

1. Swami Vivekananda's Scientific Cosmology and Albert Einstein's Special Theory of Einstein's Relativity (1905)
 2. Einstein's General Theory of Relativity (1915-16) and Its Implications
 3. Vivekananda's System of Physics
 4. What Happened Before the Beginning of the Universe?
 5. Vivekananda's Mahat and David Bohm's Super-Implicate and Implicate Order
 6. Vivekananda's Scientific Cosmology and Quantum Physics
 7. Mind and Subtle Matter (Tanmatras)
 8. Vivekananda's Akasha-Prana and Samuel Alexander's Space-Time
 9. Vivekananda and Alexander on Evolution
 10. Heredity
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VIII. Swami Vivekananda's Scientific Cosmology

1. Vivekananda's Scientific Cosmology and Albert Einstein's Special Theory of Relativity (1905)¹

Swami Vivekananda (1863-1902) made a concerted effort to explain Vedantic principles using the concepts and terminology of modern science, particularly in the areas of biology (evolution and heredity) and physics. For example, he translated Sanskrit words into the terminology of physics, such as Akasha as matter, Prana as force (or energy), and prakriti is rendered as nature. He did this to demonstrate the rationality of Hindu ideas and to reconcile science and religion. His objective was to prove that the findings, methods, principles, and goals of science are in harmony with Indian philosophy and religion. In this way Vivekananda created a new scientific theory that not only anticipates 20th century physics, but supersedes it at least from the philosophical standpoint. Science and religion should work in harmonious cooperation, since each realm has its place as partial manifestations of a single Reality. Many people think the heavenly world is "wholly other" from the secular world, and consequently there are many atheists and agnostics who do not accept the former idea. Vivekananda tried to show there is a continuity from gross to subtle to causal between the secular and the spiritual world. This idea is more compatible with some form of panentheism, rather than considering *creatio*

ex nihilo which posits a complete difference between the two realms. He stated, “Take anything before you, the most material thing--take one of the most material sciences, as chemistry or physics, astronomy or biology--study it, push the study forward and forward, and the gross forms will begin to melt and become finer and finer, until they come to a point where you are bound to make a tremendous leap from these material things into the immaterial. The gross melts into the fine, physics into metaphysics [meta meaning beyond or behind (background of) physics in Greek], in every department of knowledge.”² “It seems to us, and to all who care to know, that the conclusions of modern science are the very conclusions of the Vedanta reached ages ago; only, in modern science they are written in the language of matter.”³ In areas like evolution and heredity can we say biology has become metabiology? Thus when we leave the physical plane and enter the subtle realms; science, physics, biology, and psychology become metascience, metaphysics, metabiology (e.g., a broader understanding of heredity and evolution), and metapsychology (e.g., yoga psychology).

Vivekananda made statements like, “Now, such ideas as matter, force, mind, law, causation, time, and space are the results of very high abstractions, and nobody has ever sensed any one of them; in other words, they are entirely metaphysical. Yet without these metaphysical conceptions, no physical fact is possible to be understood. Thus a certain motion becomes understood when it is referred to a force; certain sensations, to matter; certain changes outside, to law; certain changes in thought, to mind; certain order singly, to causation--and joined to time, to law. Yet nobody has seen or even imagined matter or force, law or causation, time or space.”⁴ His brother disciple Swami Brahmananda (1862-1922) once asked one of his disciples who became Swami Prabhavananda, “Tell me where matter ends and spirit begins.” So there is a converging of the subtler aspects of modern physics with the Indian philosophy as interpreted by Vivekananda.

On February 5, 1896 at a party hosted in New York City by the world famous French actress Sarah Bernhardt (1844-1923), Swami Vivekananda (1863-1902) explained his cosmological theory to Nikola Tesla (1856-1943), the Serbian (Yugoslavian) American electrical engineer and inventor. Tesla had attended many of the Swami’s lectures over the prior couple of months. Vivekananda related, “Mr. Tesla was charmed to hear

about the Vedantic Prana [Force, Energy] and Akasha [Matter] and the Kalpas [Cosmic Cycles], which according to him are the only theories modern science can entertain. Now both Akasha and Prana again are produced from the cosmic Mahat, the Universal Mind, the Brahma or Ishvara. Mr. Tesla thinks he can demonstrate mathematically that force and matter are reducible to potential energy. I am to go and see him next week, to get this new mathematical demonstration. In that case, the Vedantic cosmology will be placed on the surest of foundations. I am working a good deal now upon the cosmology and eschatology of the Vedanta. I clearly see their perfect unison with modern science, and the elucidation of the one will be followed by that of the other.”⁵ Unfortunately, Tesla was unable to come up with the mathematical equation.

On this subject in June 1896 Vivekananda stated, “Rather it is possible to demonstrate that what we call matter does not exist at all. It is only a certain state of force [energy]. Solidity, hardness, or any other state of matter can be proved to be the result of motion. Increase of vortex motion imparted to fluids gives them the force of solids. A mass of air in vortex motion, as in a tornado, becomes solid-like and by its impact breaks or cuts through solids. A thread of a spider's web, if it could be moved at almost infinite velocity, would be as strong as an iron chain and would cut through an oak tree. Looking at it in this way, it would be easier to prove that what we call matter does not exist. But the other way cannot be proved.”⁶ Concerning relativity the Swami commented, “Why does not the earth fall?... The very question of the examiner was nonsense on the face of it. There is no up and down in the universe; the idea is only relative.”⁷

Throughout the remainder of his life Tesla accepted the ideas he learned from Vivekananda. Tesla rejected "all attempts to explain the workings of the universe without recognizing the existence of ether [Akasha] and the indispensable function it plays in the phenomena."⁸ In an unpublished and undated manuscript entitled "Man's Greatest Achievement", Tesla wrote that "long ago he recognized that all perceptible matter comes from a primary substance, or a tenuity beyond conception, filling all space, the Akasha or luminiferous ether, which is acted upon by the life-giving Prana or creative force, calling into existence, in never ending cycles, all things and phenomena. The primary substance,

thrown into infinitesimal whirls of prodigious velocity, becomes gross matter; the force subsiding, the motion ceases and matter disappears, reverting to the primary substance."⁹

Nine years later in 1905, Albert Einstein (1879-1955) in his Special Theory of Relativity worked out the mathematical proof of the equivalence of mass and energy with his famous equation: energy = mass x the speed of light squared. According to Einstein, "Matter which we perceive is merely nothing but a great concentration of energy in very small regions. We may therefore regard matter as being constituted by the regions of space in which the field is extremely intense."¹⁰

Swami Nikhilananda met the world famous theoretical physicist Albert Einstein, who in 1930 had held a published discussion with Rabindranath Tagore in Germany.¹¹ Einstein read Swami Prabhavananda's, *The Eternal Companion: The Life and Teachings of Swami Brahmananda* and was deeply impressed. Upon finishing the biography, he indicated, "Maharaj [Brahmananda] was right. Meditation is important. We know what goes on in the external world but we don't know what goes on here (pointing to his heart)." He liked the idea of emphasizing meditation because, he stated people would by nature do the external work. In addition, Einstein studied other Indian scriptures and acknowledged, "When I read the *Bhagavad-Gita* and reflect about how God created this universe, everything else seems so superfluous." Einstein greatly admired his fellow pacifist Mahatma Gandhi whom he described as, "a leader of his people, unsupported by outward authority; a politician whose success rests not upon craft nor mastery of technical devices, but simply on the convincing power of his personality; a victorious fighter who has always scorned the use of force; a man of wisdom and humility armed with resolve and inflexible consistency, who had devoted all of his strength to the uplifting of his people and the betterment of their lot; a man who has confronted the brutality of Europe with the dignity of the simple human beings and thus at all times risen superior.... Generations to come will scarcely believe that such a one as this ever in flesh and blood walked upon this earth."¹²

Religion proceeds from the subtle to the gross, from Brahman-God to the Divine Mind, to the Logos (Word), and eventually to the universe. Conversely, the sciences proceed from the gross to the subtle. Physical science from gross matter to subatomic particles, from the physical brain to consciousness. Behavioral science from the consciousness to the

subconscious (preconscious) to the unconscious mind. Social science from social events to their subtle causes. By analogy, we might think of when they built the First Transcontinental Railroad across the United States. One group of workers started in Iowa and the other in California. Eventually they met in Utah in 1869. So we have religion starting from one standpoint and the sciences from its opposite, and the eventual goal is that they meet so that their ideas can be combined into a meaningful synthesis. Vivekananda notices this phenomenon and mentioned that science was discovering some of the Vedantic ideas.

2. Einstein's General Theory of Relativity (1915-16) and Its Implications

Max Planck (1858-1947) wrote, "All matter originates and exists only by virtue of a force which brings the particles of an atom to vibration and holds this most minute solar system of the atom together.... We must assume behind this force the existence of a conscious and intelligent Mind. This Mind is the matrix of all matter."¹³ And Sir James Jeans (1877-1946) ascertained, "The universe begins to look more like a great thought than like a great machine. Mind no longer appears as an accidental intruder into the realm of matter; we are beginning to suspect that we ought rather to hail it as a creator and governor of the realm of matter."¹⁴

Science deals with the physical universe (mahakasha) where its accomplishments are fantastic. There is also the subtle universe (chittakasha) that is beyond the scope of the physical sciences, and beyond that the causal universe (chidakasha). When the physical universe dies, it continues to exist in subtle form, space, and time unperceivable to the five human senses. This is similar to a human who continues to exist after the death of the physical body. Gross space and time came into existence with the Big Bang. The common origin of matter, energy, space, and time in the physical plane originated in the subtle realm. The subtle universe existed at a particular location in extended subtle space and during the Big Bang process, in involved seed form it became the physical universe. It took birth in the corresponding area of physical space. Similarly at conception from a particular location in subtle space the subtle body (mind) enters into the womb in involved seed form and out of the physical materials slowly creates a physical body and brain.

Since in the chain of causal events the subtle precedes the gross, does a physical illness exist in the subtle body before it enters the gross body? Is it detectable in the atoms prior to its gross manifestation?

This is the ancient Indian theory of Pralaya the periodic cosmic dissolution of the universe, which Vivekananda has explained in terms of the physics of his day. Because the universe was not in the gross physical realm and there was no physical space and time before the singularity, scientists assumed it did not exist. Yet the universe and causation existed in the realm of subtle space and time, matter and energy not perceivable by the five physical senses. This subtle form is not in the vibrational range of our five senses and thus unknown to us. Vivekananda said the universe remained in the vibrational atoms, but today possibly one might say in the subatomic quantum realm. He has an understanding of the subtle realms that the scientists do not have. Vivekananda did not state if the laws of nature and physical constants remain the same or change with each cosmic cycle. Is it also possible that quantum events exist in a subtle form and only later do they appear on the gross plane that physicists can be aware of? The Indian Tanmatras are defined as minute particle of matter, do they mean atomic or sub-atomic?

According to the theory of the oscillating universe held by a lesser number of physicists, a prior universe expanded over a period of billions of years to a maximum volume, until gravitation reversed its growth and then it began contracting. There was enough matter in the universe (which has not yet been proven) allowing gravitation to halt its expansion. The universe then began to contract for billions of years until everything perished in a fiery chaos. The universe collapsed, and all atoms dissolved into the nuclear fluid of a primeval atom, in a compressed superdense state almost to a point. From there our present expanding universe originated with a Big Bang explosion. No trace of the prior universe remained. In each cycle the new reborn universe will not be identical with the prior one.¹⁵

Albert Einstein's General Theory of Relativity (1915-16) tells us, "Space and time are not the unchanging background upon which events occur. Space can contract, expand, or curve depending on how close you are to a massive object.... Gravity is not a force which pulls a thing; rather it is the curvature of space and time caused by the presence of a nearby massive object (like the earth)."¹⁶ Space has a structure that actively

forms and includes all things and events within the physical universe. Along this line Paul Davies pointed out, “Naively, one might suppose that the galaxies are rushing apart through space. A more accurate picture, however, is to envisage space itself as swelling or stretching. That is, the galaxies move apart because the space between them expands.”¹⁷ From this prospective particles are not isolated entities separated from their surrounding space, but are deformed condensed regions of space-time of high curvature. Matter is a concentration of energy in the area of space, where the field is extremely intense.

The greater the mass of the object, the greater the curvature and warping of space and thus, the curvature varies from one region to another. “Unlike the other forces of nature, gravity is not a field existing within space-time; it is space-time.”¹⁸ “‘Matter tells space-time how to curve, and curved space-time tells matter how to move.’ A standard way to illustrate this idea is to place a bowling ball (representing a massive object such as the sun) onto a stretched rubber sheet (representing space-time). If a marble is placed onto the rubber sheet, it will roll toward the bowling ball, and may even be put into ‘orbit’ around the bowling ball. This occurs, not because the smaller mass is ‘attracted’ by a force emanating from the larger one, but because it is traveling along a surface which has been deformed by the presence of the larger mass. In the same way gravitation in Einstein's theory arises not as a force propagating through space-time,” but is due to the curvature of space-time caused by a large mass.¹⁹ According to Einstein, the universe itself is curved. The greater the amount of matter in the universe, the more curved space will be and as a consequence the smaller the universe will be. In December 1895, Swami Vivekananda explained curvature in a more general way. “There is no such thing as motion in a straight line. Every motion is in a circle. If you can take up a stone, and project it into space, and then live long enough, that stone, if it meets with no obstruction, will come back exactly to your hand. A straight line, infinitely projected, must end in a circle.”²⁰

Concerning the subject of the expansion and contraction of the universe, Vivekananda stated, “The whole universe, as it were, shrinks, and then it expands again. To use the more accepted words of modern science, they are involved and evolved. You hear about evolution, how all forms grow from lower ones, slowly growing up and up. This is very true, but

each evolution presupposes an involution.... Supposing that this whole universe begins to shrink, till every one of us becomes just a little molecule, we should not feel the change at all, because everything relating to us would be shrinking at the same time. The whole thing goes down, and again projects out, the cause brings out the effect, and so it goes on.”²¹ For more on the subject see Chapter VI, Section 5. Eternity of the Universe and Cosmic Cycles.

A material universe requires spatialization (its spread-outness, the order of co-existence), temporalization (change), and substance (matter).

