REALITY OF SELF AND SELF AS REALITY

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Preface

The original draft was written sometime during April of 1998. I recently (around August 2019) revisited the old write-up of 1998 on a request by a friend. I have made only some minor editing of the 1998 version. My earlier plan was to bring out a formal book with the title '*Reality of Self and Self as Reality*'. As per the earlier plan, I wanted to include one more Chapter on the concept of Self from the viewpoint of Vedanta (or Upanishads). In this informal booklet, I haven't included this viewpoint of Vedanta.

Since 1998, there has been an immense amount of literature and lectures that have appeared on Self and Consciousness. As I have retained the 1998 version, many of the recent works haven't been reviewed here. I don't claim this work to be recent or exhaustive or critical. This write-up has to be seen as my reflections as of 1998. Despite these limitations, if the reader finds the presentation useful or interesting, I consider my effort as worth-while. I thank those readers who have evinced interest to read this informal write-up.

9th August 2021 *PVAnanthapadmanabha*

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About the Author

T. V. Ananthapadmanabha holds a PhD degree in electrical communication engineering from a reputed institute in Bangalore, India. He has researched in world renowned laboratories in the area of speech science and has published a large number of technical papers in peer reviewed international journals. Apart from his academic pursuit, as an entrepreneur he has produced software products in the area of voice and speech catering to speech and hearing impaired.

His interest also lies in understanding the contribution of Indian *rishis*. He has also authored the work, *Inner Workings During Yoga Practice,* which is based on the teachings of his spiritual guide, Sri Srinivasa Ranga (or in short, Sriranga) Sadguru. For more details on Sri Sriranga sadguru, visit www.ayvm.in.

Part-1

Science and the Concept of Self

Resume

Two broadly prevailing views on the concept of Self are presented in this chapter. Recent advances in scientific thinking especially in the areas of quantum mechanics, cosmology, molecular biology, brain research, robotics, artificial intelligence etc. have had a wide ranging impact on the beliefs of the previous centuries. Science has made tremendous progress in explaining the structure and functioning of universe and life. Technology, that derives its base from science, has contributed significantly to the progress of society. Philosophically, science and technology implicitly impose mechanistic view on life according to which the so-called consciousness, leading to the experience of self, is a property of physical matter and energy. This leads to a cynical outlook on life.

On the other hand, dualistic theories believe in the reality of a self as independent of physical matter and energy, thereby attempting to account for the meaning of life and justification of values. Broadly, these can be grouped as spiritual and non-spiritual dualistic theories. In the case of spiritual dualistic theories, mostly found in religions, entities such as soul (or psyche or self), God, mind etc. are supposed to exist. These entities are supposed to be made of non-decaying *'spiritual substance (or stuff) and/or spiritual energy'* that is different from the physical matter and energy. In contrast, the non-spiritual dualistic (non-religious) theories propose certain 'principles', which act along with the physical laws of science, to explain the emergence and functioning of self, mind, consciousness etc.

The above views are reviewed in this Part.

1. 1. The Eternal Question

We often wonder about the vast universe, the bubbling life and the probing mind. Where from has the universe emerged? How come there is an order and lawful evolution in the universe? Is life an outcome of a series of accidents or is it a purposive creation? What is mind? What is Consciousness? Is there a self? Does self survive death? Such questions about life and its surroundings sometimes haunt us. Usually, one silences such disquieting questions of the inner conscience by turning one's attention to something tangible. On the other hand, one with a philosophical bent of mind may ponder about them. Such questions have often been addressed by the learned men of the past and will surely be addressed by the posterity. While pondering on the meaning of life, one may find a new piece of nature's puzzle or relocate an existing piece in a different place presuming to provide a better perspective. Meaning of life appears to be an unsolvable mystery of nature.

1. 2. The Two Viewpoints on Self

Broadly, there are two philosophical viewpoints on life: mechanistic and non-mechanistic. There are several finer divisions within the two categories[1]. Mechanists are those who *don't believe* in the existence of anything other than the physical matter and energy, whose properties are described by the laws of physics or in general, the laws of science. Mechanists, who put *faith in reason* to determine the ultimate Truth, may be referred to as non-believers. The word 'mechanistic' refers to a specific school of non-believers in the context of formal philosophical writings[1]. However, all non-believers (materialists or physicalists or agnostics) are referred to as mechanists in this work.

Mechanistic viewpoint has been inspired by scientific findings. The scientific methodology and findings are reviewed later. According to this view, the present intelligent society is an outcome of a series of accidents or random events with no pre-planning or purpose behind the scheme of things. Life consists of biological organisms made up of cells. Cells in turn are made up of elementary particles and energy transfer mechanisms. Consciousness, Self and mind are properties of matter. Consciousness and self-awareness seem to have emerged on earth by a series of *accidents*. Paradoxically, in this view, the *intelligent* scientist who declares nature as non-purposive is himself/herself an *accidental or random outcome.*

Non-mechanists are also called dualists. The various dualistic theories are reviewed later. A major group of dualists are persons who *believe* in the existence of *non-physical entities* such as God, self or soul, mind, spirit, etc. This non-physical entity is supposed to be made up of a *different kind of stuff or energy, called spiritual,* in contrast to the *physical matter and energy*. Proponents of various religions belong to this group. Persons of this group may be referred to as spiritualist-dualists[2]. These dualists *reason out* that one should possess *faith* to arrive at the ultimate Truth. Life is an outcome of a purposive creation and not a series of accidents. The natural instinct to preserve and perpetuate life, to uphold ethical and moral values in society etc. are induced by the purposive creation and by the presence of a non-physical entity, the soul, inside the body. Religions take the stand that existence of the non-physical (soul or God) is a matter of subjective mystic experience. Records of life history of saints, yogis, sufis etc. describe such experiences, which mechanists dub as delusions.

It is important to note that believers and non-believers are not necessarily divided according to their professional background. One may

be an eminent scientist yet believe in a spiritual entity such as God or soul. On the other hand, one may be a staunch moralist and yet not believe in God or soul.

Is this issue of belief Vs non-belief worthy of a discussion? It appears as though Nature has reached the pinnacle of glory in the creation of homosapiens. Evolution is now not biological but cultural or social. The viewpoint of today's society will determine the direction of future evolution. Today, science and technology, not religion, mainly influence the society. An understanding of the meaning of life as per science is of relevance. Religions are losing their force in influencing the society. It is important to understand the reason for the weakness of religions. Meaning of life as per science and religion is worthy of a study [2,3.]

1. 3. The Methodology of Science

Scientific method has evolved over time and has established itself as infallible and appealing to human intellect [4,5]. The methodology of science consists of experiment, observation, inference, model or theory building, predictions etc. Science divides up a phenomenon (whole) into a small number of micro-phenomena (parts). It attempts to explain the parts and then puts together the parts to explain the whole. A layman may notice this approach especially in the medical profession where there are a large number of specialists. This division of a problem into parts is called reductionistic approach. The first type of scientific activity is taxonomy or systematic classification of data around us. Data are gathered by measurements using either sense organs or instruments that expand the scope of sense organs. Experiments are repeated several times by the same scientist in the same laboratory. Experiments are also replicated at other laboratories. All observations are supposedly objective without any prejudice on the part of the observer. Objective approach implies that the

experimental outcome would be the same irrespective of the caste, colour, creed etc. of the observer. Experiments are usually designed to study one particular aspect while disturbances from extraneous factors are kept under control. That is, in an experiment, the effect on a particular parameter is studied while certain variables are changed. The aim is to establish correlations amongst a set of variables. Data are represented in a variety of graphical forms to reveal hidden correlations and structures. These are described by means of mathematical equations or models. Predictions are made possible by extrapolating the correlations and symmetry relations using the power of mathematical modeling. Thus, one may be able to predict the expected outcome of an experiment even before conducting the experiment. The success of a theory is based on its ability to (a) provide explanation for a known phenomenon and/or (b) make successful predictions with the least number of assumptions (parsimony of hypotheses). Science has an open mind and is impersonal. A successful theory proposed even by a genius has to be abandoned if it is noted that the predictions don't match with the observed data. Unlike music or literature where individuality plays a significant role, science grows by a community effort and the subjective influence of an individual is to be suppressed.

1. 4. Science: Its Achievements and Contributions

1. 4. 1. Physical Sciences

Matter, as we see in the universe, is so complex and there are a large number of material objects ranging from the chair on which one may be seated to a distant star. Chemists have shown that all these objects are made up of hundred and odd elements and their combinations. What a great simplification! Further, physicists have shown that these elements are themselves made up of a few elementary particles governed by few

fundamental forces. It is the number and arrangement of these elementary particles that gives rise to different elements. Further, these elementary particles are themselves made-up of quarks, their geometrical arrangements and their dynamics. Physicists have deduced the composition of a star situated millions of miles away from the earth. Physicists have also unraveled the structure of an atom whose dimensions are extremely small.

Physics has altered our common sense notions of space and time. Space and time are said to be inter-convertible! In terms of a layman's language, one may trade 'space' for 'time' and vice-versa. Mass and energy are shown to be inter-convertible! It is said that gravitation is equivalent to the curvature of space. It is difficult to imagine curvature for the emptiness of space. There are stars whose gravitational force is so huge that they don't allow light to escape out of them. Existence of such invisible stars, called black holes, has been deduced! Such are the startling, incomprehensible results obtained in the area of modern physics regarding the structure of matter and energy[6].

