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Philosophical Consciousness and Scientific Knowledge: Conceptual Linkages and Civilizational Background

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CHAPTER 7
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Developing a Science for Consciousness
Philosophical underpinnings

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"The history of science is the autobiography of consciousness" - J. Andrew Ross

Developing a Science for Consciousness requires some essential philosophical underpinnings without which the attempt rarely brings any success. This presentation is meant to highlight and share those intellectual realms with the colleagues engaged in developing a Science for Consciousness. The presentation is divided into ten parts. In Part I three possible relationships amongst Science, Philosophy and Consciousness have been discussed. Part II leads towards a science for consciousness along with some historical events relevant in the context. It also elaborates on what do we mean by science, different forms of science and finally the limitations of science including recent observations by which the boundary of science seems to be porous. This part also highlights the points why the scientists are not so far successful in developing a science for consciousness. Part III focuses on the established schools of philosophy, which have direct bearings in developing a science for consciousness. Part IV goes on elaborating nine different viewpoints on a science for consciousness, and crystallizes the viewpoint of a pragmatic consciousness-scientist. It offers a five-plane model of nature and their relevance in yoga and naturopathy. Finally it draws a connection between philosophy of nature and social philosophy in the context of two menaces of a civil society namely Corruption and Terrorism. Part V describes the characteristics of a science for consciousness and elaborates on how does science for consciousness differ from Theology and Science in its present form. Part VI offers five concrete suggestions for the scientists and philosophers of science engaged in developing a science for consciousness. Part VII reviews the very basic, three different views on how we become aware of our surroundings and of our thoughts and feelings. In part VIII, the modalities of reconciliation of Brain-bound and Brain-independent consciousness have been discussed. An emphasis has been laid on the modes of communication within Nature at the level and in the context of cortico-supracortical interaction. Part IX suggests Nanoune models for both Brain-bound and Brain-independent consciousness. Part X focuses on the future of Neuroscience in the context of continued evolution of brain and suggests evolution of a 'new brain' over the triune brain.

I
Interrelationship of Science, Philosophy and Consciousness

Scientists are concerned with facts, the philosophers with truths and the spiritualists prefer enlightenment to facts or truths

All facts although are not truth, in essence a scientist, a philosopher and a spiritualist all seek Truth in their respective plane of working. While an ordinary scientist feels satisfied with sensory/empirical truth, an ordinary philosopher feels accomplished in the course of successfully handling perceptual, cognitive, intellectual and logical truth. An extraordinary philosopher or an extraordinary scientist aspires for intuitive truth and dives into the deeper plane of nature. The spiritualist does not feel accomplished till he gets enlightenment which is accompanied by revealed truth. In developing the science for consciousness, we need in one person a spiritualist, a philosopher and a scientist. And, we need plenty of them.

With this background, while every discipline has been seeking truth, may be being confined to their respective terrain of play, the interrelationship of Consciousness Philosophy and Science could be narrated best in the following three ways.

1. **Consciousness, Philosophy and Science bear an ontological relationship**

Where the science ends, philosophy begins. Where philosophy falls silent, the experience of the domain of consciousness begins. While philosophy transcends but also includes science, consciousness transcends and also includes philosophy. When one's philosophy is correct, science automatically and spontaneously follows the suit. On the other hand, the hard core scientific data tightens the loophole of a loose philosophy. When one's consciousness works in harmony with universal, *transuniversal*, inter-universal consciousness, one's philosophy rolls on a unique tract. The correct philosophical pursuit leads to the opportunity for entering the domain of consciousness. Consciousness feeds philosophy, and through philosophy it feeds science as well.

Consciousness has a component that is inscrutable and non-negotiable. This part of consciousness is not amenable to either philosophy or science. It is this property of consciousness that offers it the supreme ontological status. Science can explore only nature while Philosophy explores both nature and consciousness. In this sense, philosophy occupies an ontologically higher status than science.

2. Philosophy and Science are two different facets having their common origin in Consciousness.

Here, consciousness although forms the terrace, the relationship between Philosophy and Science is not considered vertical. Both science and philosophy have a common origin in consciousness. However, they are horizontally related through a boundary that states that this is science and that is philosophy. Science deals with sensory, measurable, objective experience. Philosophy deals with subjective, non-measurable feelings.

Philosophy and Science are usually used as tools to explore consciousness. In turn, consciousness strengthens both the tools. What is not adequately emphasized in this

context is the role the *experience* plays. Within the experience all three could be accommodated. `Experience' results from the concurrence of *Reasoning* (Cerebral cortex), *Feelings* (Limbic system) and *Instinct* (Thalamo-reticular system of brain). The experience may be a sensory experience, an extrasensory experience like clairvoyance or non-sensory experience of phenomena, particularly of elementary phenomena like, *Love, Sex, Ego, Life* and *Death.* All are supposed to be relevant in this context.

3. Consciousness, Philosophy and Science are related as a causally interacting triangle.

Here, no single discipline can claim its primacy over the others. Each one of them is causally created by others and in turn influences their causal existence. All are equally important. However, all three are taken as the products of the brain and they interact within the brain. Consciousness, science and philosophy all appear brain-bound. The all-important experience is the result of state-specific activity of the brain. In fact, the state-specific consciousness in the brain is responsible for the birth of state-specific philosophical principles or a scientist's research hypothesis. Scientific process operates through causally interacting triangle of *Data-Theory-Control beliefs*[1] system. In this sense, when one tries to find out the exact relationship of the three, one is to look into the information processing and the state of responsivity of the brain.

Situation where the man-made boundary of convenience dissolves

Is there any occasion when Consciousness, Philosophy and Science loose their respective identity? Certainly! It happens in the course of experiencing elementary phenomena which puts Science, Philosophy and Consciousness in their proper perspectives. The identity of each and their differences dissolve while one addresses the existential issues, when one is thrown into life and death situation (elementary phenomena). The man-made boundaries of convenience differentiating Science, Philosophy and Consciousness get dissolved while one is subjected to near-death experience, transcendental death experience, transformational death experience and the experience of getting re-born in the same body (`born again' experience). In this phase, the unmediated and direct experience crystallizes as wisdom rather than as knowledge or information. Later, we may dissect this wisdom into knowledge, information or their supporting data and classify them under convenient boundary of science, philosophy and consciousness while in some other time it seems that the wisdom can not be tailored to suit any boundary.

The practice of any and each of these three, in its true spirit, is effective enough to get through the realization that within `science' there is a philosophy, within the philosophy there is a science and embedded within consciousness are both science and philosophy.

The credibility of Science and Philosophy

The credibility of science lies in its (i) reproducibility and (ii) objectivity. Its data and result are open to public scrutiny. Although 'objectivity' in science gets replaced in insight-full philosophy by inter-subjective sharing, the reproducibility of science is retained in philosophy in a different form. The same philosophical principles continue to be pursued from teachers to students, from the seers to his followers, from the master to his disciples through independent revelation and realization. In this sense there is a

'science' within the philosophical exploration of consciousness. The scientific rigor, as it is called, is usually observed in those philosophical principles which are derived from the experience of consciousness.

II

(Major portion of Part II has been developed over the lectures delivered at the University of Pune on *The Limits of Science* in October, 2001 and at Jawaharlal Nehru University, Delhi, on Science *for Consciousness*, in December, 2001)

Development of ideas towards a Science for Consciousness

In the last decade of nineteenth century, it was Swami Vivekananda from India who unequivocally expressed and affirmed that a Science for Consciousness could be developed. However, neither the science was prepared at that point of time for this venture, nor was it so focussed, as it seems now.

In the first quarter of twentieth century, two landmark observations were made. One was on the mystical front by the accomplished Indian mystics. The other was on the science front by the accomplished Western quantum mechanists. Quantum physicists from the West identified the 'measurement' problem in quantum mechanics. They became aware of the fact that observer's consciousness does influence the process of observation and creates problem in measurement. This was the first blow to an objective and positivistic practice of science. More or less at the same period of time the visionaries like, Akhandamandaleshwar Sri Sri Swami Swarupananda Paramahansa Dev, Sri Aurobindo (and later Pundit Gopi Krishna) from India unequivocally expressed that emergence of a new human species as embodiment of higher consciousness is on the card of nature's mechanics. The former observation in the discipline of science could be visualized as a stepping stone for the scientists to enter the domain of consciousness. The later revelation may be utilized as the springboard for the humanity to join the adventure in consciousness. In the effort to connect these two important landmarks in human pursuit of knowledge, a science for consciousness comes in demand.

Then followed two World Wars. In the 1930s, for the purposes of investigation of formal deduction, machines and formal computation were defined. During the time of Second World War the discovery of mathematical theory of computation made an ineffable inroads in the scientific culture. Since then the scientists from a couple of related disciplines got interested in the study of mind. Probably, the mind works like a computer! It is this assumption which made the scientists to think that a science of mind might exist which can be investigated. Since then many advancements towards this direction have been made in the field of multidisciplinary cognitive science. New Age Movement in America in 1960-70s, which brought down `spirit' in young minds, followed the `cognitive revolution' of post-war years. Transpersonal movement was also born during this period. By that time many renowned scientists had been changing their focus of attention on research on consciousness. At the classical neurophysiology level also, two Nobel neurophysiologists, Sir John C. Eccles and Roger Sperry made significant contributions in neurophysiology of Consciousness. Eccles and Popper's celebrated book, *The Self and its Brain*[2], threw an emphatic indication that the brain belongs to 'self'. *'Structure and Significance of Consciousness Revolution'* by Sperry[3] is a well-reviewed

article published in The Journal of Mind and Behavior in 1987. Two other Nobel scientists, Francis Crick and Gerald Edelman took active interest in the field of consciousness and published papers and wrote books on this subject. *Astonishing Hypothesis*[4] of Crick has highlighted the reductionist's approach. Consciousness can be explained by the sum total activities of the neurons in the brain. Evolutionary Biologist Edelman's latest title *A universe of Consciousness*[5] (2001) has just come out of the press. Similarly, from the stream of physics, Nobel celebrities like Brian D. Josephson and many other physicists like, David Bohm, Henry Stapp, Material scientist like William Tiller[6] and the Mathematicians like, Roger Penrose[7] have all shown a leaning of physical science towards consciousness. Robert Jahn from the University of Princeton, USA, and his colleagues have documented in their several publications (e.g.[8]), "the unique capacity of consciousness to precipitate anomalous behavior of a variety of physical systems and processes."

In USA, the Center is being set up for consciousness study in the University of Arizona. Tucson Conference on *Towards Science of Consciousness,* held every two years since 1994, has offered a reliable tent for all those who are engaged in exploration of consciousness. The annual conferences of Association for Scientific Study of Consciousness (ASSC) have attracted scientists and the philosophers of science from all over the world. There has been a peer reviewed multidisciplinary *Journal of Consciousness Study*, an outcome of Tucson conference, being published regularly since 1994. Similarly, the outcome of ASSC conference is another journal, *Consciousness and Cognition*.

Today there are about fifty Science and Religion Centers all over the world (with their illustrious web sites) to address this issue. Scientific & Medical Network, UK, Center for Frontier Science in the Temple University, Fetzer Institute, Institute of Noetic science and The John Templeton Foundation of USA are worth mentioning in this context. For our Indian friends here to know, our neighbour, Pakistan, has a registered society working on Science Religion issue. In Aligarh, India, there is a Muslim Association for Advancement of Science (MAAS) working on consciousness and Islam. Recently, Government of India has been in the process of setting up of Departments of Consciousness Study and *Yogic* Sciences in ten Government universities. Indian Council of Philosophical Research has been made a nodal organization by Govt. of India for networking consciousness research throughout the country. During such exciting point of time, I am privileged to deliver this lecture on the philosophical underpinnings as required for developing a Science for Consciousness.

What is Science?

The word science is derived from Latin word s*cientia*. It is a noun formed from the present participle of the verb *scire,* meaning know. The word science also has a Greek root where science is the *means to split*, to break up. Basically, science deals with knowledge, the process of acquisition of knowledge (epistemology) and the levels or domains of knowledge (ontology). The way Albert Einstein defines science, even logic and philosophy can be included within the realm of science. "Science is the attempt to make the chaotic diversity of our sense-experience correspond to a logically uniform

system of thought." (Einstein, 1950). He, however, remained confined to sense-experience only. Extrasensory or `non-sensory' experiences do not come into the picture in his definition. Science, as presently understood, is the knowledge gained systematically by human beings through observation and experimentation. The process of 'sciencing' steps through (i) identification of problem, (ii) collection of basic available information (iii) working out a research hypothesis (iv) designing experimentation (v) observation (vi) analysis of data to draw conclusion and finally (vii) generalization of the conclusion, if possible.

Finally, we must remember that "Science never proves…… but merely probes." (Gregory Bateson).

There is also a caution. "When most people say 'scientist', they mean 'technician'. A technician is a highly trained person whose job is to apply known techniques and principles. He deals with the known. A scientist is a person who seeks to know the true nature of physical reality. He deals with the unknown." (Gary Zukav)[9].

Scientific community, like any other social community, works with a self-preservational tendency. The endeavor of science has four dimensions as pointed out by Alan Wallace. The science itself, scientific realism (the philosophy on which the methods of science work), scientific materialism (the metaphysical principles which the science can not afford to leave) and scientism (the dogmatic dimension of scientific knowledge and truth). Scientific materialism and scientism fall within the spectrum of scientific fundamentalism or scientific vigilantism. This could be well correlated with the psychology of the scientists. Scientism is often born out of an "arrogant, autocratic, `almighty' 'I', a battered, besieged and bothered 'Me' and a clutching, captive, clasping 'Mine' of the scientists".

Different forms of Science

Science deals with relationship between facts. Scientific discovery is essentially the discovery of a new relationship. Depending on the nature of relationship there are four[10] kinds of science. *Orthodox science* is confined to ordinary facts in ordinary relationship. The ordinary fact described in an extraordinary relationship makes it a *Para-science* (e.g. parapsychology). Extraordinary facts (e.g. seeing a white crow) in ordinary relationship makes it a cryptoscience. When extraordinary facts are described to be in extraordinary relationship it makes a Paracrypto science (e.g. observing a new star through telescope which violates the existing laws of astrophysics).

Quasi-science is a subject that deals with relationship that seems to be scientific but still definite proof is lacking since no experimental verification is available. Astrology belongs to this category.

Premature science is a science that is 'ahead of time'. Since it is premature it is weak to thrive. Its arrival ahead of time makes it difficult to be understood by the contemporaries. Alfred Wegener's continental drift theory and Mandel's discovery of rules of heredity are two examples that were proposed much ahead of their time.

Pseudoscience or junk science claims a relationship that can be proved incorrect by applying scientific methodology. Since it depends on anecdotal evidence and there is a tendency of generalization from one single example, it lacks the scientific rigor. In its preposterous presentation, one identifies the presenter either as a fool or as naive. Therefore, so far as the institution of science is concerned, pseudoscience does not have any place within it.

The Limits and Boundaries of present Science

Science works within a framework that sets its limits and boundaries. Present science works within certain limits and does not favour to cross its boundaries.

The limiting constants[11] in the framework of present science are (i) The constant of Einstein (the velocity of light) (ii) Planck's constant and (iii) Entropy barrier. It is difficult for an explorer to document, describe and publish in the mainstream science journal something that does not work under the umbrella of these three constants. Nothing can move faster than light is the dictum of Einstein and it sets the limit for classical mechanics and its extension in Relativity. There is always a gap between the observer and the observed and, the energy is made up of discrete quanta are the basics of quantum mechanics. This leads us to Planck's constant which sets the limits for describing the events confined to the quantum plane of nature. Cybernetics works under the umbrella of entropy barrier. Information exchange across this barrier is strictly prohibited. Einstein's constant excludes the possibility of simultaneity of events, Planck's constant excludes continuity of events, and Entropy barrier excludes the possibility of identity of events.