3. Vivekananda’s System of Physics

We will now examine Vivekananda’s system in more detail, in order to gage how closely it compares to Einstein’s General Theory of Relativity. For Swamiji, “The whole universe is composed of two materials, one of which they call Akasha [Primal and Secondary Matter]. It is the omnipresent, all-penetrating existence. Everything that has form, everything that is the result of combination, is evolved out of this Akasha. It is the Akasha that becomes the air, that becomes the liquids, that becomes the solids; it is the Akasha that becomes the sun, the earth, the moon, the stars, the comets; it is the Akasha that becomes the human body, the animal body, the plants, every form that we see, everything that can be sensed, everything that exists. It cannot be perceived; it is so subtle that it is beyond all ordinary perception; it can only be seen when it has become gross, has taken form. At the beginning of creation there is only this Akasha. At the end of the cycle the solids, the liquids, and the gases all melt into the Akasha again, and the next creation similarly proceeds out of this Akasha.” The entire universe exists as Akasha, a “universal extension of matter, unbroken, one substance, undifferentiated, which is the first state of everything, and which begins to change in the same way as milk becomes curd.” “The whole universe is simply an ocean of matter, of which you and I are like little whirlpools. Masses of matter are coming into each whirlpool, taking the whirlpool form, and coming out as matter again. The matter that is in my body may have been in yours a few years ago, or in the sun, or may have been the matter in a plant, and so on, in a continuous state of flux. What is meant by your body and my body? It is the oneness of the body. So with thought. It is an ocean of thought, one infinite mass,

in which your mind and my mind are like whirlpools.” “Akasha is the primal form of matter.”²²

For the Nyaya-Vaisheshika philosophers of science, substance (dravya) has the following characteristics, which also apply to Akasha. It is the: substratum of all qualities and changes, where they inhere; material (substantial) cause of all composite things; original category of which all other categories (e.g., quality, action, relations, universals, particulars, etc.) depend on for their existence; self-sufficient independent existence not depending on anything else; and that which preserves identity through change.²³

According to this dualistic ontological reduction all objects, properties and events are reducible to two substances. Vivekananda continues, “By what power is this Akasha manufactured into this universe? By the power of Prana [Primal and Secondary Energy]. Just as Akasha is the infinite, omnipresent material of this universe, so is this Prana the infinite, omnipresent manifesting power of this universe. At the beginning and at the end of a cycle everything becomes Akasha, and all the forces that are in the universe resolve back into the Prana; in the next cycle, out of this Prana is evolved everything that we call energy, everything that we call force. It is the Prana that is manifesting as motion; it is the Prana that is manifesting as gravitation, as magnetism. It is the Prana that is manifesting as the actions of the body, as the nerve currents, as thought force. From thought down to the lowest force, everything is but the manifestation of Prana. The sum total of all forces in the universe, mental or physical, when resolved back to their original state, is called Prana. ‘When there was neither aught nor naught, when darkness was covering darkness, what existed then? That Akasha existed without motion.’ The physical motion of the Prana was stopped, but it existed all the same. At the end of a cycle the energies now displayed in the universe quiet down and become potential. At the beginning of the next cycle they start up, strike upon the Akasha, and out of the Akasha evolve these various forms, and as the Akasha changes, this Prana changes also into all these manifestations of energy.” “And yet we cannot call it force [energy], because force [energy] is only the manifestation of it. It is that which manifests itself as force [energy] and everything else in the way of motion.” “Prana is Spandana or vibration.”²⁴

He continues, “What force is it which acts upon this Akasha and manufactures this universe out of it? Along with Akasha exists universal power; all that is power in the universe, manifesting as force or attraction--nay, even as thought--is but a different manifestation of that one power which the Hindus call Prana. This Prana, acting on Akasha, is creating the whole of this universe. In the beginning of a cycle, this Prana, as it were, sleeps in the infinite ocean of Akasha. It existed motionless in the beginning. Then arises motion in this ocean of Akasha by the action of this Prana, and as this Prana begins to move, to vibrate, out of this ocean come the various celestial systems, suns, moons, stars, earth, human beings, animals, plants, and the manifestations of all the various forces and phenomena. Every manifestation of power, therefore, according to them, is this Prana. Every material manifestation is Akasha. When this cycle will end, all that we call solid will melt away into the next form, the next finer or the liquid form; that will melt into the gaseous, and that into finer and more uniform heat vibrations, and all will melt back into the original Akasha, and what we now call attraction, repulsion, and motion, will slowly resolve into the original Prana. Then this Prana is said to sleep for a period, again to emerge and to throw out all those forms; and when this period will end, the whole thing will subside again.”²⁵ “Like Akasha, Prana is omnipresent, and interpenetrating everything. Akasha is like the water, and everything else in the universe is like blocks of ice, made out of that water, and floating in the water, and Prana is the power that changes this Akasha into all these various forms.”²⁶ “A form comes out of a combination of force [energy] and matter. This chair has a peculiar form, that is to say a certain quantity of matter is acted upon by a certain amount of force and made to assume a particular shape.”²⁷

“This Prana existed then, but there was no motion in it; Anidavatam means ‘existed without vibration.’ Vibration had stopped. Then when the Kalpa [new cycle] begins, after an immense interval, the Anidavatam (unvibrating atom) commences to vibrate, and blow after blow is given by Prana to Akasha. The atoms become condensed, and as they are condensed different elements are formed.... The Akasha, acted upon by the repeated blows of Prana, produces Vayu or vibrations. This Vayu vibrates, and the vibrations growing more and more rapid result in friction giving rise to heat, Tejas. Then this heat ends in liquefaction, Apah. Then that liquid becomes solid. We had ether [Akasha=Primal Matter], and

motion, then came heat, then it became liquefied, and then it condensed into gross matter; and it goes back in exactly the reverse way. The solid will be liquefied and will then be converted into a mass of heat, and that will slowly get back into motion; that motion will stop, and this Kalpa [world cycle] will be destroyed.”²⁸ “The lowest or most condensed ... in which Prana appears as physical force, and Akasha as sensible matter. The next ... Prana appears in it as psychic forces, and Akasha as Tanmatras or fine particles. Beyond this ... Prana is almost inseparable from Akasha, and you can hardly tell whether Electricity is force or matter. Next is the Brahmaloaka, where there is neither Prana nor Akasha, but both are merged in the *mind-stuff*, the primal energy.”²⁹

We can think of Akasha as having two aspects: the original infinite, formless, changeless, undifferentiated, and imperceptible Karana-akasha (Primal Causal Matter) independent of prana; and the subsequent finite, with form, changing, differentiated, and perceptible Karya-akasha (Secondary Effect Matter) that has been worked on by prana. In their original nature both Einstein’s space-time and Karana-akasha are infinite and formless.³⁰ As Sir James Jeans indicated according to Einstein, “An empty universe, totally devoid of matter, would have its space entirely uncurved, because there would be no matter to curve it, and so would be of infinite size. As the universe is not empty, its size will be determined by the amount of matter it contains. The more matter there is in the universe, the more curved space will be.”³¹ The greater the mass (which is equivalent to energy) of a massive body such as the sun, the greater the curvature. For Einstein only gravity relates directly to space-time, while electro-magnetism and the other forces deal with matter. For Vivekananda, Akasha takes on form and thus becomes finite (limited) when the prana (energy) works on it. The first transformation of prana would be into gravitational energy. He places more emphasis on the different levels of mass and energy, the causal, subtle, and gross, than Einstein or the quantum physicists.³²

Vivekananda adds, “When the [cosmic] cycle ends, all this manifestation of energy becomes finer and finer, becomes only words, then thought. In the next cycle, first the thought changes into words and then out of those words [the whole universe] is produced.”³³ “This eternal Sphota [Logos, Sound-Brahman], the essential eternal material of all ideas or names, is the power through which the Lord creates the universe; nay,

the Lord first becomes conditioned as the Sphota, and then evolves Himself out as the yet more concrete sensible universe.”³⁴ “What is called your mind is only a bit of this Mahat [Cosmic Mind] caught in the trap of the brain, and the sum total of all minds caught in the meshes of brains is what you call Samashti, the aggregate, the universal.... mind is matter, only finer. The body is gross, and behind the body is what we call the Sukshma Sharira [Subtle Body], the fine body, or mind. This is also material, only finer; and it is not the Atman.”³⁵ Defining mind as the source of mass and energy is compatible with quantum physics, and its emphasis on the observer as a participant in the measurement process. (See Chapter VI, Sections 1-2 that describes how the universe is created from Divine ideas, words, and speech).

Vivekananda’s explanation continues, “There is no difference between matter and mind, except in degree. The substance is the same in finer or grosser form; one changes into the other, and this exactly coincides with the conclusions of modern physiological research.” “When a man's brain is disturbed, his ideas also get disturbed, because they are but one, the finer and the grosser parts. There are not two such things as matter and mind.... so it is with the body; it is one thing throughout, layer on layer; from grosser to finer. Again, the body is like the finger nails. As these continue growing even when they are cut, so from our subtle ideas grows body after body. The finer a thing the more persistent it is; we find that always. The grosser it is the less persistent.”³⁶

As Vivekananda states at conception the physical body (that includes the neurons) is created out of the mind (subtle body) composed of the substance of subtle matter. When the physical body (including the neurons) dies the subtle body remains composed of those entities that has the potential to create a new physical body and neurons. Physicalists are putting the cart before the horse if they think the physical brain precedes the mind.

Some think that the Irish philosopher and Protestant Bishop George Berkeley (1685-1753) mistakenly thought that external objects exist only in our mind (subjective idealism) and that “To exist is to be perceived.” To the contrary a camera will prove that objects continue to exist in a room, when they are not perceived by a living being. In deep dreamless sleep we continue to exist unperceived by others, and if a person enters the bedroom they will see we are sleeping there.³⁷

We know from modern science that Akasha as matter and Prana as energy are: indestructible their quantity being constant, persist over time without temporal gaps, and transform from one form to another following uniform laws. At times they evolve from the indefinite, incoherent homogeneity to definite coherent heterogeneous forms. Then there is a progressive structural and functional differentiation. At other times there is a dissipation of motion leading to a state of equilibrium, a balance of forces, followed by dissolution and disintegration.³⁸

Albert Einstein revealed, “It followed from the Special Theory of Relativity [1905] that mass and energy are both but different manifestations of the same thing.... The mass and energy were in fact equivalent.”³⁹ The question arises what are mass and energy manifestations of, and Swami Vivekananda supplies us with two answers based on two schools of Indian thought.

Reviewing Swami Vivekananda’s statements on the subject. We have resolved the whole universe into two components, into what are called matter and energy, or what the ancient philosophers of India called Akasha and Prana.” In three different lectures he stated, “The next step is to resolve this Akasha [Matter] and the Prana [Energy] into their origin. Both can be resolved into the still higher entity which is called mind. It is out of mind, the Mahat, the universally existing thought-power, that these two have been produced. Thought is a still finer manifestation of being than either Akasha or Prana. It is thought that splits itself into these two. The universal thought [Mahat] existed in the beginning, and that manifested, changed, evolved itself [by transformational causation] into these two Akasha and Prana: and by the combination of these two the whole universe has been produced.” “Now there is something beyond Akasha and Prana. Both can be resolved into a third thing called Mahat--the Cosmic Mind. This Cosmic Mind does not create Akasha and Prana, but changes itself into them.... The Mahat becomes changed into vibrating thought; and that becomes in one part changed into the organs, and in the other part into the fine particles of matter. Out of the combination of all these, the whole of this universe is produced. Behind even Mahat, the Sankhya [philosophers] conceives of a certain state which is called Avyakta or unmanifested, where even the manifestation of mind is not present, but only the causes exist. It is also called Prakriti.” “The whole universe is a tremendous case of unity in variety. There is only one mass of mind.

Different [states] of that mind have different names. [They are] different little whirlpools in this ocean of mind. We are universal and individual at the same time.... Matter cannot be said to cause force [energy] nor [can] force [energy] [be] the cause of matter. Both are so [related] that one may disappear in the other. There must be a third [factor], and that third something is the mind. You cannot produce the universe from matter, neither from force [energy]. Mind is something [which is] neither force nor matter, yet begetting force and matter all the time. In the long run, mind is begetting all force, and that is what is meant by the Universal Mind, the sum total of all minds. Everyone is creating, and [in] the sum total of all these creations you have the universe--unity in diversity. It is one and it is many at the same time.” “The mind is universal. Your mind, my mind, all these little minds, are fragments of that Universal Mind, little waves in the ocean; and on account of this continuity, we can convey our thoughts directly to one another.”⁴⁰

In the above quote Vivekananda mentions thought coming from Mahat, and for Arthur Peacocke (1924-2006) information is derived from God. According to Peacocke in addition to matter and energy, there is third important entity called information. Concepts like information must be used since God is a conscious personal agent (more than an impersonal force) whose creative activity encompasses rational purposes and intentions. God’s actions involve supplying both energy and ideas. Peacocke states:

There is a flow of information from higher to lower levels in a single, hierarchically stratified complex. The higher level is seen as constraining and shaping the patterns of events occurring among the constituent units of the lower one. Although 'information' is a concept distinct from matter and energy yet, in real systems, no information flows without some exchange of energy and/or matter.... The concept of information is indeed very apt for situations in which a form at one level influences forms at lower levels - a process that can then be conceived of as a transfer of information, as distinct from energy or matter.⁴¹

Some people believe information needs matter for its embodiment and energy for its communication.

Tamasic Akasha (matter, material cause) the material, is worked on by rajasic Prana (energy, efficient cause) the source of change or stability. Following Aristotelian logic, there is also an internal formal cause that Vivekananda calls thought and Peacocke refers to as information. It represents the sattvic element that determines how Prana will affect Akasha, in order to bring about a specific physical or mental form, or pattern. The form pre-exists internally and potentially, and is eventually actualized.

According to this type of Objective Idealism the external world has a realistic existence separate from us, being produced from the thought vibrations of the Universal Mind transformed into gross form. The internal mental universe is composed of the thought vibrations reducible to substantial ideas made up of subtle matter and energy. These ideas operate at a vibrational level that is not perceptible to our five gross physical senses. Nothing is separate from the Universal Mind. It contains all possibilities in-itself and hence is not static but constantly changing, and capable of progressing at least in limited regions.⁴² By contrast, Subjective Idealists believe objects exist only when perceived and “To be is to be perceived.”

Prana constitutes both the physical and mental universe, inanimate and living beings. For conscious beings, Akasha-Prana consists of finite centers of experience, i.e., the total psychological state of a sentient individual. They are fragments of Mahat, which is a single unitary cosmic experience that is extensive and non-contradictory.

Following the principle of unity Swami Vivekananda reduces all substance to a single entity called Akasha (matter). This is not epiphenomenalism where physical phenomena are the source of everything else. Rather, gross physical matter and subtle mental matter are a single substance called Akasha, at two different levels of vibration.