1. 4. 2. Biological and Computer Sciences

There are a large number of species both in plant and animal kingdom. Biologists have shown that all animate objects are composed of cells[7]. Differences in species arise because of differences in the arrangement of cells. Theoretically there is no difference between an animal and a man as both are made up of cells. The individuality of the species arises due to the complex arrangement and the type of cells. Evolution theory has successfully traced the emergence of the diverse form of species from some simple forms. The characteristics of life, viz., metabolism, growth, regeneration, self-repair, heredity etc. have all been explained. Vision has been restored to blind. Auditory sensations have been restored to born

deaf. Embryo has been created in a lab using artificial insemination. Life has been prolonged using support systems. Genetic mapping has been carried out in very great detail. Cloning (producing an embryo of a specific genetic mapping) has been successfully done.

Awareness of environment, learning, memory etc. are *mental* or *conscious* activities. In neuro-physiology, the basis for such activities has been studied using animal preparations and also human brain. The biochemical and electrical changes associated with learning, memory etc. have been studied[8].

Computers have been programmed to perform a variety of tasks that require a high degree of intelligence such as language usage, object identification, symbol manipulation[9] etc. Expert knowledge base, as that of a medical doctor or an attorney of law, has been programmed into computers. These programs can advise the user very effectively. Computer programs have been written to play chess, to compose music, to write poems etc. Such are the startling results obtained in the area of modern biology and computer science regarding life and mental activities.

1. 5. Implications of the Findings of Science on Life and Self

The main findings of science relating to universe and life are: (There is no significance in the order of listing)

(a) Matter and energy have not been created by any external agency. Matter and energy have been existing and will continue to exist forever. Only their distribution will change. Matter and energy can neither be created nor destroyed. The sum total of matter and energy within the universe is a constant.

(b) Universe, including animate and inanimate objects, is made up of a few elementary particles and a few fundamental forces of interaction.

(c) Objects are produced by a combination of elements based on the atomic and molecular structures. Objects of higher atomic numbers have evolved from elements of lower atomic numbers.

(d) Biological organism and subsequently life evolved on earth from a primordial soup of elements bombarded by electromagnetic or cosmic rays coming from outer space.

(e) All animate objects (living objects) consist of organisms. Organisms are made up of cells. Each cell has a specific function depending on its structure. Various cells have emerged in nature by random combinations.

(f) Cells that perform useful functions in an organism have evolved in large numbers.

(g) There is no evidence of an external agency such as soul entering an animate object to give it the characteristics of life. Life is an outcome of the combination of constituents of the biological organisms.

(h) Innumerable random combinations of various elements and cells have occurred during the past several billion years. However, most of those combinations have degenerated. Certain combinations of cells or species that were relatively stronger have survived and multiplied. Such an emergence of life is merely a chance occurrence and is not an outcome of any purposive planning. A similar thing would happen if such conditions were replicated in a laboratory. Thus, in evolution, initially the lower life forms appeared, then the invertebrates then the vertebrates, then the human beings.

(i) Individuality or self-awareness arises due to the activities of the brain. If a person is given anesthesia then there is no self-awareness showing the dependence of the consciousness on the functioning of the brain.

(j) Artificial intelligence (AI) programs can simulate the activities of intelligence such as carry out meaningful conversations, comprehend

speech, diagnose and give expert advice (legal or medical), play chess etc. This shows that the so-called intelligent processes can be mechanized.

(k) Characteristics which one considers individualistic are preprogrammed in the genes. Lab experiments have shown that by manipulating the genes it is possible to change the behavioral pattern, learning ability, physical characteristics etc. of the offspring.

1. 6. Life as a Property of Matter

Mechanists declare that '*life is a property of matter'* emerging out of the complex arrangement of complex molecules all interacting with one another. Consider for example, charcoal and diamond that are made up of carbon atoms. Charcoal absorbs light whereas diamond scatters light. According to physics, it is the *arrangement* of atoms of carbon that determines its *properties*. Similarly, the difference between different forms of life is one of degree (arrangement of cells) and not of kind (not physical Vs spiritual cells).

According to some mechanists, self-awareness and hence mental activities can also be explained based on the findings of science. Various arguments have been put-forth to defend such a view. A small dose of a chemical may render a person unconscious as in the case of injecting anesthesia. Activity of brain requires about 20 watts of power and a person enters coma when this power is lowered to about seven to eight watts[10]. It has been found that the quantity of oxygen required by brain is about the same irrespective of the type of mental activity, highly intelligent or irrational. Physical parameters, which change the functional properties of brain, change the faculties of mind.

It is said that where there is brain there is mind and where there is no brain there is no mind. It is argued that consciousness evolved or arose (popped out) as an outcome of the big size of the brain (like Jack from the box) [11]. It is said that lower forms of animals, even up to Apes, lack self-awareness[12]. A child gains self-awareness by about eighteen months. Since the functioning of brain is explainable (hopefully, fully one day) by biological sciences, it is argued that consciousness (self-awareness) must also be explainable based on science. It is argued that there can be no *consciousness* (awareness) without some kind of *experience* but there are experiences which one is not aware of (subconscious). Such arguments have been put forth to explain that conscious self is an outcome of the activities of the brain and that there is no independent self apart from brain.

Further, it is argued that mind or consciousness is an experience accompanying the functioning of brain. The conscious experiences have a psycho-neural identity[1]. The hypothetical self has no effective action on the brain. Rather, the neural machinery of the brain that functions in a deterministic materialistic manner gives rise to self-awareness. The common sense experience that we possess will power or that we can control our actions or that we can express our thoughts in language, are alleged to be illusory[13].

1. 7. Life as a Robot

Biological life can be compared to that of a robot. A robot can be designed to perform almost all the tasks of a human being (perhaps task-wise at present) such as avoiding threats, understanding speech, replying to queries etc. A robot is designed using elements from the material world and has been programmed to perform various tasks. A robot behaves in a manner similar to a human being. There is no external entity such as a

soul or self in a robot. By analogy it is argued that there is no external self or soul or conscious entity within a human being. Software programs enable a robot to function. Similarly, one may argue that software is the *mechanism* of the conscious activities in a human[14]. Science fiction stories predict that robots take over human beings and make them as its slaves. In a sense the fear of science fiction has already become real. After all, a human being can be considered to be a biological robot and we are witnessing exploitation of one human being by another.

It is said that the program controlling the biological robot may be called consciousness[14]. Who has programmed this biological robot? Nature has not only produced this biological robot (hardware) but also programmed it (software). Who has introduced the purpose or value judgments into this biological robot? Apparently the random forces of Nature since science doesn't accept that there is purpose in evolution. Purposive behavior and pursuits of knowledge seem to emerge from random purposeless processes[15] (See Appendix-A).

1. 8. Impact of Science, Technology on Society

Science is based on rational thinking and objective experimentation. Technology is the application scientific research for the benefit of society. Technology has its roots in science and it is sustained by the market place of the society. Technology has a direct impact on our day to day life. Science and technology have produced tangible results. The major contributions are in the areas of necessities of life, namely food, health, clothing, shelter, education and communication. One need not elaborate on the significant contributions made by technology in the improvement of food production, standard of health etc. Secondary contributions have also been made in the area of providing comfort.

Other areas of development have mutual dependence of sustaining scientific research and technological enterprises. Invention of instruments and tools has enhanced the scope of scientific research, which in turn supports technology. For example, invention of powerful microscopes has not only resulted in deeper understanding of the structure of materials but also in semiconductor technology. Computers that were primarily meant for quicker calculations of complex equations in science, has now become a major thrust area of technology. Computer technology is being applied in almost all areas of scientific research. There has been a positive feedback between science and technology resulting in their rapid progress.

Scientific research started off as an enterprise for pursuit of knowledge and understanding of nature. However, today, it threatens the very society that supports such activities. Directly or indirectly, both scientific research and technological gadgets have led to certain undesirable social problems.

Along with mass production and specialization in skills, migration of family members to places of employment has taken place resulting in major changes in the structure of society. Husband and wife may be living in different and far off cities or even far off countries as a consequence of career pursuits. Marriages are being replaced by companionships. Family life is losing its significance leading to single parent houses. Children spend most of their time with machines or at day care centers rather than with parents. For today's children, characters like Mickey Mouse, Ninja Turtle, Super Mario etc. are more realistic than historical characters such as Rama or Krishna or Jesus or Mohammed or Buddha.

Ability to detect the sex of a baby before delivery is an interesting medical discovery but has led to female infanticide in certain societies. Ability to fertilize an egg in a lab and plant it in a womb has resulted in

questioning the definition of parenthood. Biological life can be prolonged almost indefinitely using support systems. This has led to questions about the definition of death. Longevity has been increased, but life seems to be mechanized and many times boring or pretentious. Although there are many material comforts, yet, there is rheumatism. Today, we have nuclear ammunition that can destroy the world hundred times over. Technology has introduced many gadgets into our style of living. Consequently, earth's ecology has been disturbed. Mass communication (transportation) has made rapid strides and also has produced pollution. Communication technology has progressed yet there is loneliness and insecurity. From a cave man, we are now highly educated. However, crime rates and cut-throat competitions are increasing alarmingly.

It appears that human society is evolving towards a global conscience. Thanks to mass communication and telecommunication, the world has become smaller. There is cultural influence of one society on another. There is influence of fashions of New York and Paris on persons living in the remotest villages of India. A saint or a yogi from a remote village of India may be found to have an influence on a group of persons in a leading city of a Western nation. Such issues as nuclear weapons, ozone layer depletion, ecological balance, global warming etc. are being felt by the global conscience and hence are being addressed by the society at large.

