (generality), *visesa* (particularity), *samavaya* (inherence), and *abhava* (non-existence). *Dravya* (substance) has been considered as the substratum of *guna* (attributes) and *karma* (actions), but different from both. Out of nine substances discussed earlier, only the first five i.e. ether, fire, air, water, and earth are physical in nature; while all the four except ether (*akasha*) are supposed to be composed of all the four kinds of atoms of fire, air, water and earth (This has been discussed by the author in one of his earlier published papers¹).

These atoms were considered as indivisible and indestructible particles of matter, which are eternal and uncreated but with specific attributes of odour, taste, colour, touch and sound. The world is supposed to be created out of atoms, the origin and destruction of the objects of the world being explained by the composition and decomposition of the atoms. Atoms do not move by themselves, however, the sources of their motion are unseen forces operating as per laws of action (*karma*).

Kanada thought that these atoms are probably too small and could not be perceived, however should be inferred from their effects. These atoms could also be without attributes albeit temporarily. Kanada considered that the eternal nature of atoms could be attributed to the fact that these are imperceptible because perceptible entities are usually destructible. As per Kanada's opinion, ether, direction and time are considered to be imperceptible substances viewed as eternal and all pervasive, concerned with various physical functions of the body such as cognition, feeling etc. The self is considered as eternal, all pervading substance supposed to be

the substratum of the phenomenon of ‘Consciousness’. The ‘Self’ could only be perceived by the mind internally.

Attribute (guna) is that characteristic which though existing in a substance (dravya), but has no attribute or action in itself. Action (karma) belongs to substance (dravya) like attribute (guna). The universal (samanya) is that eternal essence which is common to all the individuals of a class. That is why the sage said, ‘*Being/Existence being the cause of continuity is ‘samanya’*’. However, particularity (visesa) is actually the ground where the things ultimately differ with each other. Usually, one distinguishes one thing from the other only by the peculiarities of its parts. Therefore, particularity (visesa), stands for that individuality of the eternal entities of the world. Therefore, though, *dravya, guna and karma have been considered both Samanya and Visesa, but Visesa, being (the constituent of) ultimate differences, exists independent (of any percipient)*.

Therefore, in summary, Nyaya-Vesika philosophic system (materialism) presents a world consisting of individual objects, termed as ‘substances’, which appear as substrata of certain characteristics in relation of container and contained. The real structure of this materialism is the essential difference between the substratum and its properties. For example, gold is the substratum while the necklace (made of gold) is the manifestation of its properties. These ‘substances’ are actually substrata with various kinds of properties residing in them.

Some attributes could be stationary such as colour etc, while some could be transient such as any ‘action’. As per our common experience, some objects could be so similar that these could be referred by a common noun, and could have something in common to all individuals of that class. That is regarded as ‘generality’. However, ‘particularity’ is that special characteristic which differentiates one atom from another though they could be of the same class. Out of the five categories mentioned above, the categories of ‘guna’, ‘karma’, ‘samanya’, and ‘visesa’ (apart from ‘dravya’, the substance), are the properties which reside in the substrata of the substance. The relationship among the substratum and the substance is one of those connections which are referred as ‘samavaya’ (inherence). Another seventh category of ‘abhava’ (non-existence) was later on added to this system.

Karl H. Potter has the opinion that as far as metaphysics of this particular system is concerned, the ‘Nyaya-Vesika’ system is one of the most rigorous efforts at the construction of a realist and substantialist ontology the world has ever seen.⁷

4. Conclusion

The phenomenon of cause and effect as understood through the western scientific analytical method, first through ‘Newtonian Mechanics’ and then through ‘Quantum Mechanics’, has been briefly discussed. This has then been compared with the thoughts of Sage Kanada on the same subject through his exposition in his sutras. It appears that Indian sages had analysed the philosophy of cause and effect more than two thousand years ago, albeit in a very abstract form, very vividly and had made an effort to understand this phenomenon from various points of views such as generality and particularity.

References

1. (Sharma Narendra Dutt, 2018), *On the Concept of Space-Time and Consciousness: Some Western and Indic Thoughts*, Journal of Consciousness Exploration & Research, Vol. 9, Issue 4, pp 328-349
2. (Chakrabarty Debasish, 2003), *Vaisesika Sutra of Kanada*, D.K.Printworld (P) Ltd., New Delhi
3. (Radhakrishnan Sarvepalli, and Editors, 1967), *History of Philosophy, Eastern and Western*, Vol. 1, London, p 231
4. (Radhakrishnan Sarvepalli, 1977), *Indian Philosophy*, Vol. 2, New York
5. (Lanza Robert, 2009), *Biocentrism*, Benbella Books Inc. Dallas
6. (Lanza Robert, Berman Bob, 2016), *Beyond Biocentrism*, Benbella Books Inc. Dallas
7. (Potter Karl H., 1997), *Introduction, Encyclopaedia of Indian Philosophies: Indian Metaphysics and Epistemology: The Tradition of Nyaya-Vesesika up to Gangesa*, Delhi, India