Arthur Peacocke the British biochemist advocates the monist concept that all concrete particulars in the universe are composed only of basic physical entities. The idea of a single substance in more than one form is developed by Peacocke:

The whole cosmos is in a state of evolution from one form of matter to another, and that a significant point in this evolutionary process occurred on the surface of the Earth where the conditions were such

that matter was able to become living.... For just as the wetness of water, or the viscosity of a nucleic acid solution, are not properties of their constituent atoms but features of their higher molecular and macro-molecular levels of organization, so the properties and behaviour of living organisms can be regarded as manifestations of the potentialities of matter if incorporated into certain organized structures.... To be consistent, one would say that matter organized in the way we call man.... At each emergent level in evolution, matter in its newly evolved mode of organization manifests properties which could not, in principle, be discerned in the earlier levels from which the new emerges. In a sense, therefore, one could say that the potentialities of matter have been, and still are being, realized in the cosmic development. However, matter has evolved into persons and it seems we cannot avoid concluding, even from the most materialistic viewpoint, that the culmination of evolution in homo sapiens demonstrates the ability of matter (a long-hidden potentiality now realized) to display functions and properties for which we have to use special terms such as 'mental,' 'personal,' 'spiritual.'... Such an affirmation of, for example, the reality of human conscious and self-conscious activities, is not dependent, as we saw, on any particular philosophy of the relation of an entity called 'mind' to one called 'body.'... For it seems that by taking seriously the scientific perspective, we cannot avoid arriving at a view of matter which sees it as manifesting mental, personal and spiritual activities.⁴³

4. What Happened Before the Beginning of the Universe?

According to most contemporary physicists, the universe originated with a Big Bang explosion. Yet, the Big Bang did not occur at a point in physical space-time, since it came into existence along with space-time. The question arises how could the Big Bang come into existence, since neither matter nor space or time or causation preceded it? Consequently, some physicists consider the universe to be spontaneously created ex-nihilo, emerging literally out of nothing, where there is a complete absence of matter-energy, space-time, causation, etc. Some think it was self-caused since there was no prior time or event to cause it, while others think it was created by chance without any apparent cause. Stephen

Hawking concluded, “It takes us beyond physics into metaphysics”, since “there is no way that one can determine what happened before the Big Bang from a knowledge of events after the Big Bang.”⁴⁴

For modern physicists this is a very perplexing problem, yet over a century ago Swami Vivekananda (1863-1902) working from a more comprehensive framework was able to supply a solution to this problem. He stated:

Everything in nature begins, as it were, from certain seeds, certain rudiments, certain fine forms, and becomes grosser and grosser, and develops, going on that way for a certain time, and then again goes back to that fine form, and subsides.... plant life comes from the seed, and goes back to the seed; human life comes out of human germs, and goes back to human germs. The universe with its stars and planets has come out of a nebulous state and must go back to it. What do we learn from this? That the manifested or the grosser state is the effect, and the finer state the cause.... Therefore we learn that the effect is the same as the cause, not different. It is only in another form.... This universe must be resolved into its causes; the sun, moon, stars, and earth, the body and mind, and everything in this universe must return to their finer causes, disappear, be destroyed as it were. But they will live in the causes as fine forms. Out of these fine forms they will emerge again as new earths, suns, moons, and stars.... Out of what has this universe been produced then? From a preceding fine universe. Out of what has man been produced? The preceding fine form. Out of what has the tree been produced? Out of the seed; the whole of the tree was there in the seed. It comes out and becomes manifest. So, the whole of this universe has been created out of this very universe existing in a minute form. It has been made manifest now. It will go back to that minute form, and again will be made manifest. Now we find that the fine forms slowly come out and become grosser and grosser until they reach their limit, and when they reach their limit they go back further and further, becoming finer and finer again. This coming out of the fine and becoming gross, simply changing the arrangements of its parts, as it were, is what in modern times called evolution.... That every evolution is preceded by an involution [e.g. a tree becomes a seed]. The seed is the father of the tree, but another tree was itself the

father of the seed. The seed is the fine form out of which the big tree comes, and another big tree was the form which is involved in that seed. The whole of this universe was present in the cosmic fine universe. The little cell, which becomes afterwards the man, was simply the involved man and becomes evolved as a man. If this is clear, we have no quarrel with the evolutionists, for we see that if they admit this step, instead of their destroying religion, they will be the greatest supporters of it.⁴⁵

There comes a time when this whole universe melts down and becomes finer and at last disappears entirely, as it were, but remains as superfine matter. We know through modern science and astronomy that this earth is cooling down [entropy], and in course of time it will become very cold, and then it will break to pieces and become finer and finer until it becomes ether [Primal Matter] once more. Yet the particles will all remain to form the material out of which another earth will be projected.”⁴⁶

Vivekananda continues, “Molecular vibration never ceases. When this universe is destroyed, all the massive vibrations disappear; the sun, moon, stars, and earth, melt down; but the vibrations remain in the atoms.” “It does not get rid of causation, time, and space; they are there, only it comes to very fine and minute forms.” “When all this universe shall have resolved back into its primal state, what becomes of this infinite force? Do they think that it becomes extinct? Of course not. If it became extinct, what would be the cause of the next wave, because the motion is going in wave forms, rising, falling, rising again, falling again?... And what becomes of all these forces, the Pranas? They are resolved back into the primal Prana [Energy], and this Prana becomes almost motionless--not entirely motionless; and that is what is described in the Vedic Sukta: ‘It vibrated without vibrations’--Anidavatam.” “This interval between one period of rest and another is called a Kalpa [Cosmic Cycle]. But this Kalpic rest cannot be one of perfect homogeneity, for in that case there would be an end to any future manifestation.”⁴⁷ “There must be something, again, where both force [energy] and matter are one. This is called Avyakta, the unmanifest state of nature before creation, and to which, after the end of a cycle, the whole of nature returns, to come out again after another period.”⁴⁸

When the physical body dies the mind and thought continues to exist. So also when the gross physical universe disintegrates, the subtle universe composed of the substance of subtle matter and energy remains. When the physical universe is destroyed subtle body continue to exist. Do the atoms and subatomic entities continue to exist? Above Vivekananda uses the term atoms. J. J. Thomson discovered the electron the following year in 1897.

Are atoms part of extended the substance of subtle mental matter? Do atoms have both a physical and a subtle form, or only subtle form? The Indian tanmatras of the subtle realm are described as minute particles. Both the qualified nondualists and dualist believed that the subtle body is atomic in size. Is the atomic world the mental realm of extended subtle matter and energy? Since the subtle realm pervades light, do events occur faster than the speed of light there, in which case quantum events are causally related? After the destruction of the gross physical realm, the subtle universe remains. An important question, is the subtle body related to the sub-atomic quantum realm? Does the quantum world remain after the destruction of the universe and does it exist prior to the Big Bang? Swami Abhedananda writes that the subtle body “is nothing but the germ of a living substance. It contains the invisible particles of matter which are held together by vital force.”⁴⁹ When the person dies the subtle body leaves through an aperture in the physical body that we assume is minute in size.

Similarly, upon physical death of an individual, many scientists mistakenly think the entire person has perished since the subtle body is not perceivable to them. They do not understand that the subtle body of the individual lives on in subtle matter and energy. Humans can only perceive a three dimensional object when it vibrates within a certain range. So we might think of the level of vibration as the fourth spatial dimension. All healthy and sane people with good sight see the same object because their mode of perception is attuned to the same range of vibration. They cannot perceive an object outside of that range unless they have a special instrument.

Vivekananda mentioned when Sir Humphrey Davy (1778-1829) was overpowered by laughing gas, “For the time being, as it were, the gross vibrations had ceased, and only the subtle vibrations which he called ideas, were present to him. He could only see the subtle vibrations round him;

everything had become thought; the whole universe was an ocean of thought, he and everyone else had become little thought whirlpools.”⁵⁰ As Davy’s discovered, external objects are reducible to external ideas that are independent of our mind (objective idealism). These ideas have substantial existence, being objective and spatial, perceivable to a mind in a certain state of vibration. This correlates with the religious philosophical idea that Brahman-God created the universe out of Divine Ideas. Vivekananda also mentioned that some highly advanced ancient yogis in their deep meditation saw the fine particles (Tanmatras). He did not state their size, but they could be no larger than a molecule and might have been more minute.

As Swami Abhedananda explains it, “Before the world was created, everything gross and subtle remained in a seed form, and everything was unmanifested. Then creation began. Now, what do we mean by 'creation'? It does not mean getting something out of nothing. In the beginning, the world is in an unmanifested state, and it gets out, and gets back again. It takes millions of years to evolve. This present state will go back to its primordial nebulous state, and it will remain in that state perhaps for millions of years, and then it will come out again. This expansion and contraction of the whole manifested world into the unmanifested energy is the eternal process of the infinite Being.”⁵¹ “The whole universe: sun, moon and stars, and the form of the human body, animal forms and vegetable forms, all existed in the causal state, before coming into being. Nothing was there to see and recognize it. All was a mass, as everything was sleeping. Then, through the process of evolution, it wakes up and comes out gradually in material forms.... That causal state retains all the potentialities of the forms or what we call the phenomena. When we go into deep sleep, we go to the causal state.”⁵² “After the dissolution of the phenomenal universe, everything will remain latent in seed form. Our bodies may be reduced to their elements, to atoms and molecules, and to forces of nature. Our souls [minds], however, will remain perfect, or remain intact, and will not be annihilated or dissolved or destroyed, but will continue to exist, and retain all the powers and desires and tendencies, which they possess. Then again in the beginning of a new cycle, they will wake up, and the accumulated desires or combined desires of all living creatures will help in the process of the evolution of the cosmos.”⁵³

5. Vivekananda's Mahat and David Bohm's Super-Implicate and Implicate Order

In order to solve the perplexing problems of quantum physics, some physicists have developed a solution comparable to Vivekananda's idea of Mahat described above. American born Professor of theoretical physicist David Bohm (1917-92) of the University of London, became interested in Jiddu Krishnamurti's (1895-1986) thoughts in 1959, and after that, they engaged in frequent dialogues that have been published. Bohm was a Trustee of the Krishnamurti Foundation and of his Brockwood Park School, from 1969 almost until his passing in 1992.⁵⁴ Concerning a more classical interpretation of quantum theory Albert Einstein remarked, "If anyone can do it Bohm can."⁵⁵ Bohm's conception of the Super-Implicate Order resembles Mahat the Universal Cosmic Mind, being that it is a conscious force actively involved in the maintenance of the universe that quite likely operates faster than the speed of light. It is "a super-information field of the whole universe, a Super-Implicate Order which organizes the first level into various structures and is capable of tremendous development of structure" that "makes the Implicate [physical] Order non-linear and organizes it into relatively stable forms with complex structures.... The super or information-potential is related to the Implicate Order of matter as the subtle aspects of consciousness are related to the material movements of hormones and electrical currents in the nerves.... The quantum field contains information about the whole environment and the whole past, which regulates the present activity of the electron in much the same way that information about the whole past and our whole environment regulates our own activity as human beings, through consciousness.... Consciousness is possibly a more subtle form of matter and movement."⁵⁶

Bohm adds, "Instead of taking a particle as the fundamental reality, start with the field. And instead of having a particle acted on by a quantum potential, suppose that the field is acted on by a Superquantum potential [Mahat]. This Superquantum potential is far subtler and more complex than the quantum potential, yet the basic principles governing its behavior are similar.... because the Superquantum potential is nonlinear and nonlocal, it is able, under certain conditions, to provide a very subtle kind of immediate

connection between distant regions of the field.... the quantum potential represents information which guides the self-active movement of the [subatomic] particles. In the field case, the superquantum potential now represents information that 'guides' or organizes the self-active movement of the field."⁵⁷ At the deeper subquantum level there is a continuity of motion, which is causally determined and is potentially predictable and controllable. The appearance of discontinuous discrete quantum energy levels in matter are continuous at a more fundamental level. The quantum interconnectedness of the universe is the fundamental reality, and the relatively independently behaving parts are particulars within this whole. Nonlocal correlations arouse out of the Implicate Order where the two events are not separated by space. A particle is not a separate and autonomous entity, but as an aspect of the Holomovement which is "an unbroken and undivided totality." Waves and particles might represent two aspects of a single unknown entity that differs from them.⁵⁸

In David Bohm's system, the unmanifested Implicate Order (Comparable to Mahat as the Universal Cosmic Body) is an unbroken and undivided totality (Holomovement) and the ground of the Explicate Order, which is the physical and mental universe. The Implicate domain is an ontologically prior existence that does not transcend matter but underlies it, as a coherent, unified and holistic substratum of physical energy and matter. Since the nonlocal Implicate Order is holistic, every event is connected with all other event in an order of undivided wholeness. All things "are present everywhere and at all times," the events in one location will interpenetrate all events in the universe.⁵⁹

In the Implicate Order everything is enfolded into everything, in contrast to the Explicate Order where each thing lies in its own particular region of space and time. Our world is fragmented and not synchronized with the wholeness in which it is grounded. All things are indirectly internally directed to all other, because they all arise out of a common ground that is immanent in each of them. "The Implicate Order can be thought of as a ground beyond time, a totality out of which each moment is projected into the Explicate Order. For every moment that is projected out into the Explicate, there would be another movement in which that moment would be injected or 'interjected' back into the Implicate Order. Now, if you have a large number of repetitions of this process, you'll start to build up a fairly constant component to this series of projections and

injections.” The whole notion of the Implicate Order to begin with, is a way of discussing the origin of form out of the formless, via the process of ‘explication’ or unfolding in an orderly fashion, resulting in a relatively stable and permanent explicate reality. The form is enfolded to begin with, and then it unfolds, manifests, and actualizes as the Explicate Order. Time and space are derived from a higher dimensional ground.⁶⁰

“What we call empty space contains an immense background of energy, and that matter as we know it is a small, 'quantized' wavelike excitation on top of this background, rather like a tiny ripple on a vast sea.” “Matter is like a small ripple on this tremendous ocean of energy, having some relative stability and being manifests.” The Implicate Order projects physical energy into subwholes of the explicate world, similar to the way an ocean manifests through its waves.⁶¹

“The task of science is then to start from such parts and to derive all wholes through abstraction, explaining them as the results of interactions of the parts. On the contrary, when one works in terms of the Implicate Order, one begins with the undivided wholeness of the universe, and the task of science is to derive the parts through abstraction from the whole, explaining them as approximately separable, stable and recurrent, but externally related elements making up relatively autonomous sub-totalities, which are to be described in terms of an Explicate Order.” In our scientific experiments, “there is a relatively independent, recurrent, stable sub-totality which constitutes the Explicate Order.”⁶²

One explicate thing does not directly affect another. One thing does not directly cause another, since all influences are mediated through the Implicate Order. Event A arises out of the whole, having a slight affect on the whole. Then event B arises out of the whole appearing to be the direct effect of A. Causation is vertical and only appears to be horizontal.⁶³

A radical form of holistic causation is discussed by Michael Silberstein as Radical Mereological (study of parts and the wholes they form) Causal Emergence:

that the universe as a whole constitutes a system in which 'everything determines everything'-represents a very radical form of causal emergence. On this view, the whole universe is more ontologically fundamental than any particular subset or part of it; the universe is not made or composed of parts. Interdependent origination or arising

says that nothing has independent, intrinsic existence; there are no intrinsic properties and no independently existing objects or things. There is mutual co-dependence between parts and wholes, which is to say that each determines and defines the other.... reality as a whole is not divided up into a discrete hierarchy of levels, but is in fact an irreducibly relational, entangled, coupled, complex, self-organizing system. Broadly, radical mereological emergence posits that the ordering on the complexity of structures, ranging from those of elementary physics to those of astrophysics and neurophysiology, is not discrete. Indeed, it holds that the interactions between such structures will be so entangled that any separation into levels will be conventional or contextual.⁶⁴

The natural world is an interconnected web of events; each part of the web is a causal consequence of other parts, rather than a self-initiating agent of its own.