Science is supposed to be detached and is not impose any value judgment on society. Yet, the implications of scientific findings lead to a certain outlook about life. Such an outlook about life is a subconscious effect on the global conscience. It is much more difficult to identify the subconscious effect on the global conscience and expect the human society to act upon it. The deliberation on the meaning of life is one such issue. It is no longer an academic issue. A philosophical deliberation on

the meaning of life has to gain utmost practical importance and urgency in the present day society. Implicitly, science and technology take on an agnostic viewpoint. That is as well a mechanistic viewpoint. Belief in the non-physical or spiritual entity may even be considered as a hindrance to the progress of science. We thus see the two-way impact of science and technology on the quality of life - materially providing benefits and philosophically imposing a mechanistic view.

According to mechanists, life is nothing but a complex bio-chemical reaction. There is no extraneous *entity* such as soul or consciousness or God residing in a living being. *' There is no ghost in the machine '*, they would say. There is neither any evidence for the existence of such an entity nor a theoretical compulsion to hypothesize such a non-physical entity. In their view, both life and non-life are merely properties arising out of complex arrangements of matter and exchange of energy. If life is a property of matter, is an individual responsible for his/her actions? Who are the ideal persons to decide on the punishment for crime? What are the criteria for punishment?

There is no reason to consider life to be more valuable than non-life. Further, the law of conservation of matter and energy explicitly states that there is no *real loss* with changes in matter and energy. Such a view implies that sick, weak and handicapped persons may be weeded out for the progress of society as it implies only a redistribution or re-arrangement of matter and energy and by the theory of evolution, only the fittest have to survive anyway. If one can make another person weak by any means (hook or crook) and increase one's own survival then that is a sign of fitness. Does our conscience accept such degenerated values? Does not the human society believe in the right to live and freedom for every individual in society? Does not the society support handicapped and old? Are not the actions of society contrary to the implications of mechanistic

philosophy? An individual's freedom to life, irrespective of his/her ability, is not only respected but also highly valued even by non-believers or mechanists, a belief contrary to the implications of their philosophy. Further, why should one perpetuate one's own life? If one is dejected one can choose to put an end to one's own life. We are already witnessing mass suicides born of disillusionment about life here on earth a d incidents of mercy killing. The increased crime rates may also be viewed as arising due to a cynical outlook on life. A society with degenerated moral and ethical values, a society with cynicism and disrespect for life may be inferred by the mechanistic viewpoint on life. Why is it that the present society is so strongly influenced by the mechanistic view? Why are the other viewpoints so weak in their impact on society? The issue of meaning of life has to be addressed by the society before a large-scale cynicism about life sets in.

1. 9. Spiritual Dualistic Theory: Religions

Religions form the biggest group in terms of spiritual dualistic theories. Despite diversity there are some common beliefs in all religions. All religions believe in ONE supreme God[2]. If there were to be several Gods equally supreme then there will be conflicts amongst these Gods. One has to postulate a meta-supreme-God to oversee that these so called supreme Gods don't enter into conflicts. Postulating many Gods leads to infinite regress and hence the concept of ONE supreme God has to be accepted. There are broadly two views on the supreme God. According to one view, the supreme God has a personal form. According to another view, the supreme God has no shape, form etc. (impersonal), but has attributes such as bliss, knowledge etc.

One of the beliefs is that God is the *creator* of universe and life. The word *creator* may be interpreted in two ways; In one view, He is a

magician who seemingly creates something out of nothing, as in dreams. The entire universe and life is a dream of the creator (*Brahman*). In the second view, He is an artist or sculptor who creates an art piece or sculpture from an ever *pre-existing* raw material as a sporting cosmic event (*leela*).

Universe is made-up of matter and energy. Where from did this matter and energy emerge? God created them by His immense power. Because God is supreme, one can't ask the question: 'Who created God?' His powers can't be questioned - (period). In this view, God is both the imminent and efficient cause of the universe and life.

When God is assumed to be a creator, in the sense of an artist or a sculptor, then the raw material, viz., the inert physical matter and energy are also assumed to be eternally existent. Individual souls are also assumed to be eternal. However, the principle underlying Nature's evolution into diverse and useful forms is a *design* of God. The universe and life are designs conceived by God. We are witnessing the unfolding of His will or design.

Theists put forth several arguments to defend the concept of God's creation. God created the universe for the sake of souls (redemption of souls). It is this soul who is the witness self in a body, who is experiencing the emotions, who is making value judgments etc. Soul in its real nature is eternal and blissful. Because of its ignorance of its own true identity, it either enjoys or suffers the situations. The soul has slipped from its blissful state and hence it has mis-identified self with its thoughts, and imagines itself to be a mortal and suffer. God is compassionate. By providing a livable universe and a human form, He makes a soul redeem its ignorance and reach His kingdom. By having staunch faith and following a prescribed path, the soul can experience the mysterious God and His powers. A deviation from the prescribed code results in suffering. When the true

reality of soul and its relation to God are realized then all misery disappears (as waking-up from a dream) resulting in an eternal blissful state. This is the goal and meaning of life. This is the approach of religions.

1. 10. Weakness of Religions

There are many criticisms on the religious viewpoints[16]. Why did God create the universe? One indulges in an activity only if one has an unfulfilled desire. God's indulgence in creation implies that He Himself has an unfulfilled desire or that He is not completely happy. Another implication is that there is so much misery in society. If God created this universe, why did He not create a misery free society? Creation is beautiful according to a theist. But, beauty lies in the eyes of the beholder. Full moon may arouse romantic thoughts in a poet. An astronomer may see only the irregularities (craters) on the moon's surface. Universe, in fact, may be viewed as chaotic. Probabilities enter into the laws of physics.

Religions consider life to be a creation of God and as such life is highly valued. The irony is that some fanatics consider life to be highly valuable only if that individual's life belongs to a particular religion or caste or community. Historically, there has been much bloodshed in the name of religion.

The existence of soul or God is to be ascertained by mystical experience. According to this view, the mystical experience is attainable by a seeker who has matured by practicing a well-defined code of conduct. There is no formal training or time bound program that can assure spiritual or mystical experience. There is no means to know quantitatively: (i) the degree (e.g., 60% or 90%) of spiritual maturity of a seeker, (ii) time required to reach the goal (iii) the rate of one's progress in

spiritual path. Failure to experience the mystical may be dubbed as spiritual immaturity or lack of sincerity on the part of the seeker. Further, there is no guarantee that one may experience the spiritual or the mystical within one's lifetime.

Certain indirect arguments are presented to justify the immense effort required to obtain a mystical experience by means of an analogy. In order to understand the advanced concepts of modern physics, a formal training of about fifteen years is required. Similarly, a long period of practice is required for a mystical experience. It would be improper to expect instant results in case of mystical experiences. However, progress in case of physics can be monitored but not so in the case of mystical pursuits.

Not all persons are religious. In fact, some non-religious persons may be leading a happier and non-guilty life compared to the believers. The proponents of religions assure the believers that there is a better life hereafter that once again rests on faith. Another strong belief is that God is merciful and listens to devotee’s prayers. Since God is all-powerful, He can alter the course of events in one's life and may even perform miracles to help His devotees. These statements have to be trusted based on faith.

There are several major difficulties with the theological views to a rationalist. Firstly, scientists without assuming God or soul have been able to explain the evolution of universe and life. Matter and energy, physical laws, properties of nature are assumed to be 'given' or existing on their own. Life and consciousness have emerged out of random forces. God, as an explanatory power, is superfluous. Of course, there are still gaps in our knowledge about universe and life. However, that doesn't necessarily mean that one has to postulate God. By postulating God, whose existence can't be proven, all the unexplainable phenomena can be attributed to God. As and when more and more knowledge is gained, the

postulate about God's existence becomes weaker and weaker. Hence the concept of God in the context of explaining natural phenomena seems irrelevant.

Unfortunately religions have gone out of their spiritual domain and ventured to offer explanations about the origin of universe and life. What religion considers mystical, science attributes it to randomness. Historically, religions have been responsible for instilling ethical and moral values in people and fear some consequences if these are broken ('*if there were to bo no God, we have to invent one*'). Certain statements in some of the religions on creation have been contrary to scientific findings as interpreted by scientists. The proponents of religions then seek to reinterpret the explanations offered in the religions. Perhaps religious explanations were meant for a common man and not for a specialist. Hence those explanations might have been considered adequate enough and even secondary. The primary emphasis of religions is the mystical. Since science has shown contradictions in the explanations offered by religions and since science does not find any evidence for such entities as soul, God etc., and since Science demonstrates tangible results, not only the explanations of natural phenomena given in religions but also postulates based on faith such as rebirth, sin, soul, retribution, *karma* etc. have all come under serious doubt. As a consequence, religious beliefs seem to have lost their force.

The implicit faith of a layman put in religion has been shaken to the very foundation. An obvious consequence is a loosening on the conscience to eschew from immoral and unethical practices. One may postulate that as long as one doesn't harm another person's freedom then one may indulge in any type of activity, even immoral or unethical. However, such a general rule can't be applied since all human beings are interdependent in today’s society.

There is only one science but there are several religions. Divergence and conflicts amongst proponents of different religions is a major disillusionment to people who want to seek solace in a spiritual entity.