What are the different boundaries the present science seeks to conform with? The present science limits its question to What? Where?, When? and How? The science at its present stage does not allow persuasion of the questions like Why? and Who? The present science is not ready to acknowledge any proposition, ideas, or thinking that is teleological. It works within the framework of the Universe and is uncomfortable to perceive or conceive the existence of multiple universe(s), the Multiverse. The present science is limited by and limited to cerebral cortex only. Transcortical or supracortical phenomena are anomalies for present science. Finally the present science does not wish to 'see through' the phenomenon of Death. Beyond death nothing exist for science. However, there are phenomena now documented, which seem to transcend the space-time boundary of present framework and points towards something 'transcendental'.

Porosity of the Boundary or Transcendence!

There is an opinion against using the term 'transcendental' in science. For those who hold such view, it may be indicated that the boundary we are used to in science is porous. There are some remarkable conceptual advances and some notable observations made in the realm of science which transcend boundaries or indicate the existence of a porous boundary. We are aware that three great theories of physics have been facing three great 'problems' today. Theory of Relativity is confronted with the *problem of space-time singularities*. Quantum theory has been facing the *problem of measurement* and the Quantum-field theory suffers from the *problem of Infinities*. However, these problems indicate that the boundary of science is porous and the reality does extend beyond the

present framework. The scientists get the glimpses of something transcendental, something beyond space time, something which opens up to the infinity. Nonlocal communication dissolving the barrier of space, the dynamic aspect of the spatial nonlocality, may be called type I nonlocal communication, challenges Einstein's constant, while nonlocal communication dissolving the barrier of time, the dynamic aspect of the temporal nonlocality, may be called type II nonlocal communication, breaks loose the barrier of time and is a challenge for Planck's constant. Nonlocal communication type III, if it exists, dissolves the barrier of both space and time, transcends the realm of causal intricacies and is a challenge for entropy barrier.

We can readily mention a few more areas, which demand extension of the present framework of Science. Namely, they are the findings of the cold fusion experiment, zero point energy (ZPE), infinite dilution of water and retention of memory, over-unity devices and Unidentifiable Flying Object (UFO), which are often debunked by scientific fundamentalism. Nevertheless, these phenomena excite scientific imagination towards an extended framework of science. Other similar phenomena that take us beyond the boundary are the possible existence of magnetic monopole, magnetic current and existence of inverted space time (William Tiller)[12] domain.

The concept of existence of multiple universe(s) has been highlighted in *Conquering the Brain*[13] and *The Millennium Bridge*[14]. The idea is under exploration by cosmologists and astrophysicists. There is an opinion that at the beginning, at the time of random fluctuations, near infinite number of universe(s) were existing in potentia, in probability mode, out of which 10^{223} or more came into actualities. Those who believe in Anthropic principle add, out of these 10^{223} universe(s) at least one, i.e., ours, succeeded to acquire the essential requirements for emergence and sustenance of life. In addressing such issue, the scientists can not afford to remain confined to the universal laws only. They are to look for the laws which the universe abide by. The concept of multiple universe(s) forming a system, *The Multiversity*, remains an open-ended theory[15].

Why do we at all need a Science for Consciousness?

Following Descartes, Kant and Hegel, *Science* and *Secularity* have been recognized as two important features of Western 'Modernity'. In the context of religion and spirituality, nothing could be more secular than consciousness. On the more, science deals with knowledge that works. Knowledge that works is the source of Power. That's why for last three centuries there has been an incredible growth of science. Today science appears more powerful than philosophy, religion, or theology. By its appeal to rational intellect, by its power of taming emotion and by its ability to probe deeper knowledge, science has gained legitimacy in the various cultures of human societies. Each one of the members of the community, when confronted with a new fact, information or knowledge, therefore, asks is it scientific? The question comes in their mind spontaneously and, here lies the strength of science. This tendency to relate anything with science has been amalgamated with the culture and the society. Besides, science by its expression in a *common universal language* has the great unifying power.

A mystical view of consciousness, a spiritual doctrine on consciousness or a subjective expression on consciousness, therefore, gains *Rationality*, *Legitimacy* and *Power* when conforms to the rules of science. The science for consciousness, however, has been evolving out of several felt needs in the domain of Humanity, in the domain of Spirit and in the domain of Science itself[16].

Felt need in the sphere of science:
We have pointed out some of the areas where the scientists while doing science experience the glimpse of nature that is beyond their present framework. At the bottom line, in spite of spectacular achievements in technology and several conceptual breakthroughs, science is muddled with scientism in one hand, and unexplained heaps of anomalies on the other. Attending those anomalies is a great challenge to the scientific endeavor. In the course of exploration of anomalies/exceptions, the hidden laws of nature get exposed. Besides, for the benefit of human kind engineering vacuum, tapping the zero-point energy are necessary imperatives. There is upcoming discipline of complementary and alternative medicine which at places works better than the modern conventional medicine. Science is required to account for and explain its mechanism. It has been suggested to work under the principle of inter-convertibility of energy, field, form, information, and life[17]. The picture is expected to gain clarity once we make an effort to develop a science for consciousness.

Felt need in the sphere of Humanity:
Humanity with its elevated awareness for almost everything possible and impossible, probable and improbable feels for a scientific exposition of their religious and cultural belief system, longs for a scientific explanation of the extraordinary phenomena in nature and desires to have a scientific foundation of their spiritual evolution. They feel this is the only way they can come out of stale categories of mental organization, can look beyond the death trap and get prepared for a new leap to emerge as a new species on this planet.

The felt need of the spirit:
The felt need of the spirit to develop a science of its own is understandable when we find so many accomplished mystics, Gurus, spiritual leaders working as 'transformer' for the humanity, as if the spirit itself now wants to liberate it from the matter, as if it wants to come out of the bondage which are of its own make, as if it desires to overcome the uncertainties which are its own creation.

Therefore, the science for its own reason, the humanity for its own requirement and the spirit for its own obligation seem to be in need of a science for consciousness. Emilios Bouratinos of Ekali, Greece, has said, very rightly, "if there is need for consciousness to be investigated by a science that is finest of its kind, there equally is a need for science to be assessed by a consciousness that is the most alert possible. How consciousness treats science and society tomorrow will depend on how science and society treat consciousness today."

Why Scientists so far are not successful in developing a Science for Consciousness?
In spite of amazing progress across the conceptual horizons and also on the technological fronts, there are five important reasons[18] which can account for why the scientists are not so far successful in their endeavor in developing a Science for Consciousness. The reasons could be summarized as follows.

1. While the science remains a human enterprise most of the scientists are prisoners of their **a**rrogant, **a**damant and **a**lmighty `I', **b**esieged, **b**attered and **b**othered 'Me' and a **c**lutching, **c**linging, **c**lasping 'Mine'. Knowing this it is not difficult to explain the abundance around of scientism and scientific materialism. The `dwelling' in consciousness transforms the investigators to have an **a**ctualized 'I', **b**uoyant 'Me' and **c**ompassionate 'Mine'. American Neurologist James Austin describes this as **ABC** of the problem in his work *Zen and the Brain*[19]. The attempt to develop a Science for Consciousness demands for personal transformation of the scientists resolving the problem of *I-Me-Mine*, a triangular guard within the core of the `self' of any human being and so also of a scientist. Are we prepared for this personal transformation?

2. Science occupies the objective realm while Consciousness deals with the subjective. It is almost impossible to express some of the profound subjective (First person's perspective) experiences into objective (Third person's) perspective. To put it into Second person's perspective is not often easier either. Here one gets stuck with another triangular guard made by *They-You-Me*! Probably it represents a lower version of the causally interacting triangle of *World-Brahaman-Self* as found in *Upanishadic* non-dualism. It also reminds us of the causally interacting triangle of *Data-Theory-Control Beliefs system*[20] in any scientific process. One is expected to go through an inside-out (and outside-in) phenomenon while penetrating through this triangular guard. This is supposed to happen when one crosses the boundary of the system under investigation. Are we equipped with for taking up this severe strain?

3. The present science works within the boundary of the universe that is in turn determined by the boundary of cerebral cortex. Most of the scientists find it difficult to accept the existence of multiple universe(s). Multiple universe(s) is an open-ended theory for cosmology and astrophysics. The parallel of it in the discipline of neuroscience is the theory of *supracortical consciousness*. To have an `open brain' engaged in transcortical holographic and/or nonlocal communication without any compromise with the integrity of the brain is equivalent of dealing with multiple universe(s) in a system of the Multiversity. This no-boundary concept demands a radical revision of the framework on which the present science works. Are we ready for this?

4. As pointed out earlier, the present science has been working under the umbrella of three inviolable constants. Einstein's constant excludes simultaneity of events. Planck's constant excludes continuity of events. Entropy barrier excludes the possibility of identity of events. It seems that these three constants guard the *Cosmological Pleasure Triangle* (CPT) of the deepest recess of nature! In the domain of *nature of consciousness*, the events are quite often simultaneous, continuous and even identical. Therefore, it is likely that the nature beyond these three constants is the *Nature* of all natures, *Mother Nature.*

As fire can not be studied dissociating from its burning properties, similarly consciousness can not be explored leaving behind its nature, Mother Nature, which could also be described as the kinetic facet, mobile pole, and executive front of consciousness. Mother Nature-Consciousness may thus be visualized as a `biune' model of the Ultimate Reality. The task ahead is, therefore, to have an access into this nature of consciousness and to find out as how to `perforate' this CPT? *Ananda*, the divine ecstasy, the root of all consciousness is seemingly experienced only thereafter!

5. All of these four reasons spring from one single reason. The scientists do not wish to *see through* the phenomenon of `Death'. For them death is the end of all existence. It is the final terminus for all endeavors of mankind. All enquiries stop at the doorstep of death.

Consciousness is both transcendental and non-transcendental. 'Non-transcendental' aspect is what we ordinarily see as brain-bound consciousness. `Transcendental' consciousness is self-transparent (cf., *seeing through*). The scientists would soon realize that the stumbling block, looming large in the gaps in between, is in the understanding of `death' as a phenomenon. It is death phenomenon that is scattered as obscurities, opacities and separateness. Clarity of death phenomenon is supposed to bring transparency in the whole picture. Fortunately our brain is able to bridge this 'heaven' (transcendental) and 'earth' (non-transcendental) by realization of the passage in between i.e. the passage of 'death'. The real 'transcendental' means transcending 'death' while one is alive. The brain has *sufficient* plasticity to biologize the phenomenon of death in its entirety and it is *necessary* for the brain if it wishes to manifest transcendental consciousness.

Death has been traditionally visualized as metaphysical issue and never as an issue for science. Are the scientists ready to account for the whole spectrum of death, which includes not only near-death experience but also transcendental death experience, transformational death experience and the experience of being reborn in the same body?

Are these three Constants of present Science Maneuverable?

Planck's constant, Einstein's constant (velocity of light) and Entropy barrier guard the conventional scientists from the view of that could be stated as the deepest recess of nature, *Nature of all natures* or, *Mother Nature*.

However, if one looks at the originators of these constant, may be Einstein or Planck, - they are amazingly philosophic! The originator's mind/consciousness have been working from a plane that is beyond these constants. What does it mean? It means human consciousness naturally transcends these constants which are so valuable for the mechanistic worldview the same human being proposes. Therefore, when one has resolved to develop a science for consciousness, this very fact is to be taken into account. To put it in another way, unless science transcends the boundary created by the scientist there is little scope for the progress of science. In the present context it is to develop a Science for Consciousness.

Further, 'nonlocality' which has been accepted in Physics as an issue, throws unambiguous challenge for these constants. Einstein's constant excludes simultaneity of events. Nonlocal communication type I remains a challenge for this framework of looking at the mechanics of nature. Planck's constant excludes continuity of events and it is uncomfortable with Nonlocal communication type II. Finally, Nonlocal communication type III questions the inviolability of the entropy barrier.

It brings us to a very important philosophical question. Do we reach God (here consciousness) through 'gaps' in the rules of nature or through the rules of nature? It reminds me of Bertrand Russell's famous witticism that, "Sir Arthur Eddington deduces religion from the fact that atoms do not obey the laws of mathematics. Sir James Jeans deduces it from the fact that they do."

I like to respond to it as under. During *Ascent*, 'gaps' are the ways to God. During *Descent*, God usually communicates through the rules and the constants. Here lies the importance of these honorable constants. These constants are to be looked from a different perspective should we wish to develop a science for consciousness.

I do not think that these constants can ever be 'ignored'. These 'constants' may be regarded as the 'guards' of the king. Their duty is to keep the king free from the mundane worldly affairs. One can reach the king only through the gaps between the guards. The king himself often may ask the guards to allow you to go in. Remember that the guards are the guards of the king. Therefore you cannot 'bribe' them. You can not take advantage of their sleepy state because they never sleep. You can please them by your behavior when they themselves may be interested to let you in and may try to have an ear of the king for you. There is also possibility when the king himself creates a 'situation' that all his guards fall asleep and the desired `devotee' enters the palace with an absolute ease. This story may probably explain the mechanics of *Ascent* in relation to these constants. In the course of *Descent*, the king usually sends his message through his messenger, through his organization, through his network those by themselves are considered amazing personality, beautiful organization and charming network! However, as the king enjoys absolute freedom, he can also quietly send a messenger to you to give you the relevant message. In my works, *Conquering the Brain*[21] and *The Millennium Bridge*[22], I refer those as phenomenal hands of Mother Nature. There is one more exceptional situation. There are some persons who are considered King's own persons, those who can go in and come out at any time even inside the king's bedroom. In the context of mythology, the king's person is *Narad*. *Rad* in Sanskrit means `stop'. No body and none can stop him and that is why he is *Narada*. In the context of cosmology and particle physics those could be 'Neutrinos'. Even eight kilometers deep within the earth where experiments on bombardment of Proton are carried out, the scientists can get rid of all particles but neutrinos. These innocuous, neutral and omnipresent particles are of two kinds; left-handed and right-handed. The former can alter the 'weak force' of nature (R. D. Klauber[23]) and then through Electro-Weak interaction may probably influence the electromagnetic waves. Then the world network vibrates with the king's message.

III
Established schools of Philosophy dealing with Science for Consciousness

"For every psychological term in English, there are four in Greek and forty in Sanskrit."
- A. K. Coomaraswamy

From the time immemorial, human beings have struggled to describe the relationship between matter and consciousness, insentient and the sentient, objective and the subjective. The formulation of this relationship has been variously structured as Dualism, Monism, Idealism, Realism etc. In this section, we would prefer to choose only those schools of Philosophy, which have direct bearing on developing a Science for Consciousness.

First, we would briefly discuss the contribution and limitation of traditional approaches. This will be followed by highlighting three schools of philosophy having western roots which could be of some help in developing a Science for Consciousness. Discussing their inadequacy, we would explore from the rich spiritual heritage of India three Indian Schools of Philosophy which have concentrated on `self'/soul-consciousness-world relationship. At the end, we would also consider an important physicalist's view on Science for Consciousness.