The unity and mutual interconnectedness and interdependence of all things and events, are due to the experience of all phenomena in the world as different manifestations of the one Universal Body (Mahat). As a result, the universe is a complicated web of relations between the parts of a unified whole. All opposites are polarities within a unity. Omnipresent Mahat as field is present everywhere in space, while its particle aspect manifest as a discontinuous structure.

6. Vivekananda's Scientific Cosmology and Quantum Physics

Amit Goswami's describes a transcendent realm that approximates Mahat. "There is a transcendent domain of archetypes (Plato) or *a priori* (Kant), a domain of consciousness that is the source of the empirical world of appearance, and this is the alternative followed in this paper. In this view, quantum objects are posited to be 'archetypal', *a priori*; they exist in potentia (to use Heisenberg's term) in this transcendent domain [Mahat] until translated to the manifest world of appearance by the discontinuous act of measurement.... simultaneously occurring events in our space-time world can be related to a common cause that resides in the nonlocal realm outside space and time [Mahat]. This common cause is the act of nonlocal collapse [of the wave function] by unitive consciousness."⁶⁵ "Coherent

superpositions, the multifaceted quantum waves, exist in the transcendent order [Mahat] until consciousness brings them to the world of appearance through the act of observation. And in the process, consciousness chooses one facet out of two, or many, that are permitted by the mathematics of quantum mechanics, the Schrodinger equation.”

According to Eugene Wigner “original idea” and Amit Goswami “consciousness” is involved in determining a quantum event. Probabilistic occurrences are replaced by definite occurrences when they enter consciousness.⁶⁶

On the macro level the object is what Immanuel Kant called a thing-in-itself whose characteristics are unknown to us. When a subject perceives a thing-in-itself, it becomes an empirical object. All perceived objects are a combination of object and subject. The degree of vibration of the mind of the subjects determines the nature of the object it perceives.

Michael Talbot concluded, “In essence, the theory of the Akasha is identical with Wheeler’s quantum foam.” John Archibald Wheeler (1911-2008) specified that, “The space of quantum geometro-dynamics can be compared to a carpet of foam spread over a slowly undulating landscape ... The continual microscopic changes in the carpet of foam as new bubbles appear and old ones disappear, symbolize the quantum fluctuations in the geometry.” Talbot mentions that Wheeler suggests, “Various electromagnetic and gravitational forces can act on the quantum foam and set up vibrational patterns similar to the ripples created by a stone tossed into a pond. It is these vibrational patterns or ripples in the quantum foam that we detect as subnuclear particle.”⁶⁷

Nrusingh C. Panda the Indian biochemist reasoned, “Similar is the situation with the galaxies, stars, planets and satellites that seem to be separated by a void but are really connected by the Akashic matter. As the floating ice and the water are essentially made of the same substance, so also are the celestial bodies and the intervening Akasha that are substantially identical. Everything in the universe is intimately connected with the rest; nothing in the universe is separate from the rest”, which is in agreement with Vivekananda’s ideas.⁶⁸ Panda believes in quantum physics there is “one unified field that is the source of the manifestations of a set of fields,” and that the all-pervading field is identical with Akasha.⁶⁹

Concerning atomic theory Vivekananda discerned, “According to the Sankhya [philosophers], atoms are not the primal state. This universe does

not come out of atoms: they may be the secondary or the tertiary state. The primordial material may form into atoms and become grosser and bigger things; and as far as modern investigations go, they rather point towards the same conclusion. For instance, in the modern theory of ether [Akasha, all-pervading cosmic matter], if you say ether is atomic, it will not solve anything. To make it clearer, say that air is composed of atoms, and we know that ether is everywhere, interpenetrating, omnipresent, and that these air atoms are floating, as it were, in ether. If ether again be composed of atoms, there will still be spaces between every two atoms of ether. What fills up these?... So the atomic theory cannot be final. According to Sankhya, nature is omnipresent, one omnipresent mass of nature, in which are the causes of everything that exists. What is meant by cause? Cause is the fine state of the manifested state; the unmanifested state of that which becomes manifested.”⁷⁰

In agreement with Vivekananda that there is something more basic than elementary particles, Werner Heisenberg (1901-76) ascertained, “Whether the primary substance can be one of the known substances or must be something essentially different ... The physicist today try to find a fundamental law of motion for matter from which all elementary particles and their properties can be derived mathematically.... In the first case, it would mean that all other elementary particles can be reduced in some way to a few sorts of ‘fundamental’ elementary particles.... In the second case, all different elementary particles could be reduced to some universal substance which we may call energy or matter, but none of the different particles could be preferred to the others as being more fundamental.... I am convinced that in modern physics this view is the correct one.” Heisenberg is emphasizing energy-matter or something more basic and not elementary particles as the primary substance.⁷¹ Possibly the reason causal relations bind things together and follow fixed laws, is because these events are part of a larger whole, a universal substance. Since 1990, many quantum physicists in their books support the holistic position. They include, “The physical state of a complex whole cannot always be reduced to those of its parts, or to those of its parts together with their spatiotemporal relations.... The result of the most intensive scientific investigations in history is a theory that contains an ineliminable holism” (Tim Maudlin). The entangled universe displays an “unbroken wholeness” (David Bohm and B. J. Hiley). “Since any particle has certainly interacted

with other particles in the past, the world turns out to be nonseparable into individual and independent objects” (Toraldò di Francia). “An undivided wholeness exists on the most basic and primary level in all aspects of physical reality,” invoking “a seamlessly interconnected whole called the cosmos” (Robert Nadeau and Menas Kafatos). “Only the whole of all quantum systems taken together is in a pure state.... Consequently all matter at the level of quantum systems is one holistic system” (Michael Esfield).” “A system of more than one particle must nevertheless be treated as a single holistic unit” (Roger Penrose).⁷²

According to modern physics, “Atoms are made of nuclei and electrons; nuclei are made of protons and neutrons; protons and neutrons are made of ... quarks ... The union of two quarks make a meson, that of three quarks a baryon.... The underlying assumption of the quark theory is that the quarks themselves are truly structureless, fundamental particles—point-like objects with no internal parts.” “Elementary particles are particles with no measurable internal structure; that is they are not composed of other particles”, yet they have mass and magnitude.⁷³ For the ancient Indian Vaisheshika scientific philosophers the smallest elementary particles are indivisible, without parts and magnitude. The reason being is that all compound objects are subject to further division and we would never arrive at the smallest particle. Two atoms of the same type combine to form a dyad (dvyanuka), and three dyads combine to form a triad (tryanuka), which is necessary for magnitude to exist.⁷⁴

However, Swami Vivekananda cautions, supposing “indivisible atoms are like geometrical points without parts or magnitude; but something without parts or magnitude, if multiplied an infinite number of times, will remain the same. Anything that has no parts will never make something that has parts; any number of zeros added together will not make one single whole number. So, if these atoms are such that they have no parts or magnitude, the creation of the universe is simply impossible out of such atoms.”⁷⁵

No doubt, the speed of light is the maximum velocity in the realm of gross matter. But does this fact apply to the realms of subtle and causal matter? Certainly at the level of causal matter, Brahman-God’s creative activities surpass the speed of light. Einstein taught that the process of time movement occurs slower as we approach the speed of light. Does this

mean traveling at the speed of light all change would cease and we would remain in the present?

7. Mind and Subtle Matter (Tanmatras)

Between December 1895 and February 1896 Swami Vivekananda made the following statements, “The mind is much finer matter than the external instruments. That material of which the mind is composed goes also to form the subtle matter called the Tanmatras. These become gross and make the external matter. That is the psychology of the Sankhya. So that between the intellect and the grosser matter outside there is only a difference in degree.” “If you practice Yoga, however, says Patanjali, after a while your perceptions will become so fine that you will actually see the Tanmatras. For instance, you have heard how every man has a certain light about him; every living being emits a certain light, and this, he says, can be seen by the Yogi. We do not all see it, but we all throw out these Tanmatras, just as a flower continuously sends out fine particles which enable us to smell it.” “Of the same substance is manufactured the other variety, the Tanmatras, fine particles of matter, which strike our organs of perception and bring about sensations. You cannot perceive them but only know they are there. Out of the Tanmatras is manufactured the gross matter--earth, water, and all the things that we see and feel.” “All gross things are the results of fine ones. Everything that is gross is composed of fine things, which they call the Tanmatras, the fine particles. I smell a flower. To smell, something must come in contact with my nose; the flower is there, but I do not see it move towards me. That which comes from the flower and in contact with my nose is called the Tanmatra, fine molecules of that flower. So with heat, light and everything. These Tanmatras can again be subdivided into atoms.”⁷⁶

So thoughts possess extension at a subtle level that is unperceivable to us. They have mass and can travel from one place to another. In a quote given above, Vivekananda mentions a realm subtler than the visible universe where, “Prana [Energy] appears in it as psychic forces, and Akasha [Matter] as Tanmatras or fine particles [molecules?].”⁷⁷ Does this mean that mental forces work on molecules, and possibly even atoms and sub-atomic particles?

In two lectures delivered in 1920, Swami Abhedananda told his audience, “Thought is in and behind the vibration of electrons ... Thought forms are caused by the force of the mind ... They are materialized as electrons in vibration ... The electrons produce atoms and then molecules and different elements, and gradually they produce the forms of the material objective world.... The mentalists claim that mind is the force, which directs the finer particles of electrons, and creates them from its own being, as it were, and then produces atoms.... So the gross physical universe is the materialization of the thought forms that exist in the cosmic mind.” “Mind substance is finer matter in vibration, and that finer matter may be like our electrons.... electrons are in a constant state of vibration ... the field of vibration maybe the medium, through which the soul [subtle body] works upon gross matter. But that energy is said to be the energy of the mind. So the mind substance may be called the finer particles of atoms, which are in constant motion or vibration.”⁷⁸ Five years later he mentioned, that the ancient philosopher Kapila discovered subtle particles finer than atoms called “tanmatras which would be similar to the electrons and protons of modern science.”⁷⁹

In quantum physics the human experimenter (as a thinking being) is more than an observer as assumed in classical physics, but a participant in the quantum process. “According to the interpretation the interaction of an observer or apparatus that is external to the quantum system is the cause of the wave function collapse, thus according to Heisenberg ‘reality is in the observation, not in the electron.’” The observer is absolutely necessary in the transition of the quantum process from the possible to the actual.⁸⁰

A scientific explanation of the role of consciousness-mind-thought in the physical process is discussed by Michael Talbot. He mentioned that Jack “Sarfatti theorizes that the reality-structurer is based upon the possibility that consciousness [mind, thought] is a bio-gravitational field similar to the gravitational field governing the structure of matter. This is akin to saying that mind and matter are different vibrations or ripples in the same pond. If this hypothesis is true, we may view the fields which govern consciousness [mind, thought] and those which govern matter as part of a continuum, a spectrum of fields within fields. On the semantic level, we may view consciousness [mind, thought] and reality as a continuum.... A pebble dropped in any part of the pond will affect the whole

pond.... If consciousness [mind, thought] is a field and only one vibration on the continuum of fields that organize matter, we have an explanation for the interaction between mind and matter.... The possibility of psychokinesis immediately follows from Sarfatti's postulate that consciousness [mind, thought] controls the biogravitational field. This field, the biogravitational field of consciousness [mind, thought], may interact with all the other resonances (levels of organization) such as the gravitational field of Einstein, and even the atomic and nuclear fields which govern the structure of matter.... The field of consciousness [mind, thought] may be on the same continuum as the field which gives the illusion of the quantum potential. The interaction of both fields would most assuredly explain how the mind of the participator can affect where a particle in the double-slit experiment will strike.”⁸¹

Concerning the mind-body relationship Swami Vivekananda related, “This body is just the external crust of the mind. They are not two different things ... It is not that some forces are physical, and some mental; the physical forces are but the gross manifestations of the fine forces, just as the physical world is but the gross manifestation of the fine world.” “The mind and body are like two layers in the same substance, moving at different rates of speed. Relatively, one being slower and the other quicker, we can distinguish between the two motions.” “The fine body, according to them, is a material but transparent body, made of very fine particles, so fine that no microscope can see them. What is the use of that? It is the receptacle of the fine forces. Just as this gross body is the receptacle of the gross forces, so the fine body is the receptacle of the fine forces, which we call thought, in its various modifications. First is the body, which is gross matter, with gross force. Force cannot exist without matter. It must require some matter to exist, so the grosser forces work in the body; and those very forces become finer; the very force which is working in a gross form, works in a fine form, and becomes thought. There is no distinction between them, simply one is the gross and the other the fine manifestation of the same thing. Neither is there any distinction between this fine body and the gross body. The fine body is also material, only very fine matter; and just as this gross body is the instrument that works the gross forces, so the fine body is the instrument that works the fine forces. From where do all these forces come? According to Vedanta philosophy, there are two things in nature, one of which they call Akasha,

which is the substance, infinitely fine, and the other they call Prana, which is the force [energy].” “Now that which we call matter and mind are one and the same substance. The only difference is in the degree of vibration. Mind at a very low rate of vibration is what is known as matter. Matter at a high rate of vibration is what is known as mind. Both are the same substance; and therefore, as matter is bound by time and space and causation, mind which is matter at a high rate of vibration is bound by the same law.... Take a bar of steel and charge it with a force sufficient to cause it to vibrate, and what would happen? If this were done in a dark room, the first thing you would be aware of would be a sound, a humming sound. Increase the force, and the bar of steel would become luminous; increase it still more, and the steel would disappear altogether. It would become mind.” “The mind attains to powers of finer perception which no instrument will ever be able to attain.”⁸² For example, in the rebirth process the mental body (mind, soul) which is the internal and subjective, externalizes and objectifies and creates a physical body.