1. 11. Non-mechanistic Theory: Teleology

One of the theories about creation is that the raw material of the physical world (matter and energy) always existed and was never 'created'. According to theists, God put down the rules for its evolution. Instead, one may hypothesize an atheistic philosophy where Mother Nature itself is intelligent and purposive and it has not only the raw materials but also the in-built laws.

The methodical evolution is an indication that a teleological principle is operating in Nature. In fact, it may be noticed that whenever human beings act in a manner so as to counter the purpose of evolution, nature rebounds initially with warnings, and then with fury to ensure that its purpose is not meddled with by persons of its own creation. For example, nature expected a moral code to be followed by people. A violation of such a moral code as an isolated case by an individual in African continent resulted in the spread of AIDS. Nature intended humans to live in harmony with flora and fauna. As man's desire for comforts went beyond certain limits, nature has rebounded with a threat to ecology. (Green house effect, global warming, ozone layer depletion, un-timely and heavy rains, melting of arctic ice, raising of seal level etc.) Man, out of greed and urgency, invented pesticides as a short cut for hard work that has resulted in erosion of fertility of soil etc. Man, out of greed wanted more yield of milk from cows and fed non-vegetarian food to them resulting in mad-cow decease. Nature hid its structure in atoms. Man explored deep into its structure and is now worried about nuclear arms disarmament. Nature gave man flora and fauna to be used as medicines and even

cosmetics. However, man's desire to overdo has resulted in allergies. Nature is teaching man to learn to live in harmony with environment and temper his own needs and comforts. Such situations seem to suggest that Nature is intelligent and purposive in its evolution.

Of course, one may argue that left to nature alone, mankind would have vanished long back or it would have suffered terribly. Thanks for advances in man's inventions in medical science that human beings are surviving with better health. Thanks for man's efforts he is able to withstand the nature's extreme climatic conditions. This argument may be countered by saying that Nature is working through man. It is difficult to decide between the hypotheses whether an intelligent Nature or God is directing the evolution. If Nature has a purpose and capable of directing the evolution, then that *principle* of nature itself can then be considered as an impersonal God.

Proposing Nature as the directive agent results in a non-spiritual goal for life and leads to an atheistic philosophy. It dispenses off with the belief that something subsists after death. However, it stresses the need for maintaining a life of harmony with nature and other life forms. This is same as the mechanistic philosophy except that intelligence of nature replaces random forces. It leads to a cynical outlook on life since survival or seeking knowledge happens to be meaningless pursuits. Also, man as an automaton of nature, may disown any responsibility for his actions. Man's belief in the transcendental existence has strong roots and raises man's hope into future and provides a moral basis for values.

Anthropic Principle: Some scientists have used persuasive arguments to justify that evolution has a purpose. This is based on the so-called anthropic principle. It is putting biological evolution in the reverse gear and inquiring if life would have emerged had the conditions in evolution been different. It is stated, for example, that had the rate of expansion of the

universe, at about one sec after it was born (big bang), been different by *one part in a thousand billion*, then the universe would not have evolved and life wouldn't have emerged on earth[19a, 20]. It is strongly believed that in the very vast universe with billions of stars, life seems to exist only on earth! It is argued that the huge size of the universe and the immense number of stars have evolved in order to support life on earth [19b, 20]. Similarly, many of the physical constants in physics have the right value or else life would not have emerged on earth. These arguments presuppose that emergence of life had been the goal of evolution. Nature has left the direction of future evolution of society on earth in the hands of human beings.

1. 12. Non-spiritual Dualistic Theory: Extended Science

Science has undoubtedly made remarkable progress in explaining the various phenomena. One doesn't want to abandon the framework of science because of its success. At the same time, in order to provide an explanation for the creative, emotive and subjective aspects in life, one has to postulate certain additional principles. One could work backwards (hind-sight) to reconstruct evolution theory knowing that one has to accommodate self-awareness, values, purpose, aesthetics etc. Some philosophers have proposed certain additional principles that are supposed to operate in parallel with the evolutionary physical forces of nature. Different philosophers differ in terms of hypotheses about the additional principles, their operational characteristics, the manner in which these principles coordinate with physical laws, etc. We refer to these theories as 'extended science' [21 - 24]. These theories are highly technical and it would be difficult to make a justifiable presentation here. However, to give a flavour of their arguments a couple of examples are given. Author's interpretation may not truly reflect the original theories of the

proponents. Readers are recommended to refer to the original works for accurate renderings.

In one view, certain 'creative principles' operate in parallel with the evolutionary forces (Whitehead's philosophy) [21]. At any given point of time, in history, a species is determined not only by the entire past but also by an *anticipation* of the future. This sounds like an element of anti-causal principle. At any given point of time, a number of future possibilities are supposed to be *apprehended by the organism* and it makes a *deliberate choice*. This *knowledge of* the possible *future* states is called *'prehension'*. Knowledge implies conceptual activity and a subjective element in evolution. The ultimate purpose of the creative principle unfolds in small steps. At any time in the history of evolution the active and discernible purpose is a partial manifestation of an ultimate purpose. During the realization of sub-goals there may be changes in the physical and biological material as well as their properties and arrangement. The physical arrangement and properties thus limit the ultimate purpose and only a partial or sub-goal gets manifested. There is a mutual dependency of the creative principle and the physical laws. Thus one can say that *life creates matter* with a purpose rather than the other way around as proposed by the physical sciences. Further, a living organism consists of certain processes that are beyond those which are apparent in the material apparatus.

The major difficulty with the concept of extended science is that it doesn't account for the individuality of self - 'I'. An individual is an outcome of not merely the random forces of mechanists but also certain creative principles. Tendencies such as suicides or homicides are explained away as unsuccessful attempts by the creative principle operating in matter. Certain indirect arguments are put forth to defend such concepts as free will, values etc. One's own individuality is the

greatest reality and one's striving or struggle in life is to understand oneself rather than playing a small role for the sake of statistics on life in the unfolding of the universal drama.

It is difficult to envisage how two independent (unconnected) principles jointly operate to produce a meaningful life. Theoretically, how is it ensured that they don't violate each other? Is there a coordinating principle between them? If there is a coordinating principle, how can one consider the two principles to be independent of each other? Somewhere amidst the physical principles must lie a link to the creative principles and vice-versa. Once such a link is discerned then the creative principles can be subsumed under the physical sciences or vice-versa. It appears that the idea of two independent principles operating in nature is to be revised.

Another view of extended science can be explained by analogy to Origami, the art of folding paper to form different objects. Different objects emerge from the same paper by means of artful organized folding. It is assumed that life emerges due to an organized principle of folding of the physical matter and energy. The topology or the folding creates new forms other than physical matter and energy - *a new dimension* of conscious awareness. In addition to the physical laws, certain hierarchical folding laws are also operative so that higher forms may emerge from lower forms, all the forms being united at any given time (the theory of polyphasic unity of Harris) [22]. This view is similar to the one proposed earlier in Sec.1.11 ascribing intelligence to Nature.

1. 13. Concluding Remarks

From the above review of diverse theories it is clear that belief in the mechanistic viewpoint leads to cynicism whereas belief in the existence of a non-physical entity leads to dogmatism. Is there no solution to such an impasse? Society has to impartially consider all the viewpoints and adopt

a holistic view so that the future generation of society evolves to be non-degenerating or non-cynical. Any viewpoint or philosophy on life has to be rational, convincing and has to produce a healthy vibrant society upholding universally acceptable moral and ethical values. It has to critically examine the role of science and religion. Claims of para-psychological or mystical experiences should be quantifiable and verifiable.

Some of the following questions arise while trying to formulate a holistic viewpoint acceptable to both science and religion. Is science adequate to explain all the phenomena including conscious or mental activities? Is science complete? Are the implications of science on the meaning of life valid? How to make science and technology accountable to society? How to arrive at social and moral values generally acceptable to entire mankind? What is the basis behind the practices as propounded in religions? If one believes in the existence of a mystical experience, how to measure progress in the spiritual path? How to distinguish a rogue in a robe from a saint in a suit?

If mind/self is made of non-physical (spiritual) stuff, how does it interact with the physical body and brain? Is the site of interaction physical or non-physical? There has to be a continuum between the physical and non-physical. Else if the two entities are entirely distinct, how could they interact at all? On the other hand if mind/self is made of only the physical stuff then it leads to meaningless or purposeless life and also a decay of self (perishing of individuality). This dilemma of physical-Vs-nonphysical is also called the mind-body dualism problem. In recent years there has been an overwhelming evidence that brain is the seat of mental activities and some believe that self interacts with brain. Hence the mind-body problem is also referred to as min-brain problem. Many learned scholars have contributed immensely to the literature on the problem of physical Vs non-physical dualism or the mind-body problem. These presentations are

mostly based on works of Western philosophers. Mind-body dualism problem has also been studied by neuro-physiologists.

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Part-2
The Need to Postulate Self

Resume

Mechanists state that 'life is a property of matter'. In this chapter we ask: In what sense does a mechanist uses the term 'life'? Three forms of life are identified: physical, biological and conscious. It is argued that the present paradigm of science is inadequate to account for the mental activities as displayed by a subjective self. Such arguments are based on (a) difficulties in obtaining experimental data relating to conscious or mental activities and (b) theoretical inadequacies inherent in the present form (paradigm) of science. The need to postulate mind and self as independent entities apart from the physical apparatus of body and brain is mooted.

2. 1. Physical, Biological and Conscious Life

Survival, growth and reproduction have been identified as the main characteristics that distinguish 'life' from 'non-life'. Survival is the preservation of an identity. Although life exhibits growth with concomitant changes in its structure yet some form of an identity remains. Reproduction or creation of offspring for preservation of parental characteristics is indirectly related to survival.