Contribution and Limitation of the Traditional Approach

We are familiar with Dualism. From India, Madhvacharya (1238-1317) was the most profound advocate of dualistic philosophy in *Bhakti-Vedanta*. It is the refined and directed emotion, the devotion, which is considered as the vehicle of communication between the two, the soul and the God, *Jivatman* and *Paramatman*, Brain-bound consciousness and Brain-independent consciousness. However, in the West it was made emotionless substance-dualism, made famous by Rene Descartes, which has reigned over the civilization in general and science in particular for more than 300 years. When matter and consciousness are two distinct entities, the most important difficulty in this dualistic approach is how to account for the interaction of two kinds of substance? Similarly, with the 'idea' that consciousness is the ground of everything (Idealistic Monism), one cannot get along easily with any of the processes in nature, except probably that consciousness collapses probabilities into actualities by recognition and choice. In addition, the idealism is unable to overcome the Godelian constrain imposed in its deductive reasoning. Materialistic monism faces its difficulty when confronted with the issue of emergence, how sentience can emerge from otherwise wholly insentient matter? Double aspect theory of Spinoza, where consciousness and matter are two aspects of one entity also discounts the important process of evolution. The Realism pronounces the existence of a Reality that is independent of our observation or any effort in explaining or measuring it. Realism, however, is an important precondition for a theorist to formulate his theory. The process philosophy (of Alfred N. Whitehead[24]) emphasizes on the existence of the 'process' in the relationship between 'matter' and `consciousness', which brings credential for consideration of this philosophy in the process of 'sciencing' of consciousness.

Three Philosophies having Western roots in addressing Consciousness

Three philosophical schools with Western roots, which attempt to bridge Science and Consciousness are (i) Systems Holism (Jan Smuts), (ii) Perennial Philosophy (Aldous Huxley) and (iii) the philosophy of Goethean Science (named after German scientist and poet Johann W. von Goethe, 1749-1832). Systems theory is based on holography - the whole is represented in every fragment, part, or point of the system. Transcendental essence is hierarchically immanent - is the dictum of Perennial Philosophy. Instead of reducing pluralism to a commonality, the Goethean science prefers to derive multiplicity from a preexisting reality and Goethean phenomenology advocates an inside-out and outside-in phenomenon in the process of describing reality. All three schools are relevant in developing a science for consciousness, although each has its respective limitation. Systems Holism is limited by its `boundary' problem, also called the problem of `vertical depth'. The `transcendental' element of Perennial Philosophy poses the problem of subjectivity in science. Inside-out and outside-in phenomenon of Goethean science is still to account for death phenomenon. All three schools are seen alien to `me' and `I'. None of these three philosophies addresses the issue of `self'.

The spiritual heritage of India in addressing this issue

India has more than five thousand years of heritage in addressing this profound issue. *Samkhya* philosophy of the sage Kapil is common to Buddhist, Jain and Hindu spirituality. It is based on dualistic philosophy of *Purusha* and *Prakriti* (Consciousness and Nature respectively) and has its own version of twentyfour categories that make up the universe of mind and matter. *Anekantavada* of Jainism, universal compassion and total commitment to the process of enlightenment of Buddhism, *Nyaya-Vaisesika* of Gotama (and Vacaspati Mishra in modern age), *Prajnaparamita* of Nagarjuna and *Advaita Shavism* of Kashmir offer tools of proven excellency to address various issues in this field. Finally, comes the oldest *Vedantic* and Upanisadic epistemology that says, **'to know, one must be'.**

Science-friendly philosophy from India
Non-Dualism, *Advaita-saivism* and the *Akhanda* Philosophy

Three schools of philosophy from India are not merely useful but those are also science-friendly. The present science and the three schools of philosophy with Western roots have to reconcile with these three eventually if they wish to establish an equation between scientific rationale and spiritual abstraction. These are the philosophy of *Non-dualism*, *Advaita-saivism* and the *Akhanda* philosophy. We would discuss *Non-dualism* and the *Akhanda* philosophy below. The third one, *Advaita-saivism*, originated in Kashmir, India, would be mentioned in the text as and when the proper context is built up.

Non-Dualism

Non-dualism makes a beginning with the `self' but makes a refreshing departure from all other philosophies concerned with 'self' (particularly the 'self' of self-organizing system and the `self' of Dualism) by stating that the 'self' is nothing but an indivisible spark of unconditional consciousness. The division or illusion is in the existence of mind. Mind is the cause of dualism. It is mind which cuts consciousness into two. Once mind vanishes (*Monolay. Mononash*), there is consciousness only. *'Aham Brahamasmi'*. `I am He'. `*Ana-*

ul-Haq'. Five different schools of Nondualism offer various expositions on Self (soul)-Brahman-World relationship. These five recognized schools of Advaita philosophy are *Dvaita-advaita* (Sri Nimbarka), *Achinta-Bhedabhed Advaita* (Sri Krishna Chaitanya), *Shuddadvaita* (Sri Vallabhacharya), *Visistadvaita* (Sri Ramanuja), and *Kevaladvaita* (Sri Shankaracharya). Of these five schools, four are anthropomorphic meaning, all four hold respective personal gods as *Brahaman*. Only one, that is *Kebaladvaita* of Sri Shankaracharya, expounds on nonanthromorphic non-dualism.

One assumption which is prevalent in non-dualistic tradition is that once one has left the base-camp of dualism or high above camps of various anthromorphic non-dualisms and has managed to mount the highest peak of the Absolute, it is never possible to come back or dismount again. This assumption, however, underestimates plasticity, potential, and evolving capacity of the human brain. If it were not possible to dismount from the non-anthromorphic non-dualism, then how does one explain Acharya Shankar himself performing idol worship, of course in a different context? In the recent past, we have observed this `two way' getting personified in Sri Ramakrishna Paramahansa and in Akhandamandaleshwar Sri Sri Swami Swarupananda Paramahansa Dev.

The Akhanda Philosophy

The Akhanda state of the brain works without this assumption of irreversibility of the pathway from dualism to non-dualism and from anthromorphic non-dualism to non-anthromorphic non-dualism. It seems possible that the path from dualism to non-dualism and from anthromorphic non-dualism to non-anthromorphic non-dualism is an `one way' to mount! However, there are ways to dismount again and it is possible to remount the peak whenever it is demanded.

In this sense, the Akhanda State of the Being indicates a much more mature and flexible state of the brain. It could be made possible through evolutionary progress of the brain. It becomes possible when the human brain has tasted the experience of every individual position and has acquired the ability of having freedom from any territorial imprisonment without loosing the capacity to enjoy the richness of every territory and always understanding the proper context. This positioning of the brain is unique to the Akhanda Philosophy.

The Akhanda philosophy accepts an individual indivisible from the Whole. It deals with the divisions of the Indivisible (*A-khanda* = in-divisible) with deft and dexterity. The divisions of the Indivisible are different from the parts of the 'whole' of systems holism. The 'whole' of systems holism excludes anything which could be transcendental while the 'Indivisible' of the Akhanda Philosophy holds Consciousness-Mother Nature as irreducible constant. All other constants in nature work under them. The strength of the Akhanda Philosophy lies in its acknowledging the existence of multiple universe, - the Multiverse. This worldview accepts pluralism at the highest intellectually comprehensible level. Multiple Universe(s) form a system, *the Multiversity* (cf., Systems Holism). It is comparable to Many-world/Parallel universe theory in Astrophysics.

The Akhanda is the *First-Person-Universal* swimming comfortably in the Interuniversal Essence. The potential of an individual can, therefore, according to Akhanda Philosophy, eventually unfold to the hierarchical level of a universe. In this process, in the course of transcension (cf., Perennial philosophy) of the boundary of the universe there lies an experience of an inside-out and outside-in phenomenon (cf., Goethean Science) when one's nature *becomes* Mother Nature and the Being is realized as the personification of consciousness. The Akhanda remains continuously within a process (cf. the Process philosophy of Whitehead). He is even seen to swim comfortably in the Interuniversal Essence while experiencing an unfolding of the nested hierarchy of Being (Sri Aurobindo). The Akhanda philosophy is thus a neo-Vedantin (may also be called post-Vedantic and neo-modern) philosophy. In one hand it takes care of five different forms of non-dualism and on the other hand it reconciles Systems Holism, Perennial Philosophy and Goethean Science. The conceptual assimilation of the Multiversity dissolves the uniqueness of the universe we inhabit almost the same way Copernican Revolution demolished the unique position of the Earth in the cosmos. In astronomical scale, the Akhanda World view is therefore the highest and biggest comprehensible view, the human kind has ever made.

In conclsion, I wish to state that for a self-transparent multi-dimensional model of consciousness there is nothing what could be called orthodox or non-orthodox. It depends on one's framework of reference and bandwidth of vision which, in turn, depends on (i) the position the brain takes in a particular depth of nature, (ii) how much `death' it has conquered, (iii) how close (proximity, contact area) it is to that absolute transparency! If the instrument is not perfect and is of not choice of *consciousness*, the expression is unlikely to reflect the Truth.

The Parallels between *Vedantic* aphorism and Quantum realism

There are numerous parallels between Quantum Realism and *Vedantic/Upanishadic* Aphorism. Where all do lead us? Fritjof Capra brought the first of its kind to the notice of people interested in it. However, almost all quantum doyens familiar with Upanishads, have expressed about the existence of these parallels not in their scientific papers but in their philosophical writings. Recently, Swami Jitatmananda[25], a senior monk of Ramkrishna order and the President, Ramkrishna Ashrama, Rajkot, has brought out these parallels extremely well. Science has been telling what Vedanta has already declared. Whatever may be one's approach the ultimate truth would be One.

What is next? Would we stop now? Has the goal been reached? Probably not! To prove or justify that *Vedantic* philosophy is of the 'highest' order could not be our final goal! Non-anthromorphic non-dualism of *Vedanta* does occupy the highest platform of human knowledge and knowable Truth. It is absolutely the 'highest'. Not even a shred of doubt is there. It exemplifies Indian glory, pride, and joy. That the physical science independently has reached this stage to draw such conclusion or confirm the *Vedantic* aphorism is a matter of incredible accomplishment for the science too. However, should *Vedantic* philosophy stand at the highest platform, the question that knocks at the door is as follows. Does it have the capability of transforming present science? Could it initiate creative emergence in scientific endeavor? Could it throw light where the scientists are

still groping in the dark? Swami Vivekananda, about a century back, has offered us an emphatic `yes' in this context. To go into this matter we require introspection by both scientists and spiritualists!

An important Physicalists' View
Multi-Revolutions View on Mind-Body Problem

In the October, 2001 issue of *Journal of Consciousness Studies*, Robert Van Gulick[26] describes 25 options for addressing Mind-Matter problems from physicalist's point of view. There are ten versions of Reductions and ten versions of Emergence. The rest five have been grouped under 'Others'. In this group of 'others' the last one is Multi-Revolutions view, held by Roger Penrose, Colin McGinn and Michael Lockwood. Van Gulick articulates their view as follows.

"the persistently mysterious nature of the psycho-physical gap gives good reason to believe that we need new ways of conceptualizing and understanding both the nature of the mental and the nature of the physical. Our inability to solve the puzzle of their link …results from the inadequacy of both sides of the equations. McGinn, for example, claims that expanding the link would require both a better understanding of what he calls the hidden nature of consciousness (1991) and a radically different conception of physical space (1995). …….Lockwood (1989) finds the concept of matter itself deeply problematic and argues for what might be regarded as a dual aspect view in which matter and mind are closely integrated at the fundamental level. ……..Penrose finds existing attempts to explain consciousness in terms of physical or algorithmic processes doomed to failure for reasons concerned with mathematical limits of formal system; he is equally dissatisfied with the present attempts to integrate our physical theories of the very small and the very large at the interface of quantum mechanics and general relativity. He optimistically hopes for a joint revolution that would address and resolve both puzzles."

The issue, they have raised, has already been addressed in *The Millennium Bridge*[27] where, the whole spectrum of nature has been divided into five planes. This has been discussed at the end of Part IV and in Part VI of this presentation.

IV

(Major portion of Part IV has been developed from a lecture delivered at Jawaharlal Nehru University, New Delhi, and from an informal presentation in Indian Council of Philosophical Research, New Delhi, in December, 2001 on the topic *Science for Consciousness*)

The Science for Consciousness. Nine different viewpoints

We all know the story of the blind men and the elephant.
No body is wrong but offers a grotesque and an incomplete description of the reality

With this background knowledge of Limits of Science and the problems in Philosophy if one happens to meet people belonging to different disciplines that are known to seek knowledge on consciousness, one comes across different viewpoints on developing the science for consciousness. Consciousness is understood ordinarily as *an awareness of surrounding, awareness of `self' and awareness of one's own thoughts and feelings*. It is

a consensus view from the meanings given in various English dictionaries. However, in the context of developing a Science for Consciousness, the whole gamut of culture, religion, background education and scientific grooming, folk-belief, mystical experiences and `visions' all appear as cloud in the sky. We will discuss nine such viewpoints of which seven views have been stated earlier elsewhere [28].

Transcendental spiritualist's view:
Most of the transcendentalists hold the view that consciousness is ever-transcendental and would always remains so. It is inscrutable, non-negotiable, and unexplorable. Therefore it is futile for the scientists even to make an attempt to develop a science for consciousness. Transcendental entity can never be brought down to non-transcendental level.

The view has some similarities with that of mystery-mongers. Consciousness is ever mysterious and therefore it would be a failure from the very start to develop a science for consciousness. The approach is called Fortean approach.

Some transcendentalists often exhibit an anti-scientific attitude when they emphasize that consciousness holds the secret of the universe. It is not explainable by rules of science at present. However, science one day may find some explanation for it. Even if the science does not find it, it does not matter and we need not be bothered about it. It is this last statement which makes the attitude anti-scientific.

Orthodox Scientist's View:
Orthodox scientist who works on experiment-observation-inference principle, on the other hand, is of the view that science investigates nature, not consciousness. Therefore, consciousness does not come under purview of science. Consciousness is the domain of philosophers, mystics, or the spiritualists. The approach is that of *denial*, not even acknowledging an existence which can be investigated.

Look at another aspect of it. In the *Macmillan Dictionary of Psychology*[29] the concluding remarks of the entry under `consciousness' is, "Nothing worth reading has been written on it" (1989).

Mystic's view:
The mystics rely on their direct experience that is not mediated by any known means. They claim that science for consciousness already exists. The science for consciousness could be found in most ancient religious scripture of Hindus, i.e. in the *Vedanta* or in *Upanishad*. It can also be found in mystical tradition of Sufi, Buddhism, Judaism, and Christianity. The real problem faced by the present seekers is a language problem. The science for consciousness has been documented in a language different from that of modern science. Once someone, a philologist, or an etymologist explores the metaphysical meaning embedded in the mythological/spiritual symbols, appropriate research hypothesis will not be difficult to formulate. However, to understand that language, personal readiness/preparedness of the scientist is mandatory. Science for Consciousness could be explored by only those who `dwell' in consciousness. The

epistemology here is not merely 'participatory'. It is 'dwelling in'. It necessitates personal transformation of the scientists. Academic qualifications or university degrees are irrelevant here. Having experienced this transformation at least to some extent, the scientist may get the glimpse of five principles in the mystical science of consciousness.

(i) *There is a Reality*, which exists beyond material/sensory world, which is *a-priori* as well as *immanent*, which is not within the reach of ordinary human brain.
(ii) *This Reality is approachable by any one of us.* The journey begins with a '*discontinuity*'. One enters the terrain of elementary phenomena *alone* and only *alone*. One distinguishes 'self' from its conditioned properties (ego, etc.). In the course of the journey, the *'self' is stripped of elementary phenomena*. One experiences complete *death* experience which includes near-death experience, transcendental death experience and transformational death experience. The worldly journey ends with a '*surrender*' to that Reality.
(iii) *That Reality also approaches each one of us through the Grace Phenomenon*. Most of the time it is mediated through a *teacher*. It can happen independent of a teacher, when one's brain is elevated to the *State of Grace*.
(iv) *The experience of that Reality comes as* Direct, Unmediated, Unmitigated (cf., Nonlocal communication in the language of science).
(v) *It is possible to have a unitary experience with that Reality.* This consummation is called *Supreme Consummation* that marks the beginning of a new life. One feels *reborn* in the same body with a new assignment. One starts *dwelling* in that Reality. There is *Choice, Freedom, Ease, Ananda and New Creation*. The experienced one becomes an *Akhanda* - an individual indivisible from the Whole.
The science for consciousness, according to the accomplished mystics revolves around the science of 'self'. If the scientist, therefore, can find out the relationship between this 'self' and the Brain, (cf.: Eccles and Popper's highly esteemed work, *The Self and its Brain*[30]), then a bridge could be built up between the neuroscience and the science for consciousness.