In 1904, William James advocated the philosophy of “Neutral Monism.” In 1921, Bertrand Russell discerned that William “James's view is that the raw material out of which the world is built up is not of two sorts, one matter and the other mind, but that it is arranged in different patterns by its inter-relations, and that some arrangements may be called mental, while others may be called physical.” Russell also mentions that two American Realists R. B. Perry of Harvard and Mr. Edwin B. Holt believe that, “both mind and matter are composed of a neutral-stuff which, in isolation is neither mental nor material.” According to Vivekananda that neutral-stuff is Akasha that manifests as matter or thought at different vibrational levels.⁸³

Indian philosophers hold that thought is extended and has dimensions in subtle space. Does this mean that human thoughts, ideas and/or tanmatras have subtle mass and weight? In 1907 Duncan MacDougall a physician from Haverhill, Massachusetts performed a study on dying patients and concluded that at the moment of death, body weight declines by an average of 21 grams (about 3/4th of an ounce). Since that time this experiment has been rejected by the scientific community and subject to much criticism.⁸⁴ Is this the Pranamaya-kosha that survives the physical body, but eventually dies? If the soul-subtle (astral) body has detectable weight (which has not been proven) and molecular structure, this means

that it and this realm of existence can be studied and analyzed by physical scientists. Vedantists say that at the time of death the subtle body leaves the physical body through a very small aperture in the body. Would this mean that it has atomic level weight? One Internet source States that according to Dutch scientists the body weighs 2¼ ounces (63g) less during out of body experiences.⁸⁵

Modern science estimates that human life began on earth about 160,000-250,000 (Homo Sapiens) to 2.2-2.5 million (genus Homo) years ago, depending on how you define the word ‘human.’ Yet, Swami Abhedananda suggests that it is possible that intelligent beings lived on earth before that time in some other type of body than the ones we have today. The Swami affirmed, “When the earth was in its gaseous state we could not find favorable environments to come on the physical or material plane. Perhaps we had at that time gaseous or vapory bodies. When the whole universe is covered with water, we have watery bodies like waves or fog, or like the form of a bubble. Even in that form the intelligence can be manifested.”⁸⁶ People have seen ghosts on earth without physical bodies (and sometimes have taken photos), yet with human level intelligence. After the death of the physical body the subtle body lives on though it is most often not earthbound.

Albert Einstein a proponent of the hidden variables objected to the fundamentally probabilistic nature of quantum mechanics. He proposed a hidden variable theory because he did not believe that the wave functions in quantum mechanics offers a complete explanation of the physical reality of a particle. “Later, Bell’s Theorem [1964] would suggest that local hidden variables are impossible, leaving only nonlocal hidden variables [that travel faster than the speed of light] theories as potentially viable.... Assuming the validity of Bell's Theorem, any deterministic hidden-variable theory which is consistent with quantum mechanics would have to be non-local, maintaining the existence of instantaneous or faster-than-light relations (correlations) between physically separated entities.”

In the substantial realm of subtle matter and energy that pervades light, does velocity exceed the speed of light, and hence causation that appears to be nonlocal is really local? Is it possible that what appears to be nonlocal, is really local at a deeper level of causation? “Under the orthodox Copenhagen interpretation, quantum mechanics is nondeterministic, meaning that it generally does not predict the outcome of any

measurement with certainty.... The question arises whether there might be some deeper reality hidden beneath quantum mechanics, to be described by a more fundamental theory that can always predict the outcome of each measurement with certainty: if the exact properties of every subatomic particle were known the entire system could be modeled exactly using deterministic physics similar to classical physics. In other words, it is conceivable that the Copenhagen interpretation of quantum mechanics is an incomplete description of reality.”⁸⁷ Are the present laws of quantum mechanics only approximations of their true value? According to the Law of Karma even apparently random events follow an unknown and unperceived causal sequence.

Knowledge of the subtle and causal realms that Vivekananda describes are certainly “hidden variables” that if properly understood would definitely increase our understanding of the nature of physical events. It is possible that these hidden variables point to a deeper objective causally determined reality in quantum mechanics than is presently known. If so, quantum entities have a real objective existence at the subtle level, subsisting independent of their observation or measurement, and their activities are governed by laws that are deterministic in nature.

Existence is composed of many interrelated realms or dimensions. We perceive and experience the empirical world of physical objects through the five senses. On another level physicists interpret the world as composed of elementary particles in motion. Religion and metaphysics add additional realms such as the Divine realm that is interconnected with the physical universe. It is not a case of either/or. It is intellectual hegemony to think only one dimension exists and the others are false.⁸⁸

8. Vivekananda’s Akasha-Prana and Samuel Alexander’s Space-Time

According to Vivekananda the entire universe is composed of two fundamental entities. They are Akasha [Matter] “the infinite, omnipresent material of this universe” and Prana [Energy] “the infinite, omnipresent manifesting power of this universe.” His purpose was to show “the harmony between Vedanta and modern science.”⁸⁹ For Vivekananda (later taught by Werner Heisenberg) the fundamental reality is not a few elementary sub-atomic particles (the parts), but Akasha-Prana (Matter-Energy) the universal substance (the totality).

The conception of Space-Time as a universal process was developed mathematically by Hermann Minkowski (1908) and by Albert Einstein in his General Theory of Relativity (1915-16). From a cosmological and philosophical standpoint, this idea was then expanded upon by the Australian born British philosopher Samuel Alexander's (1859-1938) in his two-volume *Space, Time, and Deity* (1920). Though Alexander had no apparent knowledge of Vivekananda's writings, there is much similarity between his conception of a Space-Time universe and Vivekananda's Akasha-Prana universe.

In order to appreciate the importance of the similarity, in all of the following quotes taken from Samuel Alexander's two-volume book, the word "Space" is replaced by "Akasha" (Matter), and "Time" by "Prana" (Energy). What we think of as space is matter in another form. After making this replacement Alexander states:

a) Akasha and Prana "are in reality one; that they are the same reality considered under two different attributes." One entity expresses itself passively as Akasha (matter), and actively as Prana (energy).

b) Akasha-Prana "is the one stuff of which all things are made."

c) Infinite Akasha-Prana (Matter-Energy) "is the totality of all substances, but it is prior to the substances by whose composition it is described. Thus to call it the one or the Whole or the infinite substance is no more than to aim at its infinitude.... In truth, infinite [Akasha-Prana] is not the substance of substances, but it is the stuff of substances. No word is more appropriate to it than the ancient one of *hyle* [matter or stuff]."⁹⁰ Akasha and Prana "either of them, creates differences in the other or breaks it up. But in a special sense [Prana] is the author of finitude, for it is the transition intrinsic to [Prana] which in the first place makes motion possible, and secondly provides for the ceaseless rearrangements in [Akasha] through which groupings of motions are possible. [Prana] could not do its work without [Akasha]; but, this being presumed, [Prana] is the principle of motion and change." Akasha-Prana "logically, and in fact, precedes finite things which are differentiations of that stuff.... [Akasha-Prana] though the stuff of material things and all other things, is not material if that means to possess materiality; it is anterior to such matter. But it is continuous with material existence which is one of the earlier outgrowths from it."⁹¹

We learn from analyzing Samuel Alexander's scientific philosophy and applying the characteristics of Space-Time to Vivekananda's conception of Akasha-Prana that:

a) Akasha [Matter] and Prana [Energy] are interdependent and from that standpoint they are one not two. Einstein has demonstrated the equivalence of matter or mass and energy ($e=mc^2$);

b) The infinite Akasha-Prana being the primal stuff is the origin and totality of all material and mental entities; and

c) Akasha as the infinite formless primary matter and Prana as the infinite primary energy exist prior to the universe. When Prana works on Akasha the finite universe of materiality emerges making motion, change, and form possible. One result is finite individuals each with their own limited structural organization and capacities.

Alexander continues, "All existents are in relation because events or groups of them are connected within [Akasha-Prana]. Relations amongst existents follow from the continuity of [Akasha-Prana, Matter-Energy]." "There are no things which are unrelated to others, which would imply spatio-temporal discontinuity. They must be connected in [Akasha and Prana], and again it is plain that they must be connected by all the relations which arise out of the categories, seeing that categories are pervasive features of all things."⁹² "We are finite because our minds, which are extended both in [Akasha and Prana], are limited pieces of [Akasha-Prana]. We are infinite because we are in relation to all [Akasha-Prana] and to all things in it. Our minds are infinite in so far as from our point of view, our place or date, we mirror the whole universe."⁹³

Therefore, due to the continuous nature of Akasha-Prana, every objects and event is related to every other, though some are more closely interconnected than others. Consequently, there are no accidents, chance or totally independent events; the universe is all law. What appears as accidental is a weaker more indirect internal relation.⁹⁴ Wernher von Braun (1912-77) the father of rocket technology and space science in the United States said, "The natural laws of this universe are so precise that we do not have any difficulty building a spaceship, sending people to the moon and we can time the landing with the precision of a fraction of a second."

An object or event appears separate and discrete from a limited external perspective, but not as internally related parts of the totality of all objects and events (the universe in its entirety) within Akasha-Prana. It is

like a wave being both separate from and part of the ocean. Hence the Conservation of Energy holds the amount of total energy in the universe is constant though it takes on different configurations. Objects and events are internally and inherently related as being aspects, configurations, limitations, or modifications of Akasha-Prana, each containing a certain portion of Akasha-Prana.⁹⁵

Alexander further declares, “Now the body of God is the whole universe and there is no body outside of His. For Him, therefore all objects are internal.... God infinite in extent and duration ... God’s body being the whole of [Akasha-Prana] is omnipresent and eternal.”⁹⁶

Vivekananda states, “Now there is something beyond Akasha and Prana. Both can be resolved into a third thing called Mahat--the Cosmic Mind. This Cosmic Mind does not create Akasha and Prana, but changes itself into them.” Mahat is the omnipresent and eternal Universal Mind and Body of God of which our mind and body is a fragment. Each entity is an organized quantum of Akasha and Prana, with its individual characteristics.⁹⁷

The categories (mentioned above by Alexander) were first developed by two great philosophers, Kanada (c. 6th/2nd Century B.C.) the founder of the Vaishesika philosophy in India and Aristotle (384-322 B.C.) in Greece. For Kanada the primary categories (Padartha) are: substance, quality, action-motion, generality, particularity, and inherence; and for Aristotle (the first four being most important) are: substance, quantity, quality, relation, place (where), time (when), position, state (condition), action (doing), and being acted upon.⁹⁸ Alexander expounds, “The categories prove upon examination to be the fundamental properties or determinations of [Akasha-Prana] itself, not taken as a whole, but in every portion of it.”⁹⁹ The categories are the primary properties of manifested Akasha-Prana, applying to everything that exists. They are the modes of being in the world that tell us, “What a thing is.” In addition, the categories are the modes of mental representation, the way we think about things.

In conclusion, following Vivekananda’s system, energy not time is the active force that brings about the changes that occur in matter. We cannot separate space and time from the rest of the existence to which they belong and take them as subsisting by themselves. Time and space are not forces, but a measure of change and dimensions.

Aristotle (384-322 B.C.) reduced the sense world to two ultimate principles matter and form. But it is energy working on matter that creates the form. The question arose is matter or form the Principle of Individuation? It is through matter that the form acquires empirical existence in place and time.¹⁰⁰ For example, clay takes the form of a pot or a statue.

One could bring the ideas of Vivekananda (Akasha-Prana) and Einstein (Space-Time) closer together by interpreting Akasha as space as some Indian writers do. Space and time do not exist apart from matter and energy, since they are concomitant. It is difficult to conceive of empty space since all space contains some kind of substance, which we refer to as matter or energy. Are they the same entity, looked at from two different standpoints; matter or energy as substance and space as the extended spatial configuration of that substance? Also, Prana as energy working on Akasha produces change that is in many ways equivalent to time. There can be no change without time and no time without change in the mind. So in this sense Prana requires time to do its work and time (as change in the mind) is caused by the activity of Prana. From this standpoint the working of Prana, change, and time are concomitant.

9. Vivekananda and Alexander on Evolution

What controls the activity of Prana (Energy)? The scientific idea is that it mechanically follows the cause and effect laws of nature and physics. In the case of gravitation, Akasha as the quantity of matter (mass) acts as a cause on Prana determining the magnitude of the gravitational force. Religious philosophers add that scientist deal with the process of secondary causation. It is preceded by primary causation, which is the acting out of the will of Brahman-God (Mahat, Ishvara). The transformation of Mahat the intelligent creator into Akasha-Prana is responsible for orderliness and design in the universe. Mahat as the primary cause works through secondary causation (the laws of nature). This is the traditional teleological (design) explanation that out of infinite possibilities, Mahat creates specific actualities following a Divine plan.