Inert matter also preserves its identity, in fact, better and longer. In an atom, electrons are continually jumping off from one orbit to another, emitting or absorbing electromagnetic (em) radiation, yet preserving its structure. This can be compared to metabolism in a cell. In case of exposure to extreme intensities of em radiation, an atom loses its structure

resulting in ionization (analogous to death). In inert matter, interaction between matter and environment, viz., exchange of energy, is taking place at micro-atomic level and at an unobservable rapid rate. A piece of rock preserves its structure for millions of years. In addition, crystals exhibit growth of similar structures which is similar to reproduction. According to one of the characteristics of life, viz., 'preservation of an identity', even inert matter should be considered to possess life. Use of the term 'life' to describe inert matter is not new. For example, a radioactive material degenerates with its mass decreasing continually. This process is quantified by a variable called '*half life time*' of the material. We refer to a drained cell (or battery) as *run out of life.* It can be said that inert inorganic chemicals possess a 'physical life'.

However, the term 'life' is usually associated with organic chemicals made up of cells. When an *entity interacts* effectively with the physical and chemical *environment* in such a way as to resist decomposition then *we say* that the entity manifests 'life'. It may be assumed that restoration and decomposition activities are taking place simultaneously. When the restoration process is stronger than the decomposition process, we observe 'growth'. When the decomposition process is stronger than the restoration process, we observe decay. Restoration is the conversion of physical (light and heat energy) and chemical (oxygen, carbon dioxide, food etc.) inputs into chemical forms of organic compounds that have been altered or reduced by the process of decomposition. Some examples of entities that exhibit such energy transfers and chemical changes (metabolism) are cells, bacteria, algae, plant etc. Let us refer to this process as 'biological life'. An entity with biological life preserves its structure and composition purely by factors built-into it - by its intrinsic properties, i.e., *as a part of laws* of physics and chemistry. Usually, such exchanges or reactions take place slowly and at an observable level making it dramatic unlike sub-atomic changes in an inert matter. In fact,

the dividing line between 'physical' and 'biological' life is very thin. This division seems to be decided by the relative quantities of inorganic and complex organic compounds present in an entity or by our ability to observe competing decomposition or restoration processes.

The demarcation *[entity Vs environment]* exists to an external observer. However, when an entity exposed to a threatening environment ***willfully seeks or moves*** to a more favorable environment or when an entity ***struggles*** against the external unfavorable environment for survival then we can say that the entity is ***aware*** of the environment and threat to its identity. In other words, when the demarcation [***entity Vs environment***] exists not only to an *external observer* but also when it is *experienced* by the entity itself then we consider the entity to possess ***conscious life***.

Consider a situation where a hammer is brought down with a heavy force on a piece of rock or a chemical is poured on a cell. The rock or the cell doesn't move. They don't avoid the threat. The entity such as a rock or a cell doesn't *experience* the environment. Movement alone is not an indication of conscious action. In some situations an entity may exhibit movement. For example, reflex movement when an electric current is passed through a dead frog's leg or a robot avoiding an obstacle. A robot is capable of detecting an obstruction for its movement but doesn't move away from it on its own *will*. Rather a programmer who defines the obstruction (threat) has programmed a robot. Such movements can't be considered to be the result of 'awareness' of the environment in the sense of an 'experience' in which there is subject-object distinction. In certain other cases it is difficult to demarcate between a conscious act and an inert reaction. Examples: algae reacting to light; movement of the branches of plants to seek or avoid sunlight; roots of plants penetrating a

rock to find fertile soil; ability to detect passing insects by a carnivorous plant; selection of sites by insects for the purpose of camouflage etc.

Consider a part of sea where there are fish, seaweeds, rocks etc. When that part of the sea becomes polluted, fish may *migrate*; weeds are destroyed; rocks just lie there. Birds migrate during winter from extremely cold climatic conditions to tropical climates. A deer at a lake runs away at the slightest noise, suspicious of a predator. Animals exhibit ingenious methods of survival instincts or adaptations to environment. We, human beings, can't deny the existence of subject-object distinction. Human conscious life involves the experience of external environment.

In literature, the terms ‘awareness’ and ‘consciousness’ have been used interchangeably. It is better to make a distinction between these two terms. We define awareness as an experience in which there is a subject. We define consciousness as a *principle* that is responsible for inducing the notion of a self or a subject in a living entity. The concept of consciousness is discussed later (Sec.3.5) in greater detail. However, in this Chapter, the terms ‘to be conscious of’ and ‘to be aware of’ are used interchangeably. Similarly, 'conscious activities' and 'mental activities' are used interchangeably.

Self-awareness: Conscious action for survival involves

(a) Knowledge of one’s identity

(b) An experience of the external environment and

(c) Ability to judge a threat Vs safe situation.

Item (a) refers to that identity which strives to survive in the form of a ‘subject’ or selfhood or 'I'. That which has to survive is distinct from the

environment and implies subject-object distinction. Survival also implies (c) above. Self-awareness is being aware of the environment *in relation to oneself (subject).* Animals, up to primates, *don't seem to possess* an identity (self-awareness) of their individualities[1]. If so, it is difficult to understand the act of survival in the lower forms. One may wonder what is it that these lower forms are trying to preserve if they don't possess a sense of an individuality or awareness of their identity. Mirror experiment is used to test if self-awareness is present in lower animals. In the mirror experiment the reaction of an animal for a black mark on its face is tested. A monkey is unable to associate its reflection in a mirror with itself. Chimpanzees and Apes show some limited behavior pattern that seems to suggest limited form of self-awareness. The ability to be aware of one's individuality implies knowing that one knows. It is said that self-awareness is not fully evolved in a baby till about one and half a year. Only in humans is the self-awareness fully developed. The assertion that lower forms of animals lack self-awareness is debatable.

It is argued that an animal acts by instinct and that it has been programmed to act for survival similar to the case of a robot. Human beings not only avoid a threat but also know the reason for their action. For example, a deer *may* run away from the sight of stuffed tiger assuming visual cue alone has been used. Even in humans the reflex action is the more dominant determinant. A person although fully aware of the fact that he is watching a three-dimensional movie, ducks his head when a bat in the movie flies close to his head and enjoys the fun. In this situation, there are parallel activities of instinct and intellect. Biologically awareness of environment and self-awareness have evolved gradually.

We want to emphasize the distinction between 'biological life' and 'conscious life'. A physicist or a chemist studies the 'physical life' of matter. A biologist studies (*as an external observer*, i.e., *objectively*) the

'*biological life*' not the *conscious life*. The distinction between 'biological life' and 'conscious life' has not been explicitly made in biology. We can state that neuro-psychologists are studying, in the biological domain, *consequences of conscious activities*. Psychologists and para-psychologists attempt to study mental activities associated with conscious life. However, their approach can't be considered to be objective compared to the approach used by physicists.

We now argue that science is inadequate to explain the conscious activities of an individual. This argument is based on various factors such as terminology, methodology, gaps in theoretical knowledge etc.

2. 2. Terminology Problem

One may question: In what sense have the scientists used the word 'life' when they state that '*life is a property of matter?'* Charcoal is a black fuel. Diamond is a dazzling jewel. However, both are different forms of the same element, namely, carbon. An object appearing as *black* or *dazzling* is a subjective *sensation* experienced by a human observer. Science is not concerned with how people react to materials. Scientists use objective measurements based on instruments and do not rely on the subjective judgments. An object being used as a fuel or a jewel (the worth of an object) is determined by the value assigned by the society. According to science, diamond is no more valuable than charcoal both being different arrangements of carbon atoms. There is no reason to consider one arrangement superior to another. Both forms exist on their own right. Try exchanging charcoal for diamond! According to science, life is no more valuable than non-life, both being different arrangements of matter in their own right. One arrangement may be more useful than another but, worth or use of an object is not a subject matter of science. In fact, there is no

concept of 'value' built into the system of science. We humans highly value 'life' - one's freedom to life (right to live) is considered supreme.

We see a contradiction between the implication of science about life and our implicit notion about life. This contradiction arises because the term 'life' has a different connotation in science compared to its everyday usage by non-scientists. Perhaps, a scientist uses the term 'life' as a technical term or *a notation* for describing the complex reactions (behavior) of a 'bio-chemical system' to the environment - the behavior that should strictly be defined only by objective terms. Although a layman and a scientist are both using the same term 'life' they denote different aspects of a living entity.

Scientists often mix up informal language of humans in their formal descriptions leading to confusion. For example, physicists and chemists describe properties of matter using terms such as density, electrical conductivity, permeability, specific heat etc. Such terms make sense within the domain of science. But, properties such as color, odor, taste, pitch or tone or musicality etc. are definitely not within the domain of science as these are subjective impressions. Similarly, in biological science, properties of cells etc. should be defined using technical terms that are within its domain. However, properties that are subjective experiences such as, intention, emotion etc. are used in describing the functions of organisms. In fact science abounds with terms signifying terms of animation or causality[2]. A scientist many times uses terms of informal language, within the objective domain of science.