Pantheist's view:
Consciousness has a transcendental and an immanent aspect. The transcendentalist stresses only on the transcendental aspect of it while pantheists lay stress on the latter. "Brahman is the only real. World is unreal. Brahman is the world", said Raman Maharshi. From this paradoxical expression, the transcendentalist picks up the first sentence and the pantheist stresses on the last. According to this view consciousness is everywhere. Consciousness is everything. Where then is a need for the scientist to build up a science for consciousness? In the ocean where does one build the bridge? Or, what does one connect, from where to what? While the transcendentalist collapses the hierarchy on the higher (deeper) side, the pantheists collapse it on the lower side.

Skeptic's view:
Skeptic's approach is neither Fortean nor denial. In response to a new claim, the skeptic first expresses his ignorance, subsequently starts genuine doubting (doubting is not denial) and finally, emphasizes on further enquiry, investigation and exploration.

In spite of being shown evidence after evidence there remains a group of skeptics who prefer to remain ever skeptical. They may be labeled as 'pseudoskeptic' in the words of Marcello Truzzi[31], or `pathological skeptic' in the words of Ed Storms, or `organized skeptic' in the words of L. David Leiter. David Leiter in *Journal of Scientific exploration*[32], hypothesizes on the origin of this organized skepticism to be some kind of wound at the deeper level of psyche inflicted during their formative phase of life.

Skepticism, however, has a legitimate place in science particularly when it is combined with open-mindedness. It helps add the most essential component, the 'rigor', in science. Here we would consider such true skeptic's view.

Can Consciousness be researched? A million-dollar question! An entity that is *a-priori*, could at best be found, reached out or merged into. Worst, it could be missed. When we miss it, does it prevent the scientists in painting a complete worldview? If we do not recognize it, does it affect our fulfillment as human being?

Once we accept consciousness as all pervading, then we are all within it. Being within it, how can we do research on it? It is a subjective experience and is therefore better left to be explored by the mystics. Science deals with which are objective. It describes things or phenomena in third person's perspective in a measurable or quantifiable way. "What can not be measured is not scientific," said Galileo and that were the beginning of a positivistic science. "Science is measurement and measurement is science," repeated Marie Curie. Positivistic science got further consolidated. With positivism in the core, the precision limit of present scientific instrument for resolution of space today is 10^{-15} cm. Maximum temporal resolution is expressed as thousandth of a millisecond. However, if Consciousness is trans-temporal and trans-spatial then does it not stand far beyond the scope of science in its present form? One may take help of reasoning or logic while trying to bridge the gaps. However, have we not heard from the accomplished mystics that the reasoning stops at some stage of their exploration of consciousness and a terrain of silence is sandwiched between the domain of reason and the domain of consciousness? From both mystical and scientific point of view, therefore, consciousness can not be brought down to third person's perspective that is measurable and objective.

If so, what the consciousness research is all about? The question like what is consciousness appears to be fruitless to pursue in science. On the other hand, the skeptic suggests, if one re-frames the research question on consciousness it may become possible to address the issue in a different way. For example, does consciousness have a mechanics? Does it work? Is it anyway causally related to events or phenomena we observe in day to day practice? If it is independent of events or phenomena, how can it have influence on them? The questions like these seem amenable to science.

Consciousness in Social scientist's perspective:

There can be no development of individual's consciousness ignoring the social context of it. One can see this in Freud's 'unconscious' directing behavior of an individual towards his/her family/societal partner/colleague. Also this can be seen in Carl Jung's 'collective

unconscious' as the fountain of social inspiration and in possibility of world revolution hidden within the unsatisfied consciousness of the proletariat of Carl Max.

Deep ecology and Depth psychology are intimately connected. We are loved and we too love. We are conditioned and groomed by the society for a conditioned existence (e.g. as doctor, a philosopher, a scientist or a businessman) which is the basis of our 'ego' and for which we too are cautious about other's existence. We also live with a desire to perpetuate our ideals, values, tradition through our followers, disciples, students or genetic descendents, a manifestation of the basic instinct 'sex'. We are moved or perturbed by the birth or death of another member of our family or society. We too, as individual, when fallen in this life and death situation may look at it as most precarious. May the situation act as a turning point in our behavioral response!

Therefore, if one distills from the pluralistic transnational ocean of culture, five sparkling pearls that come out are Love, Sex, Ego, Life and Death. These are the five 'elements' of subjectivity, five private facets of 'self' and also are constituents of elementary phenomenology (in contrast to the surface phenomenology of classical and quantum worlds or the depth phenomenology in the realm of mind, soul, consciousness). Phenomenological integration in the brain integrates the phenomenal experience of these five. Depth psychology and deep ecology could be seen converging on this 'Five in one'. The early stage of *Tantra sadhana* is practically aimed at reaching this point of social, cultural and civilizational distillate. The journey to the deeper plane of consciousness begins thereafter.

Consciousness in Natural scientist's perspective:
If it were not consciousness a part and parcel of nature how a nature, which sculpts actualities from plentitude of possibilities, could be so parsimonious, Hamiltonian, total action-conservationist and is able to demonstrate a spectrum of degrees of freedom/constraint in spite of being totally mutable! According to natural scientists, consciousness is a part and parcel of nature, intimately residing within it, as well as hiding in the deepest recess of nature. (cf. the immanent and transcendental properties of consciousness in perennial philosopher's view). Deepest recess of nature, according to them, could be found beyond computationlism where a living organism makes choice that often does not depend on algorithmic prespecification. Godel's Theorem appears as a `death blow' to the formal system and formal logic and the naturalist started looking for source of life beyond Godelitis. Consciousness, therefore, according to natural scientists, could be explored in every plane or terrain of nature. Consciousness, thus defined, is brain-independent, independent of our brain-trapped consciousness. Nevertheless, the two are never mutually exclusive.

Life Scientist and Evolutionary Scientist's view:
A conscious unicellular organism probes its environment by movement. In multicellular organism `receptors' are left on the surface of the organism to sense and probe the environment. Neurons appeared sometime around 700 million years ago in a biological organism, and a rudimentary `brain' much later. And, why to talk about animal kingdom! Scientist J. C. Bose[33] from India first documented evidence that plants are also conscious.

Recently it has been shown by various experimental studies (for example on desert shrub *Ambrosia dumosa*[34] that the roots of a plant can recognize the roots of its fellow competing for nutrients in the same source of environment (a kind of `self' non-self distinction!). Many persons involved deeply in agriculture, not necessarily a scientist, believe that it is possible to communicate with plants to keep them healthy and make them more productive. Life and evolutionary scientists, therefore, think at the very basic level that investigation of life and evolution are well within the purview of science. If we know the rules governing the emergence of life and the rules for the process of evolution, we are near to the causal mode of consciousness. Even our emotional response, according to them, is a result of evolutionary programme within. The advanced thinkers in the line of evolutionary biology look at the human being as a 'transitional being', who embodies one of the numerous phases of evolving consciousness on this planet. Millions of years have passed to evolve into this phase from a mass of protoplasm. The process is likely to culminate by making the human being as an embodiment of a higher consciousness. Emergence of a new species is on the nature's card. One finds, in this process, not only a Great Network of Being (Alfred North Whitehead[35]) but also a mechanism for unfolding of a Nested hierarchy of Being (Sri Aurobindo). Evolution is, therefore, a play of consciousness and if the scientists explore the principles and mechanics of evolution and emergence of life, they get clues how does consciousness work.

Consciousness scientist's Perspective:
We would elaborate on this point a little further.

The Essential Background
Consciousness scientists are those who come form the background of a rich *scientific culture* (high `Intelligence Quotient', IQ). They are aware of the recent developments in neuroscience, cognitive science, quantum physics, vacuum physics, particle physics, astrophysics, information technology, nonlocal communication, and the science of life and evolution. They know the `limits' of present science and the problems in different schools of philosophy. They are expected not merely to be interested in but also to be emotionally *involved* (high `Emotional Quotient', EQ) in exploration of consciousness. Moreover, the most important, they should have direct experiences of consciousness, which are rich and profound. This helps their personality to acquire one-pointedness (high `Consciousness Quotient', CQ) and integrity (high `Spiritual Quotient', SQ) over their already high `Emotional Quotient' (EQ) and `Intelligence Quotient' (IQ).

From this background it seems logical for them to consider that consciousness has a mechanics (causal mode) which could be connected with the causal modes in quantum and classical worlds.

Qualifications desirable for becoming a Consciousness Scientist
It would be certainly better if he knows a little bit of philology and etymology so that he can translate the myth, metaphor and symbol of different cultures into the language of science. As familiarity with Internet surfing for review of recent literature helps him to remain thorough in modern knowledge, so knowing Sanskrit would be an additional advantage for him to dig into the world's most ancient wisdom documented in *Upanishads*.

Look at how and why the present science occupies a supreme worldly position in the context of knowledge? It is because of the hard work of some open-minded scientists who are sensitive and intellectually honest, who have made their conclusion based on evidence and who do have deep reverence for nature (manifested as humility, awe, and wonderment). While the same scientists engage themselves in exploration of the deeper terrain of nature related to consciousness, two additional qualifications appear mandatory. These are

(i) A readiness for personal transformation

(ii) A reverence for value system in Nature's mechanics.

For, in a science for consciousness, a balance is necessarily to be struck between capabilities of Science and the values and ethics, for the entire humanity.

Finally, last but not the least, his sufficient acquaintance with the modern research methodology, clinical epidemiology, with special reference to research on `quality' makes him fully armed to join the adventure in consciousness.

Characteristics of a Consciousness Scientist

A consciousness scientist having direct experience of consciousness works at two levels. The first level includes intuition, illumination, and revelation that result in discovery and invention. At the second level, the intellectual level, he gets engaged in empirical validation of the intuitive/revealed truth. The capacity to integrate these two levels characterizes a consciousness scientist. He understands the connection that overarches Myth, Metaphysics and Science[36]. Besides, a consciousness-scientist by nature would be a *creative scientist*. Whether he is a theorist or an experimentalist does not matter! A creative scientist is he who dissects, breaks, deconstructs, synthesizes and rebuilds. He creates new research hypothesis, puts the existing facts in a new context, digs out new meaning of available information, designs new experiment and innovates new technology, uses available resources for a new purpose. He is, therefore, not only an inventor, buts also a challenger, an entrepreneur. When confronted with infinite complexity that is too difficult to comprehend he applies his masterstroke, the *simplification*, to simplify the matter again. There is always a refreshing newness in his presentation. However, as a creative scientist he suffers from several discontinuities. For him, Thomas Kuhn's[37] cautioning note is very appropriate. "Like artist, creative scientists must be able to tolerate crisis and occasionally be able to live in a world out of joint." He is also aware of Bernard Barber[38], who pointed out that contrary facts or ideas are routinely and inevitably resisted at first by scientific community.

Consciousness scientist's view

The first question a consciousness scientist is confronted with whether this science for consciousness would develop from a new position or would be an extension of present science. Here, he agrees with what Werner Heisenberg once said. "For Christopher Columbus, it must have been the most difficult decision to leave all known land and sail so far west that the storage on board would not allow him to return. In a similar way, completely new land in science can not be discovered unless one is prepared to leave at a certain point the foundation on which traditional science is based and try to jump into emptiness."

Therefore, the Science for consciousness is likely to develop from its own position and would extend into related disciplines of science to enrich them. Every discipline of science works under umbrella of a specific constant (mentioned earlier). In the science for consciousness, consciousness is the only constant and all other honorable previously identified constants are considered landmarks in hierarchy of nature.

The consciousness-scientist takes a pragmatic note of all views expressed above and exhibits a multi-prong composite approach. He takes the cue from the skeptic and formulates a research hypothesis that consciousness has a causal aspect, mobile facet, kinetic pole, executive front to participate in its mechanics. And, this aspect, this facet, this kinetic pole and executive front of consciousness may have connections with the lesser depths of nature. The scientists explore *nature*, not consciousness. While consciousness may be nonnegotiable, inscrutable, unexplorable, its kinetic pole may not be so! If we can extend the spectrum of nature from physical nature to nature of consciousness, then there is no problem for science to explore this nature of consciousness under purview of science. Nature of consciousness may be called the Nature of all natures or *Mother Nature*. Consciousness-Mother Nature forms a 'biune' model of the **Ultimate Realty** (cf: *Parama Shiva* of *Advaita Shaivism* of Kashmir).

Science falls silent when confronted with phenomenon of death. Death is one of the phenomena in the elementary terrain of nature. This terrain of elementary nature and the plane of Mother Nature are the pieces missing from the whole jigsaw puzzle. Consciousness and Nature form a spectrum that for understanding can be divided into five planes[39]. This division is based on the presence or absence of perceived uncertainty in an observer-dependent reality and then on the levels/kind of uncertainty (see Part V). Every plane is independent of others but is also connected with each other. Connections are used at the time of necessity. The causal mode or the mechanics of every plane is run by a specific currency. The inter-convertibility of currency across these five planes is one of the key research frontiers in exploration of nature. This five-plane scheme of nature and consciousness (Pentaune model) fulfils the demand raised by Multi-revolutions theory of Penrose McGinn and Lockhood. How? This scheme extends the plane of matter from the quantum world to the terrain of elementary phenomena and scales the plane of Mother Nature out of Consciousness. The plane of Mother Nature and the terrain of elementary phenomena connect the plane of consciousness with the world of quantum.

Consciousness scientist does not work with the assumption that consciousness is skull bound or brain bound. Unification of brain-bound consciousness and brain-independent consciousness through self-consciousness remains the goal of his research. The hard core scientists, the physicists in particular, who first identified this 'consciousness' as an influencing factor in their observation of behavior of quantum particles, however, have been allured by the brain-dependent consciousness. However, to a consciousness scientist, consciousness is a ground reality and can also be brain-independent. Our working consciousness is brain-bound, - a kind of consciousness imprisoned in the 'case' of the brain, a kind of consciousness entangled by the shackles of the brain, a kind of consciousness which can work only using the mechanics of the brain. However, there exists consciousness that is 'free' and totally independent of our brain. This consciousness

can be explored quite independent of recording what happens in the brain. In other words, consciousness can be explored totally independent of Neuroscience. This brain-independent consciousness could be explored by exploring different planes of nature as mentioned above. On the other hand, the brain-bound consciousness and the brain-independent consciousness can be connected (initially mystically) by self-consciousness, the awareness of 'self'. Increasing awareness of the existence of brain-independent consciousness by the members of the humanity is an indicator of the beginning of the era of *supracortical consciousness*. Like *The Multiversity*, Supracortical consciousness is also an open-ended theory[40].

The present human brain is a `crowning achievement of the process of evolution', says Stephen J. Gould. However, to a consciousness scientist, the process appears to be in its infancy and is far from complete. The process in all likelihood would continue to evolve till the brain, the most complex conglomerate of matters in the entire universe, becomes comfortable with consciousness inside and outside it.