Samuel Alexander (1859-1938) discusses three more characteristics of his Space-Time universe that apply equally well to Vivekananda's conception of an Akasha-Prana universe. They are:

a) "Mind is according to our interpretation of the facts, an 'emergent' from life, and life an emergent form a lower physico-chemical level of existence." "The quality and the constellation to which it belongs are at once new and expressible without residue in terms of the processes proper to the level from which they emerge; just as mind is a new quality distinct from life."¹⁰¹

b) "There is a nisus in [Akasha-Prana] which, as it has borne its creatures forward through matter and life to mind, will bear them forward to some higher level of existence." Nisus is the creative force "of the world towards new levels [or layers] of existence (as well as towards new kinds of being within any one level)."¹⁰²

c) "The highest of these empirical qualities known to us is mind or consciousness. Deity is the next higher empirical quality, the highest we know.... There is nothing in mind which requires us to stop and say this is the highest empirical quality which [Prana] can produce from now through the infinite Time to come."¹⁰³

Extrapolating from Alexander's statements, we learn that: in the course of the evolution of Akasha-Prana (Matter-Energy), radically new properties such as life and mind appear as unpredictable rearrangement of prior existing entities. Within the emergent's that represent a higher complexity such as mind, there are degrees of development between one mind and another. Mind and matter are similar as both being compounded of Akasha-Prana, continuous with one another, and in that sense they do not differ in kind. Yet mind has a higher and more intricate structural organization and configuration than matter, being a more complex pattern of Akasha-Prana the basic stuff.¹⁰⁴

Originally, in the nineteenth century Western theologians looked upon evolution very negatively. With the New Biology, evolution is now considered to be the way God works in the natural world. British biochemist Arthur Peacocke explains the evolutionary process, "The natural (and human) sciences give us more and more a picture of the world as consisting of complex hierarchies - a series of levels of organization of matter in which each successive member of the series is a whole constituted of parts preceding it in the series. The wholes are organized

systems of parts that are dynamically and spatially interrelated.... the idea of an immanent God, which is the God of Evolution.”¹⁰⁵ Evolution represents hierarchical layers of organization, complexity, and levels of entities, structures, and processes. Atoms in molecules in cell in organs and so forth, until one reaches the entire cosmos as a single interrelated natural system.

Arthur Peacocke expounds upon the modern form of “emergent evolution”. He provides the example of mental emergence as a distinctive reality with its own determinant efficacy:

Those involved in studying how the brain works have come to recognize that properties not found in components of a lower level can emerge from the organization and interaction of these components at a higher level.... Reality could, it was argued, putatively be attributable to that to which these non-reducible, higher-level predicates, concepts, laws, etc., applied; and these new realities, with their distinctive properties, could properly be called 'emergent.'... Mental properties are now widely regarded by philosophers as irreducible to their physical ones, indeed as emergent from them, for mentalistic terms cannot logically be translated into neurophysiological ones.¹⁰⁶

Michael Silberstein of Elizabethtown College defines:

Nomological or strong emergence. This refers to cases in which higher-level causally efficacious entities, properties, forces, potentials, laws, teleological organizing principles, etc. come into existence without in any way being necessitated or determined by lower-level features, and constrain, supersede, or change the behaviour of the latter. In such cases fundamental physical facts and laws would only provide at best a necessary condition for higher-level facts and laws. If, for example, brain states are necessary but not sufficient for mental states, and the latter causally affect the former, then mental states are nomologically emergent phenomena.¹⁰⁷

For Peacocke and Silberstein’s emergent evolution involves qualitative changes not reducible to the prior level of development.¹⁰⁸ This appears to resemble the traditional Indian Nyaya-Vaishesika concept of

Asatkaryavada, meaning the non-existence of the effect in the cause. Every effect is a new beginning and is not born out of a cause. Conversely, Vivekananda like the Sankhya philosophers and Ramanuja before him hold to the doctrine of Satkaryavada (or Parinamavada) of the pre-existence of the effect in the cause, in a potential form even before its manifestation. The effect exists prior to its modification in a latent state in the cause.¹⁰⁹ What emerges is causally determined. For example, the higher states of evolution (e.g. self-consciousness) exist in the lower states (e.g. a plant) in seed form. The potential apple tree is hidden at the subtle level not perceivable by the five physical senses. We do not perceive a future apple tree in a seed, yet the potential is there. It is only on the gross manifested level that the newly evolved entity appears to be an emergent not causally related to its predecessor. Vivekananda stated, “Another idea connected with this, the manifestation of the same principle, that the explanation of everything comes from inside it, is the modern law of evolution. The whole meaning of evolution is simply that the nature of a thing is reproduced, that the effect is nothing but the cause in another form, that all the potentialities of the effect were present in the cause, that the whole of creation is but an evolution and not a creation. That is to say, every effect is a reproduction of a preceding cause, changed only by the circumstances, and thus it is going on throughout the universe, and we need not go outside the universe to seek the causes of these changes; they are within. It is unnecessary to seek for any cause outside. This also is breaking down religion. What I mean by breaking down religion is that religions that have held on to the idea of an extra-cosmic deity, that he is a very big man and nothing else, can no more stand on their feet; they have been pulled down, as it were.”¹¹⁰ Vivekananda also pointed out, “Indeed, Ramanuja's theory of contraction and expansion is exactly what the modern evolutionists call evolution and atavism. The soul goes back, becomes contracted as it were, its powers become potential; and by good deeds and good thoughts it expands again and reveals its natural perfection.”¹¹¹

“A very big man” is an anthropomorphic idea of God, whereby personal human limitations concerning traits, emotions, and intensions are imposed upon the omniscience and omnipotence of the Divine Being. God is one being among other entities that place a limit upon and restrain His activity.

b) Samuel Alexander mentions an internal creative force (nisus) that is responsible for the evolutionary manifestation of [Akasha-Prana]. This is evident for example during the 20th century when there was a remarkable advance in the accumulation of knowledge, technology, life-expectancy, and athletic skills. Nisus is similar to a concept developed earlier by Henri Bergson (1859-1941) the French Nobel Prize winning philosopher in his book *Creative Evolution* (1911). Bergson saw evolution as directed by an internal force. The basic source of evolution in nature is the inner *elan vital*, the vital impulse of which we are immediately aware. It is the mysterious creative agency that is the original impetus from which all life springs, the source of mutations and of the directed character of evolution. Nature being a kinetic substance whose body lies in a process of ceaseless becoming, has the tendency is to advance in novelty and complexity.¹¹² *Elan vital* is “an original impetus of life” that pervades the evolutionary process. As creative not mechanical, the vital impetus is a “current of consciousness” that penetrates matter, gives rise to living bodies, and determines the course of evolution. It is the cause of new species and the evolutionary progress toward higher complexity of structural organization.¹¹³

These pattern-forming and developmental capacities of living organisms is what Vivekananda explains through his ideas on involution and evolution. His explanation of this internal force (*elan vital*, nisus) that brings evolution about is, “So all progress and power are already in every man; perfection is man's nature, only it is barred in and prevented from taking its proper course. If anyone can take the bar off, in rushes nature. Then the man attains the powers which are his already.... Today the evolution theory of the ancient Yogis will be better understood in the light of modern research. And yet the theory of the Yogis is a better explanation. The two causes of evolution advanced by the moderns, viz. sexual selection and survival of the fittest, are inadequate.... But the great ancient evolutionist, Patanjali, declares that the true secret of evolution is the manifestation of the perfection which is already in every being; that this perfection has been barred and the infinite tide behind is struggling to express itself.... In the animal the man was suppressed, but as soon as the door was opened, out rushed man. So in man there is the potential god, kept in by the locks and bars of ignorance. When knowledge breaks these bars, the god becomes manifest.”¹¹⁴ This quote comes from Vivekananda's

commentary on *Patanjali's Yoga Sutras* (IV:2-3). It is that latent and potential divinity in the plant, animal, and human that brings about the evolutionary process. "What is the cause of evolution? Desire. The animal wants to do something, but does not find the environment favourable, and therefore develops a new body. Who develops it? The animal itself, its will."¹¹⁵

This "unrealized perfection" is what Aristotle referred to as the Final Cause. It is the purpose or end state of a thing that pulls an object toward a goal. Evolution is explained by reference to some end (*telos*) or purpose or good that acts as the Final Cause. It is internal, not external to the things that act. It brings about the full actualization of the form that the object will ultimately achieve. The ultimate Final Cause is "a state of perfection" the goal that lies at the end of the series of evolutionary development.¹¹⁶ For example, the meaning of life, the ideal is explained in terms of its goal and how to reach that end.

Prana (energy) as the source of rajas works not only through physical objects but also psychologically as an important motivator in all forms of life. This is where physics and psychology meet (psychological physics). The German philosopher Friedrich Nietzsche (1844-1900) made the psychological discovery that there is an innate desire in all living beings to manifest power, which he called the "Will to Power." This is the prana that Swami Vivekananda discusses that manifests as the universal "Will to Manifest Prana." According to Nietzsche, "It is possible to trace all its drives to the will to power [prana]; likewise all the functions of organic life to this one source." The primary drive in living beings is not the will to live (as stated by Arthur Schopenhauer and others), but to discharge force and to manifest power (prana). Will to power (prana) goes far beyond self-perpetuation, since "a living thing wants above all to discharge its force: 'preservation' is only a consequence of this." "The will to power can manifest only against resistance."¹¹⁷ Both we and the world are nothing but the will to power (prana), the fundamental underlying principle of which all other drives are special cases. Will does not precede power (prana), since it itself is a manifestation of power (prana). Will to power (prana) is the self-affirmation of a universal driving dynamics that all forms of life process. Organic life is more complex and diverse and has a greater aptitude to assimilate and control than the inorganic, yet both are objectifications of the same will to power (prana). Nietzsche taught there

are three components of the will to power (prana): 1) resistance: the capacity to preserve oneself from internal disintegration or external control; 2) self-mastery: to transform oneself and develop skill and competency in performing life activities; and 3) dominance: to extend one's influence over others.¹¹⁸ Incidentally, Nietzsche was originally a follower of Schopenhauer from 1865 to 1874. Schopenhauer presented a form of Advaita Vedanta in a rather harsh way that offered no social support system. After that Nietzsche accepted Schopenhauer's volitional primacy of the will, but took a totally secular this-worldly anti-metaphysical position in conscious opposition against Schopenhauer's philosophy.¹¹⁹ Schopenhauer's later supporters included Paul Deussen, Ludwig Wittgenstein, and Wilhelm Halbfass.

It is most unfortunate that Nietzsche's formulation of the will to power is far too restrictive; it tends to concentrate on the aggressive and antagonistic manifestations of power, a superman who desires to dominate and control others. He did not realize that love, compassion, morality, and self-denial are also manifestations of the will to power (prana). Because humans as a bundle of energy are composed of prana they desire to manifest it in their activities on all levels: the physical, intellectual, emotional-feeling, social, moral, aesthetic, and spiritual. They want to be productive and useful. This brings about a sense of personal worth, achievement, and accomplishment. It is a primary factor in human motivation as important as the Will to Love or Will to Pleasure. Every conscious form of human activity is a manifestation of this drive. People are happy when they manifest physical, mental, social, and psychological energy and power (prana). Prana is the foundation of rajas though it can manifest through sattva (higher forms of love), rajas (activity), or tamas (cruelty and self-destruction). The "Will to Manifest Prana" (or Power) is a psychological process based on the relationship between the inner being of humans (psychology) and the inherent nature of the cosmos (physics). The will and everything else are reducible to Akasha and Prana. One person differs from another only in the nature (quality) of and quantity of Prana. It is also important to realize that the "Will to Manifest Prana" is directed by an internal force that Henri Bergson called *élan vital* or the vital impulse and Samuel Alexander refers to it as *nisus*. Consequently, more often but not always the creative force is more potent than the destructive one, hence some progress is made. What is the will to live but a desire to be

conscious, manifest energy, and experience pleasure? When the prana level is low, there is a weakening in the will to live, so the two are interrelated.

Possibly the “Will to Manifest Akasha (Matter)” is the source of tamas producing a desire to return to the inert and inorganic state (Freud’s Will to Die) of sleep, drunkenness, and drug addiction; and Mahat (Intellect) is the inspirer of sattva.

For the French Catholic Teilhard de Chardin (1881-1955) energy is divided into two distinct components. Tangential energy is the material principle, the outside of things that is organized into relatively stable patterns and structures and distributed centrifugally. Tangential energy links one element or particle with others of similar degrees of complexity. Like akasha it fulfills the tamasic function of preserving the regularity of physical, chemical, and biological entities. Radial energy is the spiritual principle, the inside of things that pulls them together centripetally. Like prana it serves the rajasic function of increasing complexity and reorganizing entities in a novel way to bring about new evolutionary levels of being. The interaction of tangential and radial energies gradually generated the universe, life, and consciousness. In humans radial energy transformed consciousness into intelligence and self-awareness.¹²⁰

D. H. Killingley points out that Vivekananda brilliantly explains this passage not following the traditional interpretation of the progressive transformation of an individual, but as a collective process of the “evolution of one species from another.” Was Vivekananda the first commentator to interpret Patanjali in this original manner?¹²¹ Charles Darwin tended to emphasize external causation and factors in evolution. Conversely, Vivekananda stressed “Seed Evolution,” progress stimulated from within by a process of internal causation.

Swami Abhedananda a great supporter of Vivekananda’s ideas, in 1899 explained the Vedantic theory of evolution, “J. Arthur Thomson, an eminent English scientist of the present day, in his book on ‘The Study of Animal Life,’ [1892] says: ‘The world is one, not two-fold, the spiritual influx is the primal reality and there is nothing in the end which was not also in the beginning.’ But the evolutionists do not accept this truth. Let us understand it clearly. It means that that which existed potentially at the time of the beginning of evolution has gradually manifested in the various stages and grades of evolution. If we admit that an unicellular germ of life or a bioplasm, after passing through various stages of evolution, has

ultimately manifested in the form of a highly developed human being, then we shall have to admit the potentiality of all the manifested powers in that germ or bioplasm, because the law is 'that which exists in the end existed also in the beginning.' The animal nature, higher nature, mind, intellect, spirit, all these exist potentially in the germ of life. If we do not admit this law then the problem will arise: How can, non-existence become existent? How can something come out of nothing? How can that come into existence which did not exist before?... Therefore variation, according to Vedanta, is caused by this attempt of the potential powers to become actual.... The manifestation of latent powers is at the bottom of the evolution of one species into another.... The Doctrine of Reincarnation differs from the accepted theory of evolution in admitting a gradual but continuous evolution of the subtle body through many gross forms."¹²²

Where Vivekananda's idea of evolution differs from that of most Westerners is that at a deeper level the goal has already been reached. He said, "According to Advaita, this freedom is not to be attained, it is already ours. We only forget it and deny it. Perfection is not to be attained, it is already within us. Immortality and bliss are not to be acquired, we possess them already; they have been ours all the time."¹²³ That is evolution is not a matter of attaining something new, but removing the obstacles to that which has already been attained (or exists) at a deeper level. We might think of the sun shining and we remove the barriers to get the light.

For a reincarnationist this progressive impetus to evolve is centered not in the species but in the individual. It is less powerful in plants than animals and most potent in humans. Over a long period of time, the individual evolves up the ladder of existence from one species to another. Certainly the introduction of universal education now enjoyed by the majority of citizens of the world, is a major source for the mental evolution of the human race, more important than natural selection. There is a "Will to Manifest Prana," the primary drive found in all living beings to express energy, force, and power. The Viennese psychologist Alfred Adler (1870-1937) wrote about the striving for superiority, the basic innate drive of human action.¹²⁴ Properly executed these drives can spur on the evolutionary process.

c) Alexander discusses the evolution of matter to life to mind and in the future to Deity. Vivekananda concurs that the state of Deity will be reached in the future. "There is an end towards which the whole is moving.