It is not uncommon to come across contradiction between different meanings for one and the same term, one as interpreted by a layman and another as interpreted by a scientist. We will give an example. Consider the question: 'Is the size of universe finite or infinite?' According to physics, universe is *finite*[3]. As a layman one could ask, "If universe is

finite, there has to be an edge. What lies beyond that edge?" Mind can imagine something (empty space) beyond an edge thus defeating the definition that universe is finite. Interestingly, according to science, universe is not only finite but also expanding (expanding *into* what?). According to scientists our perceptual mechanism is determined by a geometry (Euclidean) which thinks in terms of boundary, edge etc. for finite size objects. However, the shape of universe (topology of universe) is based on a different kind of geometry (non-Euclidean). Thus there could be geometrical shapes which are finite yet have no edges. Shapes that can't be imagined by a layman. Here a layman and a scientist have used the same term 'finite' in different ways. *Special training is required for visualization of a finite size object with no edges*. Such visualization may be considered to be supra-sensory or para-normal (other than usual). A mystic, in respect of the mystical experiences, may also use such an argument. He may call for a suitable training of mind to experience the mystical.

The world of science is different from the world of a common man. The term 'life' has a different sense in the context of science compared to the context of its usage in informal languages of society. A mechanist uses the technical term 'life' as defined by a scientist but extrapolates its meaning to every day informal language. Hence, the mechanistic implications about life and its meaning are incorrect extrapolations.

2. 3. Methodology Problem

Scientific methodology can be illustrated by an analogy to the study of spoken language. Language consists of words joined together according to grammatical rules. The *meaning* conveyed in a discourse is not inherent in the words or their combination. If so, one should be able to understand an unknown language such as Sanskrit or Latin. Words are *symbols* that

convey meaning. A native who *knows the language* interprets the symbols. Listening to a discourse gives rise to certain 'meaning' and 'experience' to a person who knows the language. At the same time without concrete words or symbols, meaning doesn't arise by itself. In other words semantics is purely mental whereas the vehicle used to convey the meaning, viz., the language, is available for analysis[4, 5].

A person who doesn't know a native language can still perform a systematic study of the language: - identification of the units (phonemes) of the language; statistical analysis of the occurrence of various words and phonemes; syntactic rules on combination of words etc. Thereby he may discover the structure of a language but can't interpret the 'meaning' of a discourse.

Scientific methodology can be compared to an expert decoding an unknown language - the language of Nature. Science views the universe including life as being made up of building blocks or elements analogous to phonemes or words of a language. The combination of building blocks form bigger structural units. Such combinations are governed by a set of rules or laws. Thus for example, a physicist views the entire universe as made up of elementary particles and forces of interaction. A chemist views the universe as made up of elements and the laws governing their combination. A biologist views life as made up of cells and laws governing their combination. Scientists have successfully identified the 'units' or the ‘building blocks’ of the universe and life. The laws governing the combinations of building blocks have also been successfully discovered. This is similar to identifying the phonemes or words of a language and the grammatical rules. As argued above, mere identification of the units and rules of their combination doesn't constitute the *meaning*.

A language can be studied in another way. If a person studies the *usage* of a language in society then he may *observe* and *correlate* certain

words to certain functions/actions/behavior. In other words, he may map the structure of sounds to functions or behavior. Even for those actions that are observable, occasionally, there may be deviations. Such deviations may arise since the words carry different meanings in different contexts. Such a study of language will be incomplete because emotions or experiences aroused within a listener can't be grasped by the external behavior alone[4].

The kind of knowledge that a language expert deduces is different from that of a native. Listening to a language gives rise to an 'inner experience' for a native who knows the language. That experience is private and not observable. Only simple words such as 'sit', 'stand' etc. which have a direct correspondence between words and actions (as in pet animal communication) may be decoded by a language expert. Further, a native's interpretation of language is conditioned by emotional, cultural, ethical and moral *values* - values distilled genetically *over the history of time*.

A scientist tries to find a correlation (mapping) between a given combination of the building blocks (or structure) and a certain property or function or behavior analogous to [Word <==> Action] mapping while studying a language[6]. Thus for example, scientists are able to relate atomic or molecular structure of substances to its physical or chemical properties. Scientists are able to relate the structure of cells to a certain specialization in their function. Scientists are able to relate the secretion of certain chemicals by an organism as a reaction to external stimuli. As stated above, such a mapping between the structure and function doesn't constitute the meaning of life without taking into account a subject.

One may ask the question: ‘Is there a deeper significance at all or is there any meaning at all to Nature other than finding a mapping or correlation between structure and function?’ This leads to the question, ‘What is the meaning of meaning[23]?' Such a question can be resolved only

by a pragmatic approach. If one accepts the view that 'meaning' of the language of Nature corresponds merely to the mapping of structure to function excluding the subject then it leads to a cynical outlook towards life. Such a consequence arises because of the absence of self and the fact that values have no representation in science. Thus pragmatically speaking we can dismiss the statement that mere mapping of structure to function constitutes the meaning of life if we want to preserve the *common sense* value attached with life.

2. 4. Experimental Data on Mental Activities

Science is based on objectively measurable experimental data. Mind finds patterns, regularities, symmetries etc. in the data. Theories of science are deduced by abstract mental activity. Hence, mental activity can be considered to be one level higher compared to data gathered by senses. It should be noted that we are *not* arguing about the nature of mind, whether the mind is physical or not. Theories are formed by abstract thinking ability *applied on* experimental data. In a hierarchical sense, mind is above sensory data. How can mind formulate a theory on thoughts, its own activities?

Mental activities indicate the presence of conscious life. Let us assume that study of conscious activities comes under science. Then, to formulate theories about mental activities, one has to gather data on thoughts and thought processes. To do so one has to read another person's thoughts *objectively*. Even if it were to be possible the process of observation may alter the thoughts of the subject (person being studied) thus leading to a basic indeterminacy or uncertainty. The approach of eliciting answers to a questionnaire or artificial experimental situations in laboratories can't be considered to be general since they don't reflect the spontaneous activity of mind. If psychologists or sociologists have

succeeded in systematic investigation of behavioral patterns through questionnaires it is because a large part of our life is mechanized.

Another possibility for gathering data on mental activities is by self-introspection - assuming a witness within oneself who can make an objective record of thoughts. Let us imagine that such a witness exists and that one gather's data on thoughts to formulate theories. After formulating theories on thoughts, one has to shift the focus to the study of witness - to formulate a theory on witness. This leads to infinite regression.

Experimental data in science are gathered by a large number of scientists independently. In other words, science deals with experiments that are repeatable. However, experiments relating to mental activities can't be repeated without altering the response.

We dream as flying in the air etc. Such experiences are against the laws of physics. Then, one may say, dreams are not real. That leads us to the question, 'what is reality?' Dreams have definite observable effects on the physiology of the body. Scientists have recorded electrical activity of the brain, rapid eye movements etc. during dreaming. A person wakes up perspiring having dreamt of a tiger pouncing on him. Hence, one can't deny the reality of the experience of dreams. Perhaps scientists may like to compare dreams to illusions that don't exist in the empirical world but do exist in the sensory (private) world of the individual. Unlike the physical illusions that are repeatable, dreams are highly individualistic. In other words, private experiences of an individual are beyond the scrutiny of science. Then to what extent are the data on thoughts to be considered real or public for a serious pursuit to build a theory on mental (conscious) activities?

Science replaces sensory observations by physical variables. For example, the use of terms such as blue or red etc. are to be avoided. Instead terms such as wavelength in Angstrom unit or frequency of em

waves in Hertz are to be used to describe colors. Similarly the use of terms such as shrill or bass are to be avoided in describing sounds. Instead sounds should be described by the audio spectrum. How does one quantify thoughts or subjective experiences[7]? What are the units? For example, how does one quantify happiness, sorrow, love etc.? One may assign an arbitrarily value of +1 to happiness and -1 to sorrow, and zero to no emotion. But, there are situations of varying degrees of happiness as expressed by saying 'I am *extremely* happy' or 'I am *not unhappy'* etc. Also, there are situations of mixed emotions. For example, sending off one's daughter after marriage evokes mixed emotions. We don't have any formal system for quantifying emotions. Further, one and the same situation may give rise to different types and degrees of emotions in different persons.

2. 5. Theoretical Formulations on Mental activities

There are two major phases in scientific research. (a) Gathering data and (b) Building a theory or model. We have seen that gathering data on thoughts or conscious activities is not a practical proposition. How about theory building? Science uses mathematical approach in theory building. Mathematical approach is formal and accurate. But, informal language is used to describe thoughts. Informal language is prone to misinterpretation and is imprecise. For example, consider the following situation: A speaker says "The other day, I had a special meal". Let us analyze the thoughts of the speaker and possible process of interpretation by a listener.

Speaker's thought: 'The other day' - I don't want my friend to know that it was my birthday as he might ridicule me for partying on the occasion, old as I am.

Listener's thought: 'The other day' - some day, perhaps a Sunday (who cares!).

For each phrase of the speaker, the thought aroused in the listener could be different. Every day communication is thus a transition from *the particular experience* of speaker to the *general categories* in the language and then to *another particular experience* in the listener. The two particulars, one in the speaker and another in the listener, may or may not be the same. In fact, much of the misunderstanding (such as between spouses) is due to the informal nature of language. If language becomes highly formal (say between spouses) then the relationship between persons becomes less emotional. Use of more precise language alters our emotions and our manner of thinking. This is a kind of indeterminacy.

Theories are generalizations. In formulating theories we ignore individual differences and look for (abstract out) common properties. Science doesn't formulate a theory for an individual hydrogen atom or an individual electron. Science doesn't describe a particular person's digestive system. The notion of a theory is opposed to the notion of individuality. Theory deals with aggregates, generalities, or statistical averages. The neuro-physiological processes such as the mean capacity of short-term memory, average speed of access of data etc. are generally applicable to all individuals. These are mechanisms of thinking and not thoughts. Mechanisms are tools used by the mind and not the mind itself. Study of the mechanism is not the same as studying the mind.