Finally, a consciousness-scientist does not confuse epistemology for ontology. Consciousness, ontologically placed, is inscrutable and non-negotiable. Consciousness, epistemologically seen, has a mechanics that possibly could be connected with the quantum and classical mechanics. Consciousness along with Mother Nature (Planes V and IV) is responsible for *depth phenomenology* of will, intention, 'self', 'soul', purpose etc. This depth phenomenology of Consciousness-Mother Nature commands over the *surface phenomenology* of classical and quantum worlds Nature (Planes I and II) through the mechanics of *elementary phenomenology* (Plane III, which deals with life and death situation). For a consciousness scientist, the values are adored as the rules of the game of Nature and Consciousness. To go from one plane of nature to another these rules are to be learnt and practiced with a sportsman's spirit and without any fault. The clarity of knowledge about *ontology* of consciousness, *epistemology* of consciousness, *phenomenology* of consciousness and *axiology* of consciousness offers him a unique ability to swim comfortably in the ocean of consciousness.

Planes of Nature, Yoga and Naturopathy

Recently there is a lot of activities world over on yoga research with an objective to reconfirm the ancient wisdom through modern research methodology. The research in yoga may be visualized as exploration *of* consciousness *by* consciousness *for* consciousness. The passage is spread over the entire spectrum of nature. That is perhaps the reason, yoga and naturopathy have been put under one central council by Government of India (Central Council for Research on Yoga and Naturopathy in New Delhi). Should we visualize nature as having a stratified and nested hierarchy and yoga as the process of journey of `self' and its brain through all its five planes, it becomes easier to understand yoga and to do research on it. Similarly, when one understands the mechanics of nature in her different planes, the respective currency through which these mechanics are run and finally the probable mechanism of inter-convertibility of different currencies, it becomes easier for the researcher to formulate his research hypothesis. It may be for validation of the effect of nature-therapy or to postulate its mechanism. For example, the research hypothesis could be related to plane I of nature with the action of a plant alkaloid or

hormone. It may relate plane II of nature and the effect of retained memory following infinite dilution. It could as well relate the plane III of nature and the mechanism of action of deep psychotherapy, or the plane four of nature and the science in `*pranic*' healing, `mantra' therapy and transplantation of soul.

A connection between Philosophy of Nature and Social Philosophy

Whether this five-plane (`Pentaune' model) model of Nature and Consciousness could be of any use to understand the genesis of two menaces of human civilization namely, **Corruption** and **Terrorism**?

I guess, yes! The `Self' and its brain have the amazing capacity to travel through the entire spectrum of nature and consciousness. An evolving brain integrates the experience of the journey. However, faults do take place.

Passage from Plane I to Plane II with lack of integration or, passage from Plane II to Plane I with breakdown of integration results in Financial/Energy corruption.

Passage from Plane II to Plane III with lack of integration or, passage from Plane III to Plane II with breakdown of integration can result in System corruption.

Passage from Plane III to Plane IV with lack of integration or, passage from Plane IV to Plane III with breakdown of integration can result in Terrorism. To a Terrorist, life and death mean the same and one. It is to achieve a purpose that he thinks is right. Life and death are the events in plane III while Purpose in this model is decided in plane IV.

The model assumes that lack of integration or breakdown of integration is the cause of 'disease'/ailment/sickness. It also asserts that the Mastermind for corruption (and terror) starts at the highest level although the recruitment of working hands occurs exploiting *Intolerance, Jealousy, Greed* and the *Poverty* of common mortals.

According to the infrastructure of the brain the manifestation of the terrorism differs. It may be manifested as Political terrorism, Cultural Terrorism, and even Terrorism in the endeavor of 'sciencing' (Scientific terrorism!).

V

(Major portion of this Part V has been developed over an interactive session on *Consciousness* at the University of Allahabad, organized by National Brain Research Center, India, in October, 2000)

Characteristics of the Science for Consciousness

The outcome of exploring Consciousness is always a refreshing newness

The science for consciousness is expected to be *accommodative*. It would *resolve several paradoxes*. Finally, it would be *creative*.

It would definitely accommodate the essence of different views on science for consciousness expressed above. In the process, it would take care of orthodox science,

parascience and cryptoscience. In the science for consciousness one would come across ordinary facts in extraordinary relationship or extraordinary facts in ordinary relationship or even extraordinary facts in extraordinary relationship. It would honour epistemological pluralism. The mytho-poetic epistemology of Homeric age, the epistemology through 'all-pervading' *Logos* in the Greco-Roman cycle, theology as epistemology in the Medieval age, mechanistic epistemology of post-Galileo era, the evolutionary epistemology encouraged in the post-Darwinian age[41] and finally the 'participatory' and 'dwelling in' epistemology of present age would find their place in the science of consciousness. We would also expect to see here a reconciliation of epistemology and hermeneutics. The effort would integrate Science Humanity and the Spirit.

The developing science for consciousness is expected to resolve several paradoxes. The important ones of those are the paradox of subjectivity and objectivity and the paradox in relationship of brain-bound and brain-independent consciousness. In reconciling these two pair of paradoxes it would account for different types of existential uncertainties and even death.

The hallmarks for science of consciousness are creative emergence and new creation. New relationship in a new context for a new purpose is the fruit of pursuing a science for consciousness. It offers a new meaning to life.

How does Science for Consciousness differ from Theology?

Theology has often been confused with science since it justifies and seeks rationale for a religion. While science limits itself to description, the religion ponders on prescription and the theology engages itself in justification. Unlike in science for consciousness, most of the theologies hold one personality or a scripture as an inviolable constant. This is not challengeable. On the other hand, in science for consciousness it is otherwise. The ideas, assumptions, conclusions are all open to public scrutiny. This all happens because most of the theologies work within a boundary. Science for consciousness does not! Science for consciousness welcomes and encourages attempts for verification. Inter-subjective aggreability and organic objectivity are features of science for consciousness. The cardinal validation criterion here is reproducibility.

Difference between Theology and the Science for Consciousness

	Most of the Theologies	**Science for Consciousness**
1	One personality or a holy scripture is held as an inviolable constant	No such constant
2	Works within a boundary	Prefers to have no boundary
3	Ideas, assumptions, conclusion are almost closed to public scrutiny	Ideas, assumptions, conclusion are open to scrutiny at appropriate level of expertise
4	Most of them do not acknowledge attempts for verification	Welcomes and encourages attempts for verification

How does a Science for Consciousness differ from the Science in its present form?

Science for consciousness although is inclusive of science of matter and energy, it would be certainly different from the science of the 'rigid', 'compact', and 'dry' part of nature in the sense that it has to reconcile 'subjective' with 'objective', `experiential' with `experimental', values and aesthetics with form and structure. The process of this *sciencing* of the 'softer', 'wooly', 'wet' portion of nature, therefore, cannot remain independent of humanity and the science of `self'. Unlike science in its present form, this new science would honour epistemological pluralism and is likely to strike a balance between epistemology and hermeneutics. In contrast to present science, ontological primacy and ontological relationship of various issues occupy most important position in science for consciousness. Reproducibility, although, remains the cornerstone for both forms of science, shared subjectivity, inter-subjective aggreability and inverted subjectivity (organic objectivity) would enter into the criteria for verification of science for consciousness. Conscious experience could be verified in a *sui generis* fashion. The currency of mechanics for present science does not include causal currency, which, however, remains most significant in the mechanics of consciousness. Inviolable constants under which present science works are the constants laid down by Einstein (velocity of light), Max Planck (Planck's constant), and Entropy barrier. In a science for consciousness, consciousness itself is the only constant. All other constants are flux in nature. Present science speaks in a language that is primarily left hemispheric. Quantification and measurability are considered a must there. Therefore, this is always positivistic. Science for consciousness speaks in a bihemispheric language. Integrated hemispheric transversion (where the left hemisphere behaves like right and right hemisphere as left) followed by an inversion of neuraxis (cerebral cortex is not only a perceiver but acts also as ‘receptor’) prepares the brain for expressing in a poetic language (`divine’ rhyme) characterized by incredible clarity and profoundness (e.g., hymn of *Vedas*). Finally, present science works primarily in horizontal and rarely in vertical dimension which when it does, do it in a very limited manner. It also seeks a boundary without which it feels uncomfortable. The Science for Consciousness, on the other hand, courageously addresses vertical dimension. It remains always open and loves to deal with profound uncertainties, the very characteristic of a system with no permanent boundary.

Differences between Present Science and the Science for Consciousness

Characteristics	Present Science	Science for Consciousness
1. Spectrum	Independent of Humanity. Keeps distance from Phenomenology	Inclusive of Humanity and Phenomenology
2. Deals with	'rigid', 'compact', 'dry' part of nature	'softer', 'wooly', 'wet' part of nature
3. Validation Criteria	(i) Reproducibility (ii) Objectivity	(i) Reproducibility (ii) Subjective sharing, Inter-subjective aggreability and Inverted subjectivity (organic objectivity) (iii) Verifiable in *sui generis* fashion
4. Epistemology	Epistemology is Dualistic/ Reductionistic	Honours epistemological pluralism. Epistemology is Non-dualistic/ Participatory/ Dwelling-in
&		
Hermeneutics	Little room for Hermeneutics	Likely to reconcile Epistemology with hermeneutics
5. Relevance of Ontology	Ontological issues are not important	Ontological primacy of issues and their interrelationship are most important
6. Inviolable Constant	Einstein's constant, Planck's constant, Entropy Barrier	Consciousness itself is inviolable constant. All other constants are flux in nature
7. Currency of Mechanics	Matter/Energy/Force/Field/ Information	Includes causal currency and 'life', in addition to other currencies
8. Language	Primarily left-hemispheric	Bi-hemispheric language (e.g. language of *Vedanta, Gita*)
9. Dimension of work	Primarily horizontal and limited vertical	Addresses vertical dimension, taking care of horizontal dimensions as well
10. Uncertainty	'Helpless' in handling uncertainties	Integrates uncertainties
&		
Boundary	Always seeks a boundary	A science with 'no boundary'

VI
Five important suggestions for the scientists and the philosophers of Science engaged in developing a Science for Consciousness

Taking stock of why we failed leaves us composed. The sense of precarious and uncertain situation on the background of this composition initiates an ingenious step for learning

The limits of present science have been discussed and so also the problems in philosophy. The picture has been extended wherever possible. This section highlights what we are supposed to do if we are serious about developing a science for consciousness. Five suggestions[42] are offered in this context.

1. **To look beyond the constants set by Einstein, Max Planck, and Entropy barrier**
   The question is how? By exploring nonlocal communication Type I, II, and III. Nonlocal communication type I dissolves the barrier of space, type II dissolves that of time and type III of both space and time and transcends the intricacies of causality Documentation of nonlocal communications type I, and II, and proposition of existence of nonlocal communication type III pose challenge for velocity of light, Planck's constant and entropy barrier respectively.

Three constants under umbrella of which the present science works	**The discipline of Science**	**Excludes possibility of**	**Challenged by the phenomenon of**
1. Einstein's constant	The classical and Relativistic physics	Simultaneity of events	Nonlocal communication, Type I, dissolving `space'
2. Planck's constant	The quantum physics	Continuity of events	Nonlocal communication, Type II, dissolving `time'
3. Entropy barrier	Cybernetics	Identity of events	Nonlocal communication, Type III, dissolving `space', `time' and causal intricacies.

2. **To learn to *see through* Death**
   The question is how? The scientists are already familiar with near-death experience. They are required to explore transcendental death experience, transformational death experience and experience of being reborn within the same body (born again). These profound experiences could be recorded in both first person's and third person's perspectives. For near-death experience, it has already been done. For other three phases too it is not impossible to do so. When the brain passes through the entire spectrum of death terrain, creative emergence becomes abundant. This may help to discover the missing pieces of the puzzle.

In this context, *Savitri*[43] of Sri Aurobindo could be a very useful text that could offer guidelines for the scientists to conduct research in this direction. At the cell biology level, study of 'apoptosis' and the mechanics of 'malignant transformation' could be excellent models for unraveling the mystery of death and its transcension. In the discipline of Astrophysics, the path extends from black hole to white hole.

3. To begin exploration of uncertainties at various levels

There is no uncertainty or indeterminism perceived in classical world (Plane I) in observation of conjugal properties of an object. In the quantum world (Plane II) uncertainty is observed during measurement between two observable conjugal properties of an object. At the terrain of formation of a black hole (Plane III), perceived uncertainty is observed between properties and the very existence of the object. The fusion of quantum language (Q-Language) and metaphysical language (M-Language) begins as one enters plane III. At the level of the boundary of the universe (Plane IV), perceived uncertainty in observation could be recorded between `existence' and `no-existence', between `Presence' and `Absence'. At the level of the *Multiverse* (Plane V), perceived uncertainty plays between `nonexistence' and `a new existence', between `Absence' and a `New Presence'. Consciousness, I mean *Unconditional Consciousness* (Plane V) as a perceived reality, either does not exist or it exists as a Reality that is something new, novel, not hither-to-known.

These four levels of uncertainty depict four different depths of nature. On the basis of presence or absence of the perceived uncertainty for an observer-dependent reality and then on different levels/kinds/degrees of uncertainty, the total spectrum of nature in this scheme has been divided into five planes namely, classical world (plane I), quantum world (plane II), terrain of elementary phenomena like, life and death (black hole formation etc.) (plane III), plane of Mother Nature (plane IV) and plane of *Unconditional* consciousness (plane V).

Uncertainty is an issue of Science. It can be measured. For uncertainty at the level of quantum world, the famous equation of Heisenberg stands as follows.

$$\Delta Q \times \Delta P \ \underline{\textit{is of the order of}} \ h/2\pi$$

(where Q is the uncertainty about velocity and P is the uncertainty about position of an electron and h is Planck's constant, a definite number 6.63×10^{-27} erg. Sec.).

For an observer-dependent reality if one tries to measure other three uncertainties of three consecutive planes, their equations may be written as follows.

Δ *Conditioned* properties x Δ Existence $\underline{\textit{is of the order of}}$ Mother Nature
(Mother Nature, the executive front of consciousness, is the only constant here)

Δ Existence x Δ Non-existence $\underline{\textit{is of the order of}}$ Mother Nature-Consciousness
(The deep aspect of Mother's plane is indivisible from consciousness)

Δ Non-existence x Δ A new existence *is of the order of* Consciousness
(This is the plane of pure consciousness, non-negotiable, inscrutable)

Since these last three uncertainties are not measurable, the equation for planes III, IV or V appears absurd. This type of equation seems to be the products of brain incompletely surrendered to *Unconditionality*. With total active conscious surrender, the uncertainty itself suffers existential crisis. *An equation of surrender replaces the equation of uncertainties.* The results are illuminating. All measurements then appear trivial, a fabrication of the act of illusion or *Maya* (compare the similarity in etymology of *maya* and measurement). Which can be measured is called *maya*. Or, only the *maya* part is measurable. However, even without the desire or the capability of measurement, the feelings of uncertainty persist for sometime. Since the Plane IV is visualized as the plane where `Purpose' is determined and the Plane V as the Plane for `Will', uncertainty here, if any, appears to be a willful and purposeful illusion created by Consciousness-Mother Nature. As one continues to dwell within the plane IV and plane V, an *equation of surrender* is seen to grow. Concomitant feeding of relevant information clears most of the uncertainties and doubts.

Uncertainties are stemmed by an informationally open system by means of biologization of relevant information at appropriate levels. If there are four levels of uncertainty there should be four levels of quality of information. It amounts to extension of currency of conventional 'information' vertically further, or deeper within. There may be some special type of information like, qualified information, or a vital information that can change the life situation (live-information).

4. **To look beyond and cross the boundary of the universe**

But how? It is the most difficult job for a seeker, explorer, or an experimenter of consciousness. It demands inside to be out and outside is in. The only way to survive in this process is to *surrender*, surrender of properties, surrender of clothing of 'self'. It would be an active and total surrender to *Unconditionality*. Multiple universe(s) would be visible only then! The physics in these parallel universe(s) could be different in almost every respect, be it force, charge, mass or dimension. The cosmology and the astrophysics are required to invent new equations of relationship. Our universe is then no longer unique for its space, time or purpose. The centrality of the universe is no longer there. The central position is occupied by the *Essence* of the Multiversity.