Let us call it perfection. Some men and women are born who anticipate the whole progress of mankind. Instead of waiting and being reborn over and over again for ages until the whole human race has attained perfection, they, as it were, rush through them in a few short years of their life. And we know that we can hasten these processes, if we be true to ourselves.... That a perfect man, that is to say, the type that is to come of this race, perhaps millions of years hence, that man can come today. And this is what the Yogis say, that all the great incarnations and prophets are such men; that they reached perfection in this one life.”¹²⁵ In emergent panentheism the world not only derives its existence from God, but returns to God the maximum level (Universal Restoration). The universe finds its purpose and goal in union with God. The idea of the eventual perfection of humanity has been taught in the West by Origen of Alexandria, Egypt (c. 185-254), Samuel Alexander (1859-1938), and Teilhard de Chardin (1881-1955); and in India by Sri Aurobindo Ghosh (1872-1950).

The evolutionary process is the self-manifestation of Brahman-God in the phenomenal world and not the self-development of Brahman-God who has already attained perfection. It is an unveiling of Brahman-God’s meaning, purpose, and intentions for us. It is Deity who provides the upward drive of evolutionary progress.

Are not the stages of evolution an unveiling of the five koshas (bodies)? What could be a more reasonable path of development than those presented by the five koshas? They proceed from the grossest and outer to the subtlest and inner. The first emergent is matter (Annamaya-kosha) the gross body of all physical things; which combines with the vital or etheric body and life force (Pranamaya-kosha), the biophysical sphere, resulting in plant life. In the third stage of evolution matter and the life force combine with the unfolding of the lower mind (Manomaya-kosha) endowed with the powers of instinct, thought, sense perception, memory, desires, and emotions, all found in animals. It is also known as the astral body. Next in the scale of evolutionary development, these three emergent’s combine with the substance of the subtle mental body or sheath of intellect (Vijnanamaya-kosha), finer and more inward than the mind, producing an I-consciousness or ego, and the discriminative faculties of reason and will found in human beings. The final stage is an unveiling of the sheath of bliss (Anandamaya-kosha) manifested in Divine beings.¹²⁶

Evolution is associated with increasing complexity of gross material forms, and structural and functional complexification. They are correlated with increasing subtleties of energies, and levels of consciousness. A complex material form such as the human brain is required to manifest higher levels of thought on the material plane, but is not required after the physical body dies.

Each stage of evolution has an associated matter (akasha), energy (prana), and level of consciousness (chit). The gross body (annamaya-kosha) is composed of sensible matter and according to modern science the electromagnetic, gravitational, strong and weak nuclear energy forces. The subtle body is composed of fine particles of matter (tanmatras) and psychic energy. Tanmatras are molecules that can be subdivided into atoms and possibly sub-atomic particles. For the causal spiritual body (Anandamaya-kosha) matter and energy are almost inseparable. The mahabhutas (gross elements) emerge from the tanmatras (e.g. akasha from sound). These energies cannot be reduced to consciousness, but accompany and support their correlative levels of consciousness.¹²⁷

In addition to evolution there is also involution as Swamiji stated, "How can you have evolution without involution? Our struggle for the higher life shows that we have been degraded from a high state."¹²⁸ There are some cases where people desire to reverse the evolutionary process and regress to a lower level of existence. Sigmund Freud's (1856-1939) Death Instinct (1920) later called Thanatos is one explanation for the process of involution-devolution. It is characterized by seeking less differentiated and less organized forms of life terminating at a zero energy level. It is a basic principle of inertia that strives to destroy and undo things, with the final outcome being reached in the unconscious inorganic state. The person seeks to destroy their vital unities and return to a lifeless, disordered, disintegrated, immobile, incoherent, and powerless state. It manifests in self-destructive impulses, and when directed to the external world to destructive aggressiveness. These characteristics are also found in drug addiction, alcoholism, suicide, severe depression, and psychoses. Following the Devolutionary Drive, the misguided person seeks to escape from the daily struggles of life, from despair, guilt, anxiety, and pain; to depart from the conscious level; and to enter into a lower consciousness state at the instinctive level. Being self-destructive it is the tamasic will to pseudo-Nirvana, inertia, unconsciousness, impotence,

disintegration, undifferentiation, incoherence, indecision, and oblivion. This is a process of negative transformation; what had previously been created is now destroyed. For example in drunkenness the individual reverses the evolutionary process first returning to an animalistic level and then to an unconscious state.¹²⁹

Ken Wilber articulated that the death instinct is the impulse to retrogress to a lower tier on the evolutionary scheme and disorder, undifferentiation, immobility, incoherence, indecision, and oblivion. These characteristics are found in drug addiction, alcoholism, suicide, severe depression, and psychoses. The individual seeks to escape from the daily struggles of life, from despair, guilt, anxiety, and pain; to depart from the conscious level; and to enter into the subconscious state at the instinctive level and then to the unconscious state of oblivion. This is the will to inertia, unconsciousness, impotence, and disintegration. Possibly this process is an attempt to return to the blissful ignorance of the infant state, where the self of the child, and the physical environment are not distinguished. Otto Rank (1884-1939) considered the desire to regress to the original inanimate life, as a desire to return to the serenity and security of the womb.¹³⁰

Can we say biological evolution is the cause of the evolution of consciousness or vice versa? If the latter is the case then the evolution of consciousness brings about new and higher bodily forms through which to manifest itself.

Concerning involution, Ken Wilber learned of it from the writings of Sri Aurobindo and made the following statement, "According to the traditions, this entire process of evolution or 'un-folding' could never occur without a prior process of involution or 'in-folding.' Not only can the higher not be explained in terms of the lower, and not only does the higher not actually emerge out of the lower, but the reverse of both of those is true, according to the traditions. That is, the lower dimensions or levels are actually sediments or deposits of the higher dimensions, and they find their meaning because of the higher dimensions, of which they are a stepped-down or diluted version. The sedimentation process is called 'involution' or 'emanation.' According to the traditions, before evolution of the unfolding of Spirit can occur, involution or the infolding of Spirit must occur: the higher successively steps down into other lower. Thus the higher levels appear to emerge out of the lower levels during evolution--for example, life

appears to emerge out of matter--because and only because they were deposited there by involution. You cannot get the higher out of the lower unless the higher were already there, in potential--sleeping, as it were--waiting to emerge.... The levels in the Great Nest are all forms of Spirit, but the forms become less and less conscious, less and less aware of their Source and Suchness, less and less alive to their ever-present Ground, even though they are all nevertheless nothing but Spirit-at-play.”¹³¹ For more on evolution see Chapter IX, Section 2B. Divinity is Involved in the Soul (Self).

In the various realms of the physical, mental, moral, and spiritual, a person’s evolutionary development can differ greatly from one area to another. Physical development tends to be relatively uncorrelated with the other three, while spiritual development is certainly accompanied by moral maturation.¹³²

10. Heredity

Though Vivekananda was as adherent of modern science there were a few of their conclusions that he did not agree with including the inheritance of mental characteristics. He reasoned:

We admit some part of this hereditary transmission. How far? As far as furnishing the material. We, by our past actions, conform ourselves to a certain birth in a certain body, and the only suitable material for that body comes from the parents who have made themselves fit to have that soul [self] as their offspring. The simple hereditary theory takes for granted the most astonishing proposition without any proof, that mental experience can be recorded in matter, that mental experience can be involved in matter. When I look at you, in the lake of my mind there is a wave. That wave subsides, but it remains in fine form, as an impression. We understand a physical impression remaining in the body. But what proof is there for assuming that the mental impression can remain in the body, since the body goes to pieces? What carries it? Even granting it were possible for each mental impression to remain in the body, that every impression, beginning from the first man down to my father, was in my father's body, how could it be transmitted to me? Through the bioplasmic cell? How could that be? Because the father's body does not come to

the child *in toto*. The same parents may have a number of children; then, from this theory of hereditary transmission, where the impression and the impressed (that is to say, material) are one, it rigorously follows that by the birth of every child the parents must lose a part of their own impressions, or, if the parents should transmit the whole of their impressions, then, after the birth of the first child, their minds would be a vacuum. Again, if in the bioplasmic cell the infinite amount of impressions from all time has entered, where and how is it? This is a most impossible position, and until these physiologists can prove how and where those impressions live in that cell, and what they mean by a mental impression sleeping in the physical cell, their position cannot be taken for granted. So far it is clear then, that this impression is in the mind, that the mind comes to take its birth and rebirth, and uses the material which is most proper for it, and that the mind which has made itself fit for only a particular kind of body will have to wait until it gets that material. This we understand. The theory then comes to this, that there is hereditary transmission so far as furnishing the material to the soul [subtle body] is concerned. But the soul migrates and manufactures body after body, and each thought we think, and each deed we do, is stored in it in fine forms, ready to spring up again and take a new shape.

By the law of heredity, the reincarnating soul [subtle body] receives from the parents the material out of which to manufacture a man.¹³³

We cannot deny that bodies acquire certain tendencies from heredity, but those tendencies only mean the physical configuration, through which a peculiar mind alone can act in a peculiar way. There are other tendencies peculiar to a soul [subtle body] caused by its past actions. And a soul with a certain tendency would by the laws of affinity take birth in a body which is the fittest instrument for the display of that tendency.¹³⁴

In agreement with Vivekananda's ideas, Abhedananda in his book *Reincarnation* (1899) made this important statement, "The Vedanta philosophy, however, has already explained the cause of the potentiality in the germ of life or 'germ-plasm' or germ-cell. Vedanta solves this difficulty

by saying that each of these germ plasms or germ cells is nothing but the subtle form of a reincarnating individual, containing potentially all the experiences, characters, tendencies, and desires which one had in one's previous life. It existed before the birth of the body and it will continue after the death of the body. This germ or subtle body is not the same as the astral body of the Theosophists, or the double of the metaphysical thinkers or the disembodied spirit of the Spiritualists; but it is an ethereal center of activity—physical, mental, and organic. It is a center that possesses the tendency to manifest these powers on different planes of existence. It contains the minute particles of matter or ethereal substance and the life principle or vital energy by which we live and move. It also possesses the mental powers and sense powers; but all these remain latent, just as in a seed we see that the powers of growth, of assimilation and of producing flowers and fruits are latent. At the time of death the individual soul [subtle body] contracts and remains in the form of a germ of life.”¹³⁵

Reviewing his book, Frederick W. Mann M.D. the editor of *Medical Age* (1899) articulated that Abhedananda “has been using the [August] Weismann [1834-1914] theory of heredity in support of the Vedanta doctrine of reincarnation. He maintains that the notion of the continuity of the germ plasm has come almost to the door of the doctrine of reincarnation. Weismann, in denying the inheritance of acquired characteristics, regards variations as a result of natural selection, the influence of which has reacted upon the germ plasm. Vedanta teaches that the germ-plasm is a subtle reincarnating body containing potentially all the experiences, characters, and desires possessed by the individual in a previous form of life.”¹³⁶

For more details on this subject see: Chapter XIII, Reincarnation, the Pre-existence of the Soul, and the Law of Karma.

Endnotes

¹ Some of this chapter can be found in G. Stavig, “Swami Vivekananda, Sankhya, and Modern Physics,” *VK* (May 2005), pp. 189-96; (June 2005), pp. 216-24.

² CW, III:2-3 (Published in English, 1907). See WARHD, pp. 940-41 for publication dates of Vivekananda’s teachings. In some cases earlier publication dates are possible.

³ CW, III:185.

⁴ CW, IV:377-78 (1907).

⁵ CW, V:101-02 (1910).

⁶ CW, II:76 (1902).

⁷ CW, II:76 (1902)

⁸ John O'Neill, *Prodigal Genius* (New York: Ives Washburn, 1944), p. 248.

⁹ *Ibid.*, pp. 251-52.

¹⁰ Milac Capek, *The Philosophical Impact of Contemporary Physics* (New York: Van Nostrand Reinhold, 1961), p. 319.

¹¹ *Global Vedanta* (Spring 2001).

¹² WARHD, pp. 359, 915-16.

¹³ Web: en.wikiquote.org/wiki/Max_Planck

¹⁴ Web: en.wikiquote.org/wiki/James_Jeans

¹⁵ Ernst Opik, *The Oscillating Universe* (New American Library, 1960), pp. 120-24.

¹⁶ Web: curious.astro.cornell.edu/relativity.php. Nikola Tesla rejected Einstein's idea that the existence of large bodies causes space to become curved, because space has no properties. Only matter filling space has properties. In Tesla's model, a force-field would curve light around large bodies accounting for the same mathematical results.

(Web: <http://www.newdawnmagazine.com/articles/tesla-vs-einstein-the-ether-the-birth-of-the-new-physics>).

¹⁷ Paul Davies, *The Mind of God* (New York: Simon and Schuster, 1992), p. 49.

¹⁸ Paul Davies and John Gribbin, *The Matter Myth* (New York: Simon and Schuster, 1992), pp. 93-94, 162. If space-time is a single entity, does this mean that a thought or feeling that occurs over time must be extended and spatial in the subtle realm?

¹⁹ Web: <http://einstein.stanford.edu/SPACETIME/spacetime2.html>

²⁰ CW, I:196 (1896).

²¹ CW, II:427, 434 -35 (1907).

²² CW, I:147 (1896); II:444 (1907); III:400 (1907); I:373 (1907); cf. I:256, 359-60; II:31, 264 (1896), 427 (1907).

²³ Aruna Goel, *Indian Philosophy Nyaya-Vaisesika and Modern Science* (Bangalore: Sterling Publishers, 1984), pp. 72-73.

²⁴ CW, I:147-48, 224 (1896); III:399 (1907); cf. I:150, 223; II:76, 454-55.

²⁵ CW, II:264 (1902).

²⁶ CW, I:395-96 (1907).

²⁷ CW, II:254.

²⁸ CW, II:435-36 (1907).

²⁹ CW, V:102 (1910); cf. I:150-52, 359-60, 395-96; II:239-40, 254, 265, 438; VIII:192-93.