Although the success of scientific enterprise is attributed to its methodology, great discoveries have often been made accidentally or intuitively. A well-known example is the discovery of the structure of benzene which was inspired by a dream. Hence it is said that one has to learn to dream. Sometimes persons without formal background in science

have made some of the medical discoveries. Formal medical bodies have resisted their acceptance. Intuitions of mind play a role in original discoveries. Formulation of theories on mental activities requires supra-mental intuitions.

2. 6. Theoretical Gaps in Science: Physics

There are many theoretical gaps even within the *objective* domain of science. One of the subjects with sure foundation is physics as it deals with matter and energy and not minds. Yet, even in physics, there has entered some serious issues about the nature of matter and energy, i.e., nature of atomic particles and light. There exists a basic 'uncertainty' relating to physical measurements [8, 9] . In this section we deal with the following issues: (a) nature of matter and energy (b) uncertainty principle and (c) second law of thermodynamics.

Light is a form of energy. Even at the time of Newton it was known that light exhibits properties of particles as well as those of waves. The concept of a particle is antagonistic to the concept of a wave. A particle is localized in space whereas a wave spreads out in space. How can light exhibit properties of both particles and waves?

According to classical physics, electrons revolving around a nucleus in an atom are supposed to lose energy and collapse into the nucleus but that doesn't happen. It was then assumed that as a *property of matter*, (as a rule), electrons revolve in orbits at fixed distances from the nucleus *without losing energy*. However, there is an exchange of energy when an electron jumps from one orbit to another. Such *quantum jumps* are supposed to take place *neither in space nor in time*! Another alternative explanation for quantum jumps is to assume discontinuities in space and time. To avoid such jumps or discontinuities in space and time, *wave*

theory of electron was postulated. Thus not only light, a form of energy, but also electron, a form of matter, exhibits properties of both particles and waves.

The notion of one and the same entity existing both as a wave and as a particle is incompatible to our common sense. Particle is a localized entity whereas wave is associated with a spread in space and time. To resolve this difficulty it has been proposed that *wave function* (arising from the wave nature) represents the *probability* (a measure) that a particle may be found by an *observer* at a particular location in space at a particular instant of time. That is, one is not sure where a particle is at any given time. A particle could be anywhere because of its wave nature. The probability function associated with a wave is *our degree of knowledge* about the reality (chances of finding a particle at a given location). In other words, the nature of a particle (objective reality) is closely related to our expectations (subjective) about finding the particle at a given location at a given time. Based on this postulate, it is said that in quantum theory, subject and object (observer and observed) are closely tied to each other. However, such an inseparability of subject and object applies only to microscopic phenomena.

Such results arise as a consequence of the so-called uncertainty principle in physics. The uncertainty principle states that it is impossible to determine certain specific quantities pertaining to elementary phenomena beyond certain prescribed limits of accuracy. Let us say that one is interested in determining both the position and momentum of a particle. For this measurement one has to take two snap shots (pictures) in quick succession. The first snap shot is to measure the initial location. The second snap shot is to measure the location after a lapse of an interval of time to deduce the velocity. The act of taking the first snap shot disturbs the course and speed of the particle under observation and thereby

defeats the purpose of the experiment. Some scientists imply that matter doesn't exist without consciousness (unless observed). Such a disturbance occurs not only when a conscious observer is taking the snap shot, but also when an inanimate instrument such as a camera controlled by a robot takes the snap shot. This shows that experimental observation is not a simple process as often assumed.

In this context, one of the questions asked is, can *truth* about matter be known using *probabilities*. Some have interpreted uncertainty principle as gaps in our knowledge meaning that reality can't be known with certainty. Others have interpreted it to mean that energy is quantal which leads to quantum jumps of electrons from one orbit to another implying that space and time are discontinuous which are contrary to the assumptions made in the theory of relativity and our intuitive notion of space and time. To avoid discontinuity in space and time, one has to postulate a discontinuity in the existence of a particle. This implies that a particle has no unique identity or individuality. A wave is a dynamic structure on a medium. The individuality associated with a particle is actually a pattern of activity associated with a wave in a medium.

Now we turn our attention to another issue. The second law of thermodynamics asserts that the total *entropy* of any physical system can only *increase*. Entropy is a measure of *disorderliness*. It implies that random shuffling can't create order. Formation of atoms of increasing higher atomic weights seems to occur violating the principle of the second law of thermodynamics. There is a clear tendency in nature to produce successively organized forms of high degree of complexity. It is speculated that any process of increasing order - organizing, integrating, systematizing process must be actuated by *something different from the physical energy* - a force or influence other than the physical energy.

Certain tacit assumptions are made while developing theories in physics. For example, propagation of waves requires a medium. However, it is assumed that electro-magnetic waves can propagate through *vacuous* regions of interstellar space. This is attributed to property of space. Similarly, many unexplained phenomena are simply taken as *properties of nature*. In addition, in theories of physics, one finds references to certain universal constants such as Planck's constant, or 'pi' or 'i' (square root of -1) etc. These constants have no correlates in physical matter and energy. Yet, without these abstract universal constants theories of physics are incomplete[10]. What is the nature of these properties and universal constants? They don't constitute matter or energy. Yet, without them theories of physics are incomplete.

2. 7. Theoretical Gaps in Logic: Godel's Inconsistency Theorem

The subject matter of physics is not perfectly understood because it is very difficult to carry out accurate measurements. Theoretical physics is based on speculations. On the other hand, Logic is an abstract subject. It sets out with certain axioms and rules and derives theorems. In logic, there are no speculations or measurements. Hence, logic as a subject matter is supposed to be 'perfect'.

One of the classical results in logic is the well known 'Godel's Inconsistency Theorem' [11,12]. According to it, in a formal system, there are some theorems that are 'true' but they can neither be proven nor disproven. Of course, terms such as 'proof', 'true', 'theorem' etc. have been defined rigorously. The implication of this theorem is that even in a formal system such as logic, 'truth' can't be established completely and there will be *gaps in our knowledge*. Scientific research is based on a formal system of logic. Hence, there could be truths about life which science can neither prove nor disprove.

One may object to the extrapolation of the implications of Godel's theorem to science and thence to life[13]. The objection is that Godel's theorem is applicable only to a closed system and that universe and life are open systems. However, this objection is not valid. As we learn more about universe and life we can add more axioms, rules. When this additional knowledge is included, the resulting new system becomes closed at any given point of time. In other words, our knowledge at any given point of time is a closed system. Hence, the above implications of Godel's theorem on life would still be valid.

'Proof' is a technical term within the system of logic. However, 'self-awareness' or 'experience' is not a thing for which one needs proof. By definition it is 'self-proven' or self-validated. It is true that self-awareness exists because one is experiencing it directly. Self-awareness may then belong to the class of 'truths' whose existence can neither be proven nor disproven.

2. 8. Reductionistic Approach of Science: Whole and Parts[14,15]

The approach of science is one of reductionism. Components in a given system are identified. The properties of each component are studied in detail. The properties of a system are deduced based on the properties of its constituents. This applies to properties of matter and energy on one hand and to the physical laws on the other. There are several laws in physics. Example: Law of gravitation, Law of electromagnetic radiation, Law of interatomic forces etc. In biological sciences, a biologist studies digestive system, circulatory system, respiratory system, nervous system etc and then puts them together to get an overall view of the human being.

The reductionistic approach has often been criticized. In this context, one may recall the well-known story of a group of blind persons trying to

describe an elephant. It is argued that *parts* are fictitious, meaningless entities obtained by analysis and what exists is only the *whole* system. It is also argued that *whole* is greater than the sum of its *parts*.

Consider for example, phonemes and words. Phonemes are abstract constructs (*parts*) and words form the *whole* units. A child learns initially the words and then the alphabets or phonemes. There are many illiterates who don't know how to read and write (ignorant of phonemes) yet speak fluently. Further, phonemes are meaningless entities on their own but when put together the word attains a meaning which is not implied by its parts. Thus *whole* is different from sum of its *parts*. Similar arguments can be put forth for interpreting music. *Parts* are the musical notes, but *whole* is the composition. The whole piece of music gives a different experience compared to listening to the parts individually. An art piece as a whole can’t be viewed merely as made-up of patches of colors (parts).

In many situations new properties emerge or new rules are found to be operational while describing a whole system. For example, in physics, all though all electrons (in imaginary isolation) are similar, yet within a system (atom), there are distinct characteristics associated with the electrons. Within an atom when two electrons approach each other there is a 'force' preventing them from coming together (a new rule operates). This is not a 'mechanical force' but a 'law of nature' or 'property of nature' which excludes the coming together of two electrons. Without such an exclusion principle, higher levels of organizations can't be built. Hence to posit new rules is one of the fundamental principles of nature in building structures and organization. *Even in the simplest atom*, one can't study the individual constituents (elementary particles) in isolation (as parts) and then put them together to get a picture of the whole because new organizing principles of nature play a role which are absent in isolated systems. That being the case, building a picture of macro systems by

simply putting together simple systems without an organizing principle is unimaginable. (However, see Appendix-A for interesting counter arguments defending reductionism.)