While Zero-point Energy Paradigm (ZPE-Paradigm), proposed by some of the eminent physicists (e.g., H. Puthoff from Institute for Advanced Study, Austin, Texas), can lead us to the level of intergalactic space, the view of multiple universe centers us on the *Essence* of the Multiversity.

Assimilation of the concept of the Multiversity dissolves the uniqueness of the universe we inhabit almost the same way Copernican Revolution demolished the unique position of the Earth in the cosmos.

5. **Finally we are to reconcile and connect brain-bound consciousness with the brain-independent consciousness**

For consciousness there is no plural. Consciousness is singular, homogenous and indivisible. Heterogeneity is introduced by the presence of the brain or a brain-like structure that is engaged in dealing with the problems of consciousness. Consciousness works through the brain to produce conscious experience and to generate a sense of an experiencer, the One who experiences. It also works through nature's mechanics to produce natural phenomena and offers the possibility of (?) a cosmic / supracosmic existence (which people might have called God!). The same and one consciousness which is seen to work with the nature also works through the mechanics of the brain to result in conscious experience and the Being as the experiencer. The same and one consciousness, as seen in the brain, also works outside the brain through the mechanics of nature to produce natural phenomena and the existence of a cosmic/supracosmic Being (as God). The two terms, brain-bound and brain-independent consciousness, therefore, appear for the sake of description. Nevertheless, it is an important distinction. Consciousness as we understand ordinarily (*as an awareness of surrounding, awareness of `self' and awareness of one's own thoughts and feelings*) and conscious experiences are relevant in the context of the brain. It is a recognized frontier for neuroscience. On the other hand the working mode of Consciousness with nature are relevant in the context of phenomenology of the world, universe, multiverse (multiple universes) etc. It is a frontier for both the philosophers of science and the scientists. When consciousness works in concurrence with the working modes of the brain, one experiences it as brain-bound, brain-trapped, brain-confined consciousness. This is the same consciousness in nature that has been working in our brain to result in conscious experiences. When a mystic or a scientist of nature describes its presence in Nature and its working with Nature, it is described as working independent of the brain, independent of the presence or the absence of any brain anywhere, any time. One can not call this anything but consciousness since it is the same consciousness of the brain that has been working with the nature quite independent of our existence or independent of any interpretation by the brain. This consciousness is not only brain-independent but also it works quite independent of the universe, the habitat for us. Big bang, in this sense, may be the just one of the stories of birth of one universe we live in.

VII
Mechanism of generation of 'Awareness' in the brain
A Glimpse of Brain-bound consciousness

Whether consciousness emerges out of neuronal activity in the brain or consciousness uses this material (neural) infrastructure for manifestation of its own purpose is not conclusively known. The scientists favor the former view while the mystics and the spiritualists prefer the later. Let us have a glimpse of this consciousness within the brain.

In the splendor and grandeur of consciousness research, most of us are so enamoured by the so called 'higher' states of consciousness that we often afford to ignore the basic issue like, how we become aware of our surroundings or of our own thoughts

and feelings. How and when the processing in the brain are brought to the threshold of conscious perception?

Is there any unconscious perception in the brain? The answer that crystallizes from the evidence of recent empirical research is all in affirmative. Are the consequences of unconscious perception anyway different from those of conscious perception? Yes, asserts Philip Merikle and Meredyth Daneman. They differ in cognitive and affective consequences. There is also difference in the duration of influence (? memory) of unconsciously and consciously perceived stimuli[44].

How these unconscious activities in the brain reach the level of conscious perception was an enigma till 1990. However, recent researches in neurophysiology and electrophysiology of neurons with electrocorticogram and basic electrophysiological recording of activities of cortical and deeper neurons along with the help of advanced technology like, PET and fMNR, have thrown some light on this mechanism of generation of 'awareness' in the brain.

Let me summarize the viewpoints of three eminent contributors in this field.

1. Karl H. Pribram[45]

Karl Pribram is one neuroscientist who introduces a holographic metaphor in the information processing of brain and genesis of awareness out of it. He finds content-addressable holographic like memory expressed in the language of the brain. His experimental research on monkeys and chimpanzees and clinical research on neurologically challenged persons suggests that the brain processes information in hierarchically located three-tier systems. Those are independent but interconnected with each other both in the sense of `relational hierarchy' (working below upwards) and `compositional hierarchy' (working above downwards). At the base there are automatic processing for reflexes with minimum synaptic delay and probabilities. He stresses on the existence of two other types of brain mechanism, one for referential or semantic processing and the other for conscious (which he calls episodic execution) processing. The former involves parieto-temporal lobe and the later involves more anterior part of the brain namely fronto-limbic area and anterior temporal lobe. This three-tier processing system is self-regulated. Delay and probabilities are introduced more and more as the brain recruits the hierarchically placed higher circuitry. Conscious circuitry is eventually accessed with temporal course of events, may be with continuity of sensory stimulation and/or, by its lateral augmentation and/or, by central intervention.

2. Rodney Cotterill[46]

According to Cotterill, the complex phenomenon of generation of awareness is not merely dependent on the inputs from the sensory apparatus for perception, as was previously believed. It requires mandatory engagement of the subconscious proprioception from the muscle spindles, motor planning in the pre-motor area of frontal lobe and inputs from anterior cingulate gyrus (on apprehension of 'fear' or

'danger'). Interaction between thalamic intralaminar nuclei with other thalamic nuclei contributes to the emotional tone of consciousness.

Instead of breaking down the behavioral process into perception, cognition and action, the preference in Cotterill's view is to accept the composite picture of 'awareness' where perception and a kind of readiness for action are implicit in cognition. This is in complete consonance with the view `Cognition Reclaimed', expressed in November/December, 1999 issue of *Journal of Consciousness Study*.

3. J. McFadden[47]

McFadden's theory on consciousness has been developed on the level of very basic neurophysics. According to his *conscious electromagnetic information* (*cemi)* field theory, 100 billion electrically active neurons generate an endogenous em field and a concomitant information field within the brain. And in this context, the brain processing can be bifurcated into two types:

(i) processing which is insensitive to endogenous electromagnetic field within the brain.

(ii) processing which is sensitive to endogenous electromagnetic field within the brain.

All former type of processing is unconscious processing and the latter comes under category of conscious processing. "The key to consciousness is not the presence of em fields, but their ability to transmit information to motor neurons." – asserts McFadden. "Agents that disrupts the interaction between the brain's em field and neurons will induce unconsciousness."

"Although all neurons generate em fields," he continues, "natural selection has optimized the neurons firing capability and information-processing activity of only that fraction of the brain's em field that has contributed positively to host survival. Those em fields that have not contributed to host survival would have been invisible to natural selection and thereby remained unstructured and unlikely to influence motor neuron firing pattern."

Are these three views from classical neurophysiological point sufficient for explaining the genesis of `awareness' in the brain? Probably not! Quantum physicists, the scientists from Neural network, Artificial Intelligence and Expert System groups, have their own stories to tell.

VIII
Reconciliation of Brain-bound and Brain-independent Consciousness

"When the great innovation appears, it will seem muddled and strange.
It will be only half understood by its discoverer and a mystery to everyone else.
For any idea that does not appear bizarre at first, there is no hope."

- Niels Bohr

Reconciliation of brain-bound consciousness and brain-independent consciousness is an important task ahead. It seems difficult but is not impossible! At present, five ways could be envisaged, which might be of some help to the consciousness scientist.

1. **Understanding death while alive:**
   It is a common religious belief that brain-bound consciousness and brain-independent consciousness get reconciled following death. However, it is not impossible to achieve it in one's own life, while one is alive. Reconciliation of brain-bound and brain-independent consciousness happens in life when one stems the tide of 'death', 'discontinuity' and 'uncertainty', while *one sees `life' as an extended reprieve from `death'.*

   Four phases could be discernible while one sees through the phenomenon of death. Those are. near-death experience, transcendental death experience, transformational death experience and the experience of being reborn in the same body. I have already made an effort to describe these phases in the context of brain dynamics in the first chapter of *Conquering the Brain*[48], titled "*Experiencing death phenomena. Let the concept of death die*." All could have their neurological correlates. I am engaged in working on that. Hypothalamic `spill-over', inter-hemispheric transversion and `spill-over', shaking-up of the vertical neuraxis in the Triune brain and unification of brain-bound consciousness with brain-independent consciousness followed by the inversion of the neuraxis could be the respective gross neurological approximates of four phases of death. Sri Aurobindo, probably the most accomplished yogi in this context, experienced and expressed the whole spectrum of death including the experience of being reborn several times within an ever-transforming body in *Savitri*[49] which could be a very useful text for the scientists to conduct research in delineating planes which one comes across during transcension of death while alive.

   What could be this phenomenon of death in the language of the scientists who are engaged in exploration of nature of death? Death here could be seen as loss of existential properties, felt as an experience of *nothingness* (in the context of sensation, pleasure), *emptiness* (in the context of space), *stillness* (in the context of time) and *silence* (in the context of cause).

   However,

   "Not all silence is absence of cause,
   Not all stillness is absence of time,
   Not all emptiness is subatomic void,
   Not all nothingness is absence of rhyme."

"There is silence which broods cause!
There is stillness, which generates time with pause!
There is void from which the universe is born
Ananda shines when nothingness is torn."

- **Conquering the Brain, p 200**.

The exploration of death requires understanding of voids of different kinds, different ontological levels of uncertainty, different types of nonlocal communication, different qualitative levels of 'information' and the Brain-phenomena when the brain is challenged with death.

How does the brain handle this `death phenomenon'? By developing new integration within it, by means of biologization of relevant information at appropriate level and thereby overcoming various depths of uncertainty.

2. **Exploration of Quantum discontinuity and subsequent Uncertainties at different ontological levels:**
   Death has long been considered a metaphysical issue. However, discontinuity is not merely a metaphysical issue. It is a scientific issue as well. Uncertainty has been recognized as an issue for science by quantum scientists. That quantum description of nature seems to be an incomplete one is self-evident from the fact that quantum mechanics cannot and does not describe phenomena that are supposed to occur in-between quanta. Those are the phenomena at the depth of quantum discontinuity embedded within nature in between two 'discrete' states of particle/wave-package of energy behaving in a quantum way. While the mystics explore consciousness penetrating through the `gap' (both in `space' and 'time') separating two 'thoughts', the scientists engaged in consciousness research are to penetrate in between the two quantum states of a quantum existence. There they are to confront with uncertainties that are altogether different from Heisenberg's uncertainty. To measure those uncertainties and to learn how to overcome those uncertainties are the right kind of endeavour to delve into the domain of consciousness, which is independent of brain. For astrophysicists, the path extends from black hole to white hole.

3. **Exploration of `Mind':**
   The philosophers may prefer to attend the problem in a different way. If consciousness is singular, how can it be two? What is this dualism about? What communicates with what? Is our formulation of the problem correct? Answer to all these questions could be found with the introduction of the concept of 'mind'. It is mind which cuts consciousness into two. Destruction of mind, i.e., *mono-loy* or *mono-nash*, is said to be the beginning of experience of conscious. In monistic experience, consciousness is one and only one. As soon as dualism appears, the mind comes in between. *Mind could be defined as the organ of communication between two conscious systems.* Mind is a part of both nature and consciousness. At the extreme end mind, like nature, is also connected with consciousness. An effort has been made in the first chapter of *Conquering the Brain*[50] to explore this mind. A

model of mind, consisting of three `voids' with two intervening tunnels, has been made to look further into this problem. It may therefore be stated that the brain-dependent consciousness and the brain-independent consciousness communicate through their respective nature that includes 'mind' in the core.

4. Exploration of modes of communication between intracerebral and extracerebral consciousness:

The scientists again may pick up the thread here by looking at the nature inside the brain and the nature outside the brain. It is the nature inside the brain, which communicates with the nature outside the brain. What could be the route of such communication? Conventional sensory route or something unconventional like transcranial and transcerebral communication! Since 1985, in all of my presentations[51], I have been mentioning that the apical dendrites of the cerebral cortical neurons in general and their sensitive spines in particular, are responsible for communication between within and outside (outside the cranium) the brain. The apical dendrites come from the pyramidal neurons of the cerebral cortex. These neurons constitute about sixty to seventy percent of all cells of cerebral cortex and have two groups of dendrites, the basal small dendrites and one long, straight, stout, apical dendrite which intertwines with others to form a dentritic mat over the surface of the cortex. This dendritic mat formed at the topmost layer of cerebral cortex forms a very sensitive membrane where electrical dipoles are found in constantly shifting dynamics. In the evolutionary journey of the brain, the dendritic mat emerges as a crucial structure to play an important role in establishing cortico-supracortical communication. The possible modus operandi of this communication may be listed as follows. It would be easier to discuss this interaction in relation to the planes of the nature.

In the classical plane of nature (Plane I), (i) scalar field interaction remains a possible way of communication between this superficial dendritic mat of cerebral cortex and the nature outside. (ii) Secondly, one seriously has to consider the electromagnetic field within the brain, over the cortex and outside the meninges, skull and scalp. As an extension of this interaction one may like to go to the deeper level of brain for transcranial magnetic interaction between inside and outside of brain. Glial cells, I think, have the potential to get involved in this interaction.

In the quantum plane of nature (Plane II), there are three possible ways of communication. (i) Bose-Einstein condensation at the level of the spines of the apical dendrites of the cortical neurons, (ii) the quantum events at the perineural and synaptic spaces of the brain working in dynamic communication with 'quantum sea' of nature outside the brain, and (iii) the brain behaving as a macro-quantum object and communicating nonlocally (type I). One is required to consider the interaction amongst many-body quantum systems (MBQS) in the brain, in the context of existing suggestions in physics (Jain, 2002)[52] regarding cross over from fermionic to bosonic behaviour and vice versa.

In the plane III of nature, there are seemingly three ways of communications as well. (i) Brain, behaving as a macro-quantum object and nonlocal communication type II

may prevail. (ii) There could be 'information' exchange between 'inside' and 'outside' of the brain. The brain becomes supposedly 'open' informationally while voyaging through plane III of nature. *Conscious electromagnetic information (cemi) field* theory of Johnjoe McFadden (2002)[53] is worth exploring in this connection. This theory "identifies consciousness with only that component of brain e m field that is capable of downloading its information to motor neurones". The theory, although, does not imagine any supracortical extension in its present form, bears the potential, in my opinion, for helping exploration of the issue of cortico-supracortical communication through the possible inter-conversion of energy, field, information and causal currency has been discussed in the *Millennium Bridge*[54]. As McFadden has been exploring consciousness that is brain-trapped, he is justified to be emphatic in his theory to exclude any possibility of communication between extracranial electromagnetic field and intracerebral electromagnetic field. I am of the opinion that he is right for all ordinary circumstances, for the phenomena in plane I and may be in plane II. If outside information continuously bombards on the brain one can imagine the chaos and the subsequent `pathos' the brain has to combat with. However, there could be situations when extracranial electromagnetic field and intracerebral electromagnetic field do communicate, precisely in those situations which bear evolutionary potential, namely Love, Sex, Ego, Life and Death i.e., Plane III phenomena. (iii) Finally, the omnipresent neutrinos, in connivance with the `weak force' of nature, may successfully bombard on the photon-phonon signaling system of neurons of the brain while the brain voyages through plane III. Neutrinos, photon, phonon and conformon are, in my text (*Conquering the Brain*[55] and *Millennium Bridge*[56]), phenomenal hands of Mother Nature. Neutrinos that have been ceaselessly bombarding on the brain can get a hand of photon/phonon transduction system in the neuronal membrane. Left-handed neutrinos can influence Weak Force (Klauber, R. D[57]) and through Electro-weak interaction they may influence the electromagnetic field where photon and phonon form the substratum.