³⁰ The terms Karana-akasha and Karya-akasha are taken from: Surendranath Dasgupta, *A History of Indian Philosophy* (Delhi: Motilal Banarsidass, 1922, 1975), I, p. 253. The corresponding Jain terms are Alokakasha and Lokakasha from: Indukala

Jhaveri, "The Concept of Akasha in Indian Philosophy", *Annals of the Bhandarkar Oriental Research Institute* 37 (1956), p. 301.

³¹ James Jean, *The Mysterious Universe* (New York: E. P. Dutton, 1932), p. 78.

³² The astronomer John Dobson translates Akasha as gravitational energy that transforms into kinetic energy (Vayu), into radiation (Tejas), to electricity (Apah), and into magnetism (Prithvi) (John Dobson, *Advaita Vedanta and Modern Science* (Chicago, Vivekananda Vedanta Society, 1983), p. 7).

³³ CW, I:448.

³⁴ CW, III:57.

³⁵ CW, III:401; cf. I:250-51, 360-61, 505; II:443, 445, 454; III:400.

³⁶ CW, II:444; IV:48-49.

³⁷ Ayer, pp. 54-59.

³⁸ Copleston, VIII, pp. 127-29 relating to the scientific philosophy of Herbert Spencer.

³⁹ Web: www.aip.org/history/einstein/voice1.htm

⁴⁰ CW, II:265; I:360-61, 504, 506; II:13. The reason for the missing words using the [] symbol is that a stenographer recorded this lecture.

⁴¹ Peacocke, pp. 53-54.

⁴² Web: www.philosophybasics.com/branch_Idealism.html#Objective

⁴³ Arthur Peacocke, *God and the New Biology* (San Francisco: Harper & Row, 1986), pp. 93, 123.

⁴⁴ Debashis Guha, "Some Problems Concerning the Big Bang Theory of Creation", *Jr. Indian Council of Philosophical Research* (Jan-Apr. 1996), pp. 32-33, 36-39; Stephen Hawking, "The Edge of Spacetime" in Paul Davies, *The New Physics* (Cambridge: Cambridge University Press, 1989), pp. 65-67.

⁴⁵ CW, II:204-08 (Published 1902). This is not the luminiferous ether, a hypothetical substance that fills all space through which electromagnetic waves travel, disproven by the Michelson-Morley experiment of 1887.

⁴⁶ CW, II:426 (1907); cf. I:152; II:205, 207, 211, 427, 433-35, 442-43, 455; III:399-400. Another statement along these lines by Vivekananda is found in Chapter V, Section 7. Eternity of the Universe and Cosmic Cycles.

⁴⁷ CW, I:220 (1896); II:434 (1907); III:399 (1907); VIII:157 (1926).

⁴⁸ CW, I:210-11.

⁴⁹ Swami Abhedananda, *Reincarnation* (Calcutta: Ramakrishna Vedanta Calcutta Math, 1899, 1946), p. 3.

⁵⁰ CW, I:151-52 (1896).

⁵¹ Swami Abhedananda, *Yoga, Its Theory and Practice* (Calcutta: Ramakrishna Vedanta Math (1978), p. 95.

⁵² Swami Abhedananda, *Yoga Psychology* (Calcutta: Ramakrishna Vedanta Math, 1960), p. 169.

⁵³ Swami Abhedananda, *The Mystery of Death* (Calcutta: Ramakrishna Vedanta Math, 1978), p. 257.

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- ⁵⁴ J. Krishnamurti and David Bohm, *The Limits of Thought* (New York: Routledge, 1999), pp. vii, vi-x. For more on Bohm see Chapter X, Section 1B.
- ⁵⁵ F. David Peat, *Infinite Potential* (New York: Addison-Wesley, 1996), p. 324.
- ⁵⁶ Renee Weber, *Dialogues With Scientists and Sages* (New York: Routledge & Kegan Paul, 1986), pp. 26, 33, 39-41, 94.
- ⁵⁷ David Bohm and F. David Peat, *Science, Order and Creativity* (New York: Bantam Books, 1987), pp. 182-83.
- ⁵⁸ David Bohm, *Causality and Chance in Modern Physics* (New York: Harper & Brothers, 1957), pp. 81, 94, 117-18; David Bohm, "Quantum Theory as an Indication of a New Order Physics," *Foundations of Physics* 3 (1973), pp. 149, 153, 164.
- ⁵⁹ Bohm (1973), pp. 149, 153, 164.
- ⁶⁰ Weber (1986), pp. 93, 26, 40, 94; David Bohm, *Wholeness and the Implicate Order* (London: Routledge & Kegan Paul, 1980), pp. 177, 189; David Griffin, "Bohm and Whitehead on Wholeness, Freedom, Causality, and Time," *Zygon* 20 (June 1985), pp. 167, 169.
- ⁶¹ Bohm (1980), pp. 191; Weber (1986), p. 28.
- ⁶² Bohm (1980), pp. 179, 207.
- ⁶³ Griffin (1985), pp. 166-67; Weber (1986), p. 92.
- ⁶⁴ Clayton 4, pp. 788-89.
- ⁶⁵ Amit Goswami, "The Idealistic Interpretation of Quantum Mechanics", *Physics Essays* 2 (1989), pp. 388, 394; Amit Goswami, *Quantum Mechanics* (Wm. C. Brown, 1992), p. 518.
- ⁶⁶ Ben Goertzel, "Quantum Theory and Consciousness," *The Journal of Mind and Behavior* (Winter 1992), pp. 29-36.
- ⁶⁷ Michael Talbot, *Mysticism and the New Physics* (New York: Bantam Books, 1981), pp. 77-78, 80, 118. Shortly before his passing, Wheeler held a long conversation with Swami Jitatmananda of the Ramakrishna Order concerning modern physics. Swami Jitatmananda, *Modern Physics and Vedanta* (Mumbai, India: Bharatiya Vidya Bhavan, 2002), pp. 31-32, back cover.
- ⁶⁸ N. C. Panda, *The Vibrating Universe* (Delhi: Motilal Banarsidass, 2000), pp. 193-94.
- ⁶⁹ N. C. Panda, *Maya in Physics* (Delhi: Motilal Banarsidass, 1991), pp. 155-56.
- ⁷⁰ CW, II:442 (1907).
- ⁷¹ Werner Heisenberg, *Physics and Philosophy* (New York: Harper & Row, Publishers, 1958), pp. 61-62; Web: home.netcom.com/~byers11/CreatMomtm.htm
- ⁷² Web: www.jonathanschaffer.org/monism.pdf.
- ⁷³ Paul Davies, *God and the New Physics* (New York: Simon and Schuster, 1983), pp. 152-53; Web: en.wikipedia.org/wiki/List_of_particles
- ⁷⁴ B. David Burke, "On the Measure "Parimandala"", *Philosophy East and West*, (July 1983), pp. 273-84.
- ⁷⁵ CW, II:240-41 (1907).
- ⁷⁶ CW, I:135, 251 (1896); II:444, 436-37 (1907).

⁷⁷ CW, V:102 (1910).

⁷⁸ Swami Abhedananda, *True Psychology* (Calcutta: Ramakrishna Vedanta Math, 1965), pp. 18-21, 122-23; Stavig (2005), pp. 189-96, 216-24.

⁷⁹ Swami Abhedananda, *Ideal of Education* (Calcutta: Ramakrishna Vedanta Math, 1984), p. 5.

⁸⁰ Web: en.wikipedia.org/wiki/Interpreations_of_quantum_mechanics; Talbot (1981), pp. 21, 34, 122.

⁸¹ Talbot (1981), pp. 122, 41-42, 60-62.

⁸² CW, I:257-58, 299 (1896), 395 (1907); VI:34 (1919); VIII:193 (1926).

⁸³ Web: en.wikipedia.org/wiki/Neutral_monism#History

⁸⁴ [En.wikipedia.org/wiki/21_grams_experiment](http://en.wikipedia.org/wiki/21_grams_experiment)

⁸⁵ Web: <https://evolvingsouls.com/book/article6a/>

⁸⁶ Swami Abhedananda, *The Mystery of Death* (Calcutta: Ramakrishna Vedanta Math, 1978), p. 258; Web: Google type in: "When did the first humans appear on earth?"

⁸⁷ Web: http://en.wikipedia.org/wiki/Hidden_variable_theory

⁸⁸ Portions of sections 1, 2, 5, 7 appeared in an article by G. Stavig in BRMIC (July and August 2013), pp. 326-32, 374-82.

⁸⁹ CW, I:147.

⁹⁰ Samuel Alexander, *Space, Time, and Deity* (2 Vol., New York: Dover Publications, 1920), I, pp. 180, 320, 341; Bertram Brettschneider, *The Philosophy of Samuel Alexander* (New York: Humanities Press, 1964), p. 33. Though this book does not mention Akasha-Prana, it helped me to get a better understanding of the subject and that is why it is so often endnoted.

⁹¹ Alexander (1920), II, pp. 47-49; Brettschneider (1964), pp. 29, 58-59.

⁹² Alexander (1920), I, pp. 238, 249; Brettschneider (1964), pp. 42, 45.

⁹³ Alexander (1920), II, p. 358; Brettschneider (1964), p. 156.

⁹⁴ Brettschneider (1964), p. 164.

⁹⁵ Brettschneider (1964), pp. 28, 38-39, 42, 47, 49, 55. Brettschneider believes that Alexander was indebted to the Absolute philosophy of F. H. Bradley for some of these ideas. Alexander was probably influenced by the book *Elements of Metaphysics* (1903) since he read a large portion of it before it was published. Its author A. E. Taylor was a colleague of Alexander at Manchester University in the Philosophy Department (1896-1903. At that time Taylor was a follower of F. H. Bradley and this book expands upon the latter's philosophy.

⁹⁶ Alexander (1920), II, pp. 357-58; Brettschneider (1964), p. 156.

⁹⁷ CW, I:250, 360.

⁹⁸ Radhakrishnan, II, pp. 184-93.

⁹⁹ CW, I:189.

¹⁰⁰ Copleston, II, p. 273.

¹⁰¹ Alexander (1920), II, pp. 14, 45; Brettschneider (1964), p. 63.

¹⁰² Alexander (1920), II, p. 346; Brettschneider (1964), p. 152.

- ¹⁰³ Alexander (1920), II, p. 345; Brettschneider (1964), p. 150; Web: www.iep.utm.edu/alex-sam
- ¹⁰⁴ Brettschneider (1964), pp. 164-65.
- ¹⁰⁵ Peacocke 1, pp. 48, 136.
- ¹⁰⁶ Peacocke 1, p. 60.
- ¹⁰⁷ Clayton 4, pp. 788-89.
- ¹⁰⁸ Web: [En.wikipedia.org/wiki/Emergent_evolution](http://en.wikipedia.org/wiki/Emergent_evolution)
- ¹⁰⁹ Grimes, pp. 64-65, 250-51, 325.
- ¹¹⁰ CW, I:371-72.
- ¹¹¹ CW, III:239.
- ¹¹² Vergilius Ferm, ed. *A History of Philosophical Systems* (New York: Philosophical Library), p. 383.
- ¹¹³ *The Encyclopedia of Philosophy*, ed. Paul Edwards (New York: Macmillan, 1967), Vol. 1, pp. 292-93.
- ¹¹⁴ CW, I:291-93; cf. V:277, 298; VI:45.
- ¹¹⁵ CW, II:356.
- ¹¹⁶ Web: faculty.washington.edu/smcohen/320/4causes.htm
- ¹¹⁷ Friedrich Nietzsche, *The Will to Power*, Walter Kaufmann and R. J. Hollingdale, trs. (New York: Vintage Books, 1968), Sections, 619, 650, 656.
- ¹¹⁸ *Ibid.*, Sections, pp. 382, 636, 661, 685, 689, 692-93, 720-21, 858; Richard Schacht, *Nietzsche* (London: Routledge & Kegan Paul, 1983), pp. 217-22.
- ¹¹⁹ Bryan Magee, *The Philosophy of Schopenhauer* (New York, 1983), pp. 268, 275-76.
- ¹²⁰ John Cooper, *Panentheism* (Nottingham Eng.; Inter-Varsity Press, 2007), pp. 150-51.
- ¹²¹ D. H. Killingley, "Yoga Sutra IV, 2-3 and Vivekananda's Interpretation of Evolution", *Jr. of Indian Philosophy* (1990), pp. 151-79.
- ¹²² Swami Abhedananda, *Reincarnation* (Calcutta: Ramakrishna Vedanta Math, 1899, 1964), pp. 56-57, 60, 65.
- ¹²³ CW, II:350.
- ¹²⁴ Henri Ellenberger, *The Discovery of the Unconscious* (New York: Basic Books, 1970), pp. 278, 612, 630, 633.
- ¹²⁵ CW, II:18-19.
- ¹²⁶ Swami Adiswarananda, *The Vedanta Way to Peace and Happiness*, pp. 14-15; Web: <http://en.wikipedia.org/wiki/Kosha>; Grimes, p. 178.
- ¹²⁷ CW, II:436-37; IV:233; V:102; Web: www.kenwilber.com/Writings/PDF/Excerpt_KOSMOS_2004.pdf. Possibly matter is tamasic, energy is rajasic, and consciousness is sattvic?
- ¹²⁸ CW, II:174.
- ¹²⁹ Sigmund Freud, *Complete Psychological Works of Sigmund Freud*, tr. James Strachey (24 vols.; London: Hogarth Press, 1978), XVIII, pp. 36-38, 49, 55-56, 258-59; XIX, pp. 159-61; XXIII, pp. 148-49; Web: en.wikipedia.org/wiki/Death_drive.

¹³⁰ Ken Wilber, *The Atman Project* (Wheaton, IL: Theosophical Publishing House, 1980), pp. 7-11, 173-74; Ken Wilber, *Eye to Eye* (Garden City, NY: Anchor Books, 1983), pp. 231-33.

¹³¹ Web: www.kenwilber.com/Writings/PDF/Excerpt_KOSMOS_2004.pdf

¹³² A good portion of sections 8-9 appeared in an article by G. Stavig in BRMIC (Oct. 2014), pp. 453-61.

¹³³ CW, II: 222-23, 441.

¹³⁴ CW, I:8-9 (1907).

¹³⁵ Abhedananda (1899, 1964), pp. 40-41.

¹³⁶ Mann mistakenly attributes these specific ideas to Vivekananda rather than Abhedananda. *Medical Age* (Sept. 10, 1899), p. 662. For more on this subject see *Literary Digest* (July 8, 1899), pp. 47 ff. on GBS; or *Brahmavadin* (1899), pp. 724 ff.; Abhedananda (1899, 1964), pp. 35-45; WARHD, pp. 715-16.