The reductionsitic approach implies that all the mental activities are completely determined by the structure and functional state of the component parts. It is said that happenings in the neural machinery of the brain provide a necessary and sufficient explanation of the totality, both of performance and of the conscious experience of a human being. If so, it implies the absence of will of voluntary movement or voluntary thinking process. All cognitive experiences are also determined by physical structures. In other words, purely physical conditions and environment determine our statements and actions, thus denying any power of judgment on our part. This also leads to the denial of creative thinking. It implies that any *theory on conscious life is* itself *predetermined* by the physical components. Similarly all knowledge is predetermined. Such reasonings are contrary to our experience. The reductionistic view gives rise to the belief: 'If we could alter the structure then we could alter one's belief system'. If this were to be true then we could alter the structure by certain physical inputs so as to alter such a belief itself. This leads to self-contradiction.

Neural activities are all similar (discharge of electric currents) for different sensory inputs. There is nothing in the neural activity to distinguish sweet taste from a beautiful picture[1]. The sensations arise when the neural activity reaches certain centers in the cortex. Such a reductionstic explanation is inadequate to explain our experiences. Sensations and feelings are not mere conduction of current from one end to another but a whole lot of activity (hypotheses generation by a self) over the entire nervous system, a holistic pattern of activity. Thus it is argued that whole is different from a combination of parts.

2. 9. Criticism on Evolution Theory of Human Life

According to cosmology, universe has evolved from an initial state of primordial high energy[16]. From this initial state has evolved, in right succession, the elementary particles, atoms of simple elements, atoms of higher atomic weights, inorganic compounds, organic compounds, cells etc. The unfolding of conditions necessary for their formation as well as the *right* properties have occurred at the *right* time in the *right* sequence apparently *all by chance*. Such a theory may be compared to the preparation of a delicious dish by randomly throwing in the ingredients. The well ordered evolution is *too good* to be a mere chance outcome. One is very much tempted to hypothesize an organizing principle or purpose behind such a complex process.

While cosmology attempts to explain the evolution of universe, evolution theory attempts to explain the emergence of various species of plant and animal life [8, 17] . Evolution theory is based on the joint principles of random mutation and natural selection. ***Assuming an initial species*****,** random mutation produces a variation of the species to a different form. If the new form is able to survive the environment, including competition with other species of the same or different kind, then the species continues, else the species degenerates. This process is called 'natural selection'. Evolution theory has been successful in reconstructing the emergence of higher forms from the lower ones. According to evolution theory, emergence of higher forms is purely a random phenomenon (random mutation). In fact, the emergence of mind and awareness are also attributed to randomness[18]. It replaces two older hypotheses that (a) God or a supernatural power created all the species at one given time and (b) Nature has a purpose or design in its workings.

There are many criticisms on evolution theory[8]. The author feels that the main difficulty with evolution theory is about the concept of survival.

Why survival has been chosen as a goal? How come a species has been programmed for survival? How did the survival program come into being *in the first place?* Random mutation assumes that *an* ***initial form of life exists*** and this gets modified. It is to be assumed that the initial form of life has already been programmed for survival. There is no explanation for this initial condition of life and survival instinct. The concept of an *instinctive program for survival* can be applied to higher forms of life. But, the survival action must have existed in a very primitive (initial) form of life where there is no structure to hold a program to be executed and what more *the program itself has to evolve*, that too without purpose and purely by random forces.

There can't be any contradiction between biology and physics, both being disciplines of science. Physics assures that there can't be any loss of matter and energy. Why then do species struggle for survival? Survival implies subject-object distinction. If struggle for survival has resulted out of random forces, it implies purposive behavior has emerged out of randomness. How can purpose emerge out of randomness?

Survival implies (a) an *identity* of the entity struggling for survival (b) individual-environment *distinction* and (c) *knowledge* of favorable and unfavorable factors. Assuming no purpose or design in nature or any external agency for creation, how come such a highly complex concept of survivability occurred at all purely by random forces?

What is the identity of the species struggling for survival? A living organism grows bigger. It changes its shape, texture, chemical composition etc. In case of human being it is well known that matter (cells) in the physical body is turned over many times. Attitudes of a person may also change. Cockroaches, snakes undergo moulting or ecdysis during growth. There is usually a complete physical change from the initial state

when the species is born. During these changes, what is the biological identity that is surviving?

Does the species (especially the lower ones) experience any identity (self) at all? If so, the original program for survival has already made a distinction between the individual and the environment - a primitive form of subject-object dualism. How does such a dualism arise at all in the first place?

Survival implies entity-environment distinction. If evolution is purely by random forces, how does a butterfly camouflage itself when it has not seen its own color or pattern on its wings? How does a species know who is its predator and who is harmless? Does a deer run away on seeing a rabbit? Plants produce ingenious and colorful structural growths that attract agents for pollination. How does the plant 'know' what color and structure attracts an agent?

How does the distinction between threat Vs safe arise? How is this knowledge coded? This knowledge could not have been a learnt process. When an animal dies of a threat, it couldn’t have transmitted this knowledge genetically. If the animal escapes the threat by chance (without knowing it has faced a threat) no knowledge has been gained to be transmitted genetically. If other animals of the same species see one of the herd being killed by a threat and thereby if it deduces knowledge about a threat it implies that these animals have knowledge of life and death. It is argued by biologists that lower form of animals don’t possess even self-awareness let alone the highly philosophical concept of life and death.

The concept of survival may conflict with the instinct for protecting one's offspring (altruism). If survival is the brute force instinct then how come care for the offspring has arisen in evolution? This also assumes that the parent is able to identify its own offspring.

One of the key aspects of survival is the ability to 'read' the environment and act accordingly whether it is the temperature, duration of daylight, humidity etc. In order that such an ability may evolve, all the component systems have to evolve in a *coordinated* manner. For example, for vision, components such as lens of the eye, retina, nervous system, decoding mechanism (visual cortex), interpretive mechanism (threat/safe values or semantic processing) etc. have to evolve. Each component evolves in a random manner (non-purposive) without any knowledge of the existence of other components and their functions. Finally, an organism gets evolved which serves the overall purpose of survival. It is very difficult to imagine how uncoordinated evolution of components by random forces results in a highly sophisticated purposive well-coordinated system. It is like preparing a dish by many different persons each putting randomly the ingredients without any knowledge of what others have put-in and yet the final dish happens to be delicious. Further, it has to be noted that the second law of thermodynamics is constantly putting pressure towards increasing disorder and not towards an organized growth.

If one assumes that an initial form of life *somehow* occurred, and that *random mutation alone* is responsible for the evolution of a new species then one can work out the probability of the evolution of human intelligence by random forces. Such a calculation shows that the probability for evolution of intelligence is very small and the time taken is so large that it *exceeds the age of earth*. If component parts are hierarchically organized the time for evolution is considerably (logarithmically) reduced[18]. However, hierarchical organization presupposes an intelligent or purposive design. In some of the species certain features were preserved in defiance to natural selection and it resulted in the extinction of the species. It is criticized that the law of natural selection limits the scope of variation of species rather than

determining what specific form has to emerge. It is said that mutations induced through randomness are not patterned as to result in the observed amazing patterns of species differentiation. In other words, randomness alone couldn't have caused this diversity of forms.

A human being is supposedly the highest evolved form of biological evolution. Human being has the greatest ability for survival. Yet, historically, we see situations where a person is prepared to sacrifice one's life for a country (a soldier) or as an act of chivalry (a hero) or for a cause (a terrorist suicidal bomber). In other words, the biological instinct of survival has been replaced by an emotional *value*. Should we consider these acts as lacking survival instinct? Do we not respect heroes and soldiers and condemn terrorists? Is this also a consequence of random forces without purpose? If we attribute purposive behavior to humans, where in the scale of evolution did the concept of purpose or value emerge from purposeless or random forces?

If self-awareness is an evolved product, emerging and developing with growing complexity of the brain[19], then it presupposes that the primitive form of awareness has some effect on the organism. Only if awareness has some effect on bringing about changes in the neural structures and functions, with consequent changes in behavior then in the long run new modifications can take place so that an evolved form of self-awareness can emerge and evolve to its present state. This presupposes that *awareness can act on the organism* and it is against the hypothesis that *awareness is determined by the organism*. This shows that self-awareness arises from an independent source other than the physical structures.

Another interesting aspect of life is the mutual dependence of animals on plants (exchange of oxygen and carbon-di-oxide) and animals on other animals for food. An ecological balance must have been maintained by nature during the evolution that calls for an overall knowledge or purpose.

These criticisms on evolution theory clearly point out to the need to postulate a self who acts through mind and brain. Survival is then the continuation of the *mental state of one's own existence (subjectivity, I)*, continuation to be aware of one's own individuality. One could say that it is this experience or the state of the mind that the species struggles to maintain despite wide changes in the physical identity.

2. 10. Postulate of Mind and Self

Based on the discussions presented in the previous sections it is clear that one's self or mind is not a property of matter as propounded by mechanists but it has an independent existence. Although mental activities require the support of the brain and nervous system, self and mind are not entirely determined by brain and nervous system. The postulate of a self provides a better explanatory power to known subjective states. Rather than doubting the existence of mind or self (as even to doubt it one should use it), one should be concerned with questions such as: What is mind? Who is Self? How come mind or self has not been detected experimentally by scientists? How does the mind interact with brain and nervous system? These issues are central to mind-body dualism problem (See Sec.2.12).

2. 10. 1. Mind Vs Science

We argue further that there is a need to postulate a mind independent of brain. Appropriate formulation doesn't