In plane IV, one additional way of communication between brain-bound and brain-independent consciousness could be nonlocal communication type III.

These are the nine suggested mechanisms for an 'open' brain depicting nine ways of communication between the natures of brain-bound and brain-independent consciousness.

The crux of the problem in `sciencing' supracortical consciousness:

The crux of the problem for a scientist in exploring supracortical consciousness is to show that a specific pattern of some kind of physical (or nonphysical) force/energy/field, effective outside the cranium can act transcranially through the scalp, skull and meninges and lead to some kind of subjective experience expressed as 'Love'. Any subjective experience is generally produced following a sensory activity in the brain. For example, when the light falls on retina or a sound strikes the organ of Corti in the ear or the smell of a rose stimulates the olfactory epithelium etc. Subjective experience often is generated independent of sensory stimulation, even without the presence of any sensory stimulation, as a direct effect of `thought' as

shown by recent PET and SPECT studies. The question is, could the subjective experience be produced by any specific pattern of some kind of force/energy/field acting on the cerebral cortex from outside the cranium? In other words, this is to show whether the cerebral cortex can have properties of 'receptor'! The 'receptor', in such case, would be for transcranial physical/nonphysical force/energy/field. If no known physical force is found to be involved, could it be an action of some nonphysical force/energy/field? If it is a nonphysical force/energy/field in nature, then at the present stage it seems to be only speculative. Should nonphysical force/energy/field exist, there could be two possible ways of this interaction. The first one includes a nonphysical-physical connection (transformation), following which the physical force acts on the cerebral cortex. Here, the receptor in the cerebral cortex would be meant for physical force/energy/field only. As a second possibility, the nonphysical force is supposed to act directly on the cerebral cortex without prior transformation into physical force/energy/field. The receptor on the cerebral cortex in this case is meant for non-physical force/energy/field only.

Nonphysical force/energy/field meant here may be the part of nonlocal communications of various types, or may be of some kind of ontologically higher level of *information*. Physical force/energy/field could be electromagnetic force/energy/field, weak force, and/or gravity. Walter Freeman (1999)[58], Susan Pockett (2000 and 2002)[59] and Johnjoe McFadden (2002)[60] have already made the case for electromagnetic field, although none of them has thought of any supracortical relevance of their respective theory.

The connection between physical and non-physical could be established by tracing Neutrino, Photon, Phonon and Conformon respectively through Neutrino equivalent of consciousness (Neut-E-Consc.), Photon equivalent of consciousness (Phot-E-Consc.), Phonon equivalent of consciousness (Phon-E-Consc.) and Conformon equivalent of consciousness (Conf-E-Consc.) as suggested in *Conquering the Brain*[61] and in *The Millennium Bridge*[62].

Distinguishing supracortical consciousness from supracortical phenomena:
It would be better if we distinguish supracortical consciousness from supracortical phenomena[63]. Manifestation of supracortical consciousness is a subjective experience of Love, objectively manifested as creativity. For supracortical phenomena it is not so. It is usually a remote sensing, clairvoyance, clairaudience etc. In the course of experience of both supracortical phenomena and supracortical consciousness the 'receptor' property of cerebral cortex is involved. Both of them appear inexhaustible within cortical limits (for examples, till the neurotransmitters are exhausted in case of focal epileptic fit, or the brain fails to retain its integrity during a sensory hallucination). However, in supracortical phenomena, usually the 'windows' of the brain (the sensory/motor association areas) are involved. The brain as a whole is never involved. Supracortical consciousness, on the other hand, is an outcome of integrated global response from the brain, although it originates from the vortex of the cerebral cortex. Besides, at the extreme end of the experience of supracortical phenomena the integrity of the brain may be threatened. The mechanisms of

supracortical phenomena and supracortical consciousness are also suggested to be different. Nonlocal communication type I (dissolving the barrier of space) or type II (dissolving the barrier of time) might be involved in supracortical phenomena. Nonlocal communication type III that dissolves both the barriers of space and time and transcends the intricacies of causality, has been suggested to be the mechanism to effect supracortical consciousness.

5. The Mystic's way of Reconciliation. Using Self-consciousness as a Tool:

In the process of reconciliation of brain-bound and brain-independent consciousness, the mystics might have a unique option. He uses self-consciousness as a tool in this endeavour.

Self-consciousness, as told, is the first step of nature in her attempt to free consciousness from the shackles of the brain, from the confines of neural entanglement, from the cage of neural networking. The mystic, although, begins with classical `self' he relies more on the 'quantum self'. In the course of this onward journey for the search for more and more freedom, the 'self' sheds off its 'classical' properties and then also the quantum properties. In plane III, it gets de-conditioned from elementary phenomena. Radical transformation occurs in plane IV. In the process, *self's nature becomes Mother Nature and the 'self' is realized as consciousness.*

There is another way the mystics use self-consciousness as tool. Self-consciousness is used as *witness consciousness*. It begins with observations of the contents of consciousness, the external contents and then the internal contents. The process is graduated to a higher level when observation of the observer starts. The self starts observing the observer. In each step upward, it observes the observer in the downstream and continues to do so till eventually his back touches the unconditional consciousness. Then follows an about turn. The self becomes face to face with its origin.

In both the procedures, there are two important processes worth mentioning here. The first is the process of *Surrender.* An active, conscious, one-pointed and total surrender to the Unconditionality is the beginning of real reconciliation. The second is the *Grace phenomenon*[64]. During all these efforts made by 'self', the brain gets elevated to the *State of Grace* and the omnipresent Grace could get hold of the brain to result in *Supreme Consummation*.

The Boundary issue brings us back to the very basic

The crux of the problem in reconciliation of brain-bound consciousness with the brain-independent consciousness, however, could also be stated as some unique philosophical or scientific issues. For example, how the Infinite gets confined into a finite system? Or, how a finite system could be connected with the Infinite? Or, how a system can behave in both finite and infinite ways simultaneously?

It would be fruitful to look, in this context, into the working mode of *Prana*. *Prana* could be simultaneously finite and infinite. Ordinarily meaning, it is breathing, the act of respiration. Traced to the subtlety, it goes to the 'pace maker' neurons of Apneustic center, Pneumotaxic center, Inspiratory center, and Expiratory centers at the brainstem. Mystically perceived, it goes back to the generation of spontaneity, the '*Prana*' in nature. *Prana* is an expression in metaphysical language (M-language)! What could be representation of *Prana* in quantum language (Q-language)? I often sense a major role of *neutrinos* in this representation. Neutrinos[65] are probably able to connect a *photon-phonon-conformon* operated finite system with the domain of the Infinite.

Communication of a finite system with the Infinity would be certainly nonlocal. Then, the questions can be framed in the following ways. How does local communication reconcile with nonlocal communication? Or, how nonlocal communication becomes ultimately able to deliver the message to a locally communicating system? For the new physics it is an attractive frontier of research.

When a finite system communicates with the Infinity, the interesting process that begins is *Evolution*. *In the process of evolution locality and nonlocality work together and the finite system is seen to communicate with the Infinity*. Today's human being is the outcome of such process continuing over millions of years. The only organ of the human being where evolution is yet to be completed is the brain. Brain is an organ that acts locally and can communicate nonlocally. And here, *we require again focusing on neuroscience.*

'Chaos' in the brain and Supracortical consciousness

It is Lorente de No, a student of Raman y Cajal, who in 1929 first demonstrated the presence of an axo-dendritic feedback loop in the neuron by Golgi staining. Lorente could not publish this paper because of strong opposition from his teacher. The paper was published in 1934 after Cajal died. This observation initiated a totally new era for the growth of neural assembly, neural network and self-organization concept in the brain. Interestingly the brain, today, is known to have all three types of *attractor*s namely, Point attractor, Cyclic attractor and Chaotic attractor with their respective 'attractor basin' of functioning.

Sit quietly and observe the bubbles of thought arising on the canvas of mind. Are these outcomes of spontaneous neuronal firing from a chaotic pool? Observe the spurt of confusing and purposeless movements of a puppy or a kitten left of its own. Are these movement results of chaotic firings from the cortical motor neurons? Watch out the hysterical outburst of emotion of the wife of a police officer implicated in a murder? Could it be an uncensored limbic chaos expressed while reasons fail to act? Look at the seizure of a patient suffering from epilepsy, may be grand mal, petit mal, psychomotor or temporal lobe epilepsy! Do these involuntary spontaneous outbursts result from a deliberate escape of the neuronal chaotic processes from a normally existing censoring mechanism! These are important issues which the chaos-scientists are busy in addressing.

How the ‘order’ is brought out of the seemingly chaotic activity in the network of spontaneously firing of millions of cortical and limbic neurons? Intervention by ‘consciousness’ could be a possible mechanism. However, how consciousness does it remains an important issue in connecting consciousness with chaos. The feed forward and feed back loops in the cortical neuropil are not closed loops. The loops remain ‘open’ at the level of the neuro-neuronal junctions (chemical synapses, electrical synapses and tight junctions). And possibly, those junctions are the meeting ground for the classical fields inside the brain and the classical fields outside the brain, the quantum world inside the brain and the quantum world outside the brain, the informational fields inside the brain and the informational fields outside the brain. Therefore, ‘chaos’ in the brain seems compatible with the existence of supracortical consciousness. And, who knows with supracortical consciousness embodied in the brain, the ‘chaos’ there may look completely different (as source of new creation) from what it appears now.

IX
Nine Planes of Consciousness. Brain-bound or Brain-independent

“Every truth passes through three stages before it is recognized.
In the first, it is ridiculed. In the second, it is opposed. In the third, it is regarded as self-evident.”

- Arthur Schopenhauer

In this section we would present Nanoune model for both Brain-bound and Brain-independent consciousness[66].

Nanoune model for Brain-bound consciousness:
Let us describe now nine planes of the brain-bound consciousness and conscious experience. Consciousness in relation to the brain is responsible for conscious experience and generation of a sense of an experiencer.

Consciousness uses different modes of the brain to produce conscious experience. The brain usually works in six modes. The first three are in the modes of brainstem, limbic system, and the cerebral cortex (the Triune brain). The next three milestones have been proposed in my works[67]. Those are in *supracortical* mode.

Brainstem-cortical mode results in experience of *brainstem consciousness* by which one becomes awake, alert, and oriented. Limbico-cortical mode results in experience of *limbic system consciousness*, a motivation-guided consciousness to seek pleasure and avoid the unpleasant. In the cortico-cortical mode there is experience of *cortical consciousness* characterized by unitary experience and the ability to discriminate, analyze, reason out and judge.

The brain can also work in supracortical mode. There are three successive ontological milestones of the Being in this direction namely supracortical being, supracortical godhead and supracortical autonomy. C*onsciousness* in supracortical direction is characterized by its apparent 'inexhaustibility' within cortical limits and is manifested

as 'Love' which could be identified as sacrifice for the beloved. Whatever love and sacrifice one observes in day to day practice could be because of successful expedition of supracortical consciousness through numerous obscurities of the infrastructure of the nervous system. Another manifestation of supracortical consciouness is creativity, creative emergence and new creation. The next ontological milestone is S*upracortical godhead*. There are two additional characteristic features expressed in such personality. Those are 'magnetic' attractability and a super-intellect or spiritual intelligence. Lord Krishna or Lord Rama's (God-figures in Hindu mythology) station of the being was probably in this platform. The apparently final milestone is that of a S*upracortical autonomy* where the whole of the brain behaves as an automatic and autonomic instrument of the 'Divine'. In the manifest personality of this state of consciousness two added features are personification of 'eternal yea' and 'melting love'. The person has no option but to love profoundly and to affirm forever. Multiple universe(s)/Many world theory is a reality in this stage of the Being. In India, such elevated or evolved personality has been traditionally regarded as *Sadguru*. Ramkrishna Paramahansa, Guru Nanak, Raman Maharshi and Sri Aurobindo are some of the rare examples of the Being in such station of existence.

In all these existence of the Being, consciousness remains brain-bound. One can call this brain-bound consciousness as *Jivatman*. In the English language, it is *'soul'*. According to the station of the being, the person could be described as a 'captive' soul or a 'great' soul etc. There is another interesting thing to note here that has already happened in the relationship between brain and consciousness. This is the emergence of *self-consciousness*. It has manifested following consolidation of cortical consciousness in the *Triune brain*. Emergence of self-consciousness is the first attempt of consciousness to free itself from the shackles of the brain. Sir John C. Eccles and Carl Popper were absolutely precise to put a title in their celebrated book, *'The Self and its Brain'* where it is meant that the brain belongs to 'self'! This 'self', in its absoluteness may be what the *Vedantins* might have called *Atman.* Brain-independent consciousness in this sense, is non-anthromorphic nondual consciousness that the *Vedantins* might have called *Paramatman.*

The 'self' may identify itself with any of the six modes of the brain. According to the station of self-consciousness one gets *a chain of Being*, may be compared with the Great chain (or nest) of Being. The Great chain (or nest) of Being in perspective of neuropsychology starts from Brainstem being, Limbic being, Cortical being and leads to Supracortical being, Supracortical godhead and Supracortical autonomy.

It seems clear that as the 'self' moves higher through the ontological ladder, the gap between the brain-bound consciousness and the brain-independent consciousness becomes narrower. They attempt to reach a point of singularity. The experiences of *Jivatman*, *Atman*, and *Paramatman* are, therefore, additional experiences independent of *Being-experience* occurring at six ontological levels. In this sense one gets 6 + 3 = 9 kinds of conscious experience in the total spectrum. This is a 'Nanoune' model in the spectrum of conscious experience, experiencer, and the brain-bound consciousness.

Nanoune model for Brain-independent consciousness:

We have already discussed the Pentaune model of Nature and consciousness. However, the classical plane of the Pentaune model of nature does not form the rock bottom of nature. There is a huge `unconscious' underneath it. The scientists are not yet sure of these unconscious planes in the nature. One becomes more certain of unconscious processing in nature by observing unconscious processing within the brain. Taking the 'cue' from the unconscious processing inside the brain, the 'unconscious' underneath the classical conscious world could be described as having four distinct planes corresponding to four planes overlying it. Respectively those are the plane of *fringe consciousness*, the plane of *implicit perception and memory*, the plane of *fringe unconscious* and *rock bottom unconscious*. These four unconscious planes have their respective mechanics too. The science for consciousness in the third millennium is to account for each of these nine mechanics (Nanoune model i.e. nine inseparable planes of Nature and consciousness) as nine divisions of the In-divisible (*A-khanda*) consciousness.

Are these two Nanoune Models Independent or Connected?

The Nanoune model of consciousness and conscious experience inside the brain and the Nanoune model of the mechanics of Nature and Consciousness outside the brain are not mutually exclusive. Sometimes I wonder that the characteristics of personalities like, Supracortical being, Supracortical godhead and Supracortical autonomy (*Sadguru*) could be accomplished by an evolving brain integrating the respective uncertainty of different planes of nature by the process of biologization/systemization of relevant information.

Exploration of the functions of the brain by traditional methods (SPECT, PET, fMNR, MEG, EEG etc.) at the classical plane seems more rewarding in the context of brain's unconscious processing. However, those could also be used to measure and record the representation of super-conscious planes at the classical level. Exploration of inter-convertibility of Energy, Field, Form, Information, Causal currency and Life remains the key in establishing the mutual interdependence of the two models.

A simpler Nanoune model for researchers of consciousness:

This exploration takes the simpler route starting from where we stand to reach the state of content-free consciousness. Next, it confronts `death phenomenon' in its entirety to reach Mother Nature's domain. Finally, the stream and the ocean, the sparkling and the origin become One. To begin with, there is (i) discontinuous stream of conscious experience on the background of a 'self'. (ii) Self-consciousness offers the ownership to these experiences. By practice, one is able to experience (iii) content-free consciousness. Transcension of the voids/death terrain follows. It passes through. (iv) Near-death experience, (v) Transcendental death experience, (vi) Transformation death experience, culminating in the (vii) Experience of getting re-born within the same body. Phase (vii) is not possible till one gains access to (viii) plane of Mother Nature which is nothing but the nature of consciousness. Unconditional consciousness forms the plane (ix) in this model.

Contentless consciousness, Transcendental consciousness, Brain-independent consciousness and Supracortical consciousness

The Western philosophers (e.g. Jonathan Shear from Virginia Commonwealth University, USA, also Associate editor, *Journal of Consciousness Studies*) and the scientists (e.g. John G. Taylor[68], Dept. of Mathematics, King's College, London and James Austin, Professor of Neurology and the author of *Zen and the Brain*[69]) have recently laid emphasis on the empirical existence of *contentless consciousness*, the consciousness which is free of intentional contents. Simply, it is devoid of any content originated internally or externally.

When consciousness is devoid of externally originated contents, it still may be full of internally originated contents as it happens during dreamy (REM) sleep. In dreamless (NREM) sleep, internally originated contents are also absent from consciousness. Dreamless sleep consciousness could be an example of contentless consciousness. Everyone experiences this during dreamless sleep. With practice of meditation, it is possible to remain 'awake' while one's brain has been passing through the state of dreamless sleep. The experience of contentless consciousness is, therefore, an experience equivalent of deep (dreamless) sleep while one is awake. I do not think, there is anything transcendental in it. However, this may be considered an extraordinary personal accomplishment when one gains the ability to experience it in full-awake condition. It can also be regarded as an achievement for science to demonstrate its existence empirically. Finally, it is the stepping stone for experiencing transcendental consciousness.

What is transcendental consciousness then? It is an experience past the complete passage through 'death', while one is alive. While experience of contentless consciousness may be described as an experience of dreamless sleep in the awakened state, the experience of transcendental consciousness would require a transit through death while one is alive. To understand/realize the phenomenon of transcension is, therefore, to understand/realize the phenomenon of death in its entirety.

Therefore, as long as one follows *Mandukya Upanishad,* to understand wakeful consciousness (*jagrata*), dream consciousness (*swapna*) and dreamless consciousness (*susupti*), one is through and all right with first three states of consciousness. However, while one sojourns from the third state to the 'fourth state' (*Turiya*) of consciousness, one requires a practical transcension of 'death', the boundaries of space, time and purpose. All accomplished mystics who have experienced this fourth state of consciousness, have experienced it following complete transcension of death, the 'great void' of nothingness, emptiness, stillness and silence.

On the more, contentless consciousness, in the context of the view of above-mentioned scientists and philosophers, is a brain-bound consciousness. Transcendental consciousness may present as contentless too. However, the contentless consciousness, par se, is not transcendental. Brain-independent consciousness is an example of transcendental consciousness.

Here is another paradox. Brain-independent consciousness could be identified within the brain in the context of dynamics of the brain. Brain-trapped consciousness could be, on the other hand, far from the structure of the brain.

When one experiences transcendental (brain-independent) consciousness paradoxically by the brain itself, the process of 'transformation' of the underlying psycho-somatic apparatus begins. The first milestone of experience in this direction has been designated as the experience of *supracortical consciousness*.

Subjective awareness, Objective awareness and Supracortical Consciousness

Awareness may be `subjective' or `objective'. For example, my twelve-year-old daughter can sing beautifully a French music without feeling any of the meaning conveyed in its rhyming words. She is objectively aware of the song, correct pronunciation, and its rhyme. She is capable of playing with it without any trace of subjectivity in the interaction.

Karl Pribram[70], in a different context, suggests existence of two kinds of awareness, 'egocentric' and 'allocentric', having two different 'brain mechanisms' for them. Egocentric awareness is episodic, executive and involves more anterior part of the brain, the fronto-limbic system. Allocentric awareness is referential, semantic and involves more posterior part of the brain, parieto-temporal or temporo-occipital (in case of visual perception) region. Both mechanisms, although can act independently, are interconnected and one can influence the other. Two mechanisms, he speculates may be dissociated in cases of 'blindsight' where the patient shows unconscious vision-guided behavior.

The term *blindsight* was coined by Weiskrantz[71] in 1974, stating that there is denial of acknowledged awareness although the patient retain the ability to detect, localize and discriminate visual stimuli presented in his blind field. This develops following a lesion in the visual sensory cortex in the occipital lobe. The lesion is usually unilateral. Blindsight, however, is not the only case of dissociation of two kinds of awareness. Pribram[72] often sites the example of a case of history of 'Neglect' where the patient is unaware of having her left arm although she is able to use it, unconsciously for everyday purpose. This develops following a lesion in the light temporo-parietal cortex as confirmed by E.E.G. Carlo A Marzi[73] distinguishes two types of blindsight, normal and abnormal. In normal blindsight, the person is without any demonstrable organic brain lesion.

Subjective and objective awareness are found disconnected while one has been undergoing a death-terrain experience. Narratives from the patients who underwent Near-death experience reveal that the patient was aware of what all had been happening in the surroundings without any subjective experience of pain or discomfort in his organ or in the body.

This dissociation of subjective and objective awareness could also be seen in case of experience of supracortical consciousness in its early formative stage. Supracortical consciousness is characterized by its inexhaustibility within cortical limits. It is

manifested by subjective experience of Love and Divinity. Its objective manifestation is creativity. In the early stage, it is possible for a person to experience Divinity and Love without any visible objective parameter of creativity. On the other hand, one may be inexhaustibly creative, for example, linking concepts, connecting ideas, joining different categories, and building up new context, new meaning or even judging high level creativity without any subjective experience of Love or Divinity.

Probably, the mechanism synchronizing and harmonizing two neural mechanics of subjective and objective awareness goes out of run following supracortical opening and it is regained and consolidated with supracortical consciousness gradually getting embodied in the brain.

X
Towards a New evolutionary Accomplishment

"Are you God?" they asked the Buddha.
"No", he replied.
"Are you an angel then?" "No."
"A saint?" "No."
"Then what are you?"
Replied the Buddha, "I am awake."

- **Huston Smith**

Awakening is the first step for evolution. Human consciousness is nothing but an *awareness of `difference in the process of making'* (Hegel). And practically, "*nothing in biology makes sense except in the light of evolution*", asserted Dobzhansky.

The important question ponders, could this nine plane model either of brain-confined or brain-independent consciousness or a composite one be achieved and perfected by the present state of the Triune Brain (of P. D. MacLean)? Probably not! Are we then not taking adequate care of an evolutionary imperative hidden in the brain?

The brain is structurally a polylithic organ. Vertically it has three evolutionary components namely, the reptilian brain, the mammalian brain and the human brain. The present brain is, therefore, vertically a triune structure. Horizontally it also consists of two hemispheres, the left hemisphere and the right hemisphere, evolved and differentiated on cultural pressure (lateralization). The brain is the only organ of the body where one can recognize landmarks for both vertical and horizontal growth. And, this process of evolution has not stopped for the brain. Why? Because, the brain is also an organ where `locality' and `nonlocality' embrace, where nonlocal communication could be demonstrated by a locally acting system. And, *evolution is the hallmark of the system where nonlocal communication can effect on a locally* communicating system. If it is so, would we then eventually land up to own a <u>new brain?</u> Probably yes!

Julian Huxley is known to have looked for 'A Science of Human Possibilities'. Possibly at the farthest reaches of exploration of this science, we would develop a *Brain* of the Brain over the cerebral cortex which would usher a transition of present

homo sapiens to future *homo spiritualis*! The first tangible milestone in this direction is an awareness that could be recorded as *supracortical consciousness.* To become aware of the brain-independent consciousness paradoxically by the brain-trapped consciousness is the beginning of supracortical journey. The first step for this is to take off from the cerebral cortex and to look up! And here, *again quite paradoxically, we require focusing on Neuroscience in the context of profound spiritual experiences.*

Awakened state and Evolution

What did this awakened state mean to Buddha? Who knows! Unless one becomes Buddha how does one know of it? The problem lies here! However, we are free to go through an `imagery' here.

Buddha is awake! He is certainly alert and oriented (brain-stem consciousness). His motivation is streamlined for this awakened state (limbic system consciousness). His `self' is awake intellectually, judgmentally (cortical consciousness). He is inexhaustibly awake (supracortical consciousness). He is awake in daytime, awake in night, awake round the clock, awake in all seasons, awake in sufferings and awake in pleasure! He is awake throughout the axiological stairs of values, the rules of nature, the mechanics of the cosmos. He is awake in phenomenological jungle. His awakened state is so impressive that any fortunate one who has seen of it, heard of it or has honestly imagined of it, gets 'magnetically' attracted towards him (supracortical Godhead status of Buddha). His awakened state is literally `transforming' for all those brains, which are capable of sensing it, cognizing it, intending it (supracortical Godhead). He is awake in his full autonomy as an observer and is awake to participate in the play of creative cosmos. Being awake, he reaches the fountainhead of the creative cosmos (supracortical autonomy).

In this awakened state, the consciousness within the brain gains mastery over the entire spectrum of nature (cf. Darwinian concept of nature remains confined to classical plane only). The brain is classically poised from the base level of sensation to that of highest level of volition and `free will', from the base camp of primitive reflexes to the highest echelon of cognitive probing, from the level of the muscle spindle to the level of premotor area of frontal lobe and anterior cingulate gyrus (to express in the language of Rodney Cotterill[74]). Astonishingly, there is also classical-quantum correspondence (may be at the level of 40-60 Hz oscillators in the brain)! Brain is seen to behave as a 'marco-quantum' organ, which seems open to nonlocal communication. The 'Quantum Sea' outside the brain and the `quantum streams' inside the brain are in the state of equipoise. The brain is steady and ready to combat 'death' phenomenon. It is awake to *see through* the entire terrain of 'death'/ `discontinuity'/`uncertainties'. The brain appears informationally `open'. It is 'awake' for acquisition of some `new', vital, life changing information (information which is `alive') to help the mankind to come out of their present imprisonment. The electromagnetic field of the classical brain which can download information to its motor neurons (to express in the language of McFadden[75]) may be able to exchange information related to the outside electromagnetic field. The brain is 'awake' to

realize the ‘magnetic monopole’ of nature (Mother Nature’s plane) in brain dynamics. The brain is poised to participate in the dynamics of creative inter-universal Essence.

In this stage, it is certainly difficult for anyone to imagine what could be the impact of such extraordinary experience on the brain itself, on the body itself! Embodiment of such experience, certainly, will have a life-changing effect.

Profound spiritual Experience and Evolution

Profound experiences of `supracosmic’ / `supracortical’ consciousness, even for once, have life-changing, transforming, even paradigmogenic potential. This is in contrast to the experience of `ego’-losing, `ecstatic’ altered state of consciousness of psychedelic origin even when it is experienced repeatedly. The former experiences initiate a life-changing process of evolution in the brain by which one gains ability to modulate his/her old reflexes and acquires new reflexes (“*raison d’être* of consciousness is reflex modification and acquisition of new reflexes.” - Rodney Cotterill).

I visualize the whole scenario in the following way.

In the course of exploration of consciousness while the 'self', as it is understood in worldly measures, journeys to establish identity with the universal / transuniversal / interuniversal consciousness, there happens a serious reorientation of the structures and the functions of the brain. Structurally polylithic brain starts behaving as a functional monolith. The brain starts behaving as a macro-quantum object and participates in nonlocal communication, type I, II and III. I have proposed in my works[76] of three kinds of synchronization resulting from such a situation. Those are (i) synchronization of left and right hemispheres, (ii) synchronization of three vertical components of the brain, and (iii) synchronization of inside and outside of the brain.

Darwinian theory of natural selection speaks of selection pressure confined to classical plane of nature. Also, Darwin was silent on consciousness. However, the evolution we are concerned with would be a conscious evolution of the brain journeying through classical, quantum and elemental planes of nature under the respective selection pressure of different kind of uncertainties to secure a station within the plane of Mother Nature (Plane IV of nature). This station of brain could be described as the *State of Grace*[77]. To perceive and experience the *`Grace’* the brain is required to be elevated to the *State of Grace*[78]. In the 'State of Grace', three kinds of synchronization as mentioned above, are supposed to be in near-completion phase. In such extraordinary state[79], in the course of information processing and responsivity of brain, one finds little hemispherical bias. Stair-asynchrony is conspicuous by its absence. There is complete synchronization of the inside and the outside of the brain as well. In this state, while the brain remains in the `State of Grace', the omnipresent, omniscient Grace can capture the brain to use it as a transmissive organ of Mother Nature. This is *'Supreme Consummation'* (Sri Aurobindo).

"In the abyss of deep blue the sempiternal light is lit. The destined human cerebral cortex faces Infinity's finite front. Hidden asymmetries in the external cosmos are complemented by reciprocal asymmetries in the neurobiology. In cyclic symmetry and in metric plane, the quivering limbs of the cosmic facet embrace the virgin vibration of the dreamy chords of the living biological corpse. The undying love of cosmic integration center impregnates the passionate heart beat of biological integration center."

- **Conquering the Brain, p 17**.

Supreme consummation initiates opening up of *chakras,* the integration centres. And the most important, it initiates a new brain formation.

Two most undifferentiated structures of brain, the reticular system and the cerebral cortex are called into sustained action along with the most undifferentiated cells within the brain - the stem cells. The reticular system takes part in delineation of integration centers within the central nervous system. Integration centers, in the yogic terminology, have been called *chakras*. The cerebral cortex re-orients its neurons for the brain to behave in a macro-quantum way. In the course of profound spiritual experience, it is suggested that the stem cells engage in 'renewal' of certain cortical structures and may participate in formation of *a new brain* over the vortex of the cerebral cortex (supracortical brain)[80]. The most potent stimulus for initiating this lasting change in the brain remains supreme consummation.

Concluding Observations

Unlike *Supreme Consummation* which is a rare event, partial consummation of brain-bound consciousness and brain-independent consciousness is not an uncommon phenomenon. Thanks to observers of nonlocal communication of various types and the state of maturity of human brain! The humanity seems to be on the threshold of a new formation. Therefore, this period is not only exciting but is also critical. In this critical and exciting period of Time, it would be rewarding to assess our glorious civilizational Past, developments, discoveries and phenomenology of the Present and to make use of those to build up a sustainable Future.

The study of consciousness, with special reference to its ontological, epistemological, phenomenological and axiological aspects, appears essential for this purpose. The inner space and the outer space, brain-bound consciousness and brain-independent consciousness, surface and depth phenomenology, organization within and civilization without are equally important in this context. Explorations of the phenomenon of 'death' while alive, which helps in letting the inside become out and outside become in, is expected to minimize their differences. The planes above 'classical' consciousness (super-conscious planes) and the planes underneath it (unconscious planes) could be placed in proper perspectives in the context of classical consciousness only thereafter.

We have drawn `The Big Picture' necessary for developing a science for consciousness. The whole project seems to be a multidisciplinary adventure in a mega scale which is expected to crystallize into a New and unique Worldview / Paradigm which would be able to accommodate Humanity Science and Spirit and integrate

Consciousness Philosophy and Science. Concluding comment, therefore, concurs with what has been stated in the opening paragraph of this paper. *What we need is in one person a spiritualist, a philosopher and a scientist. And, we need plenty of such beings* .We have, therefore, undertaken a never-ending project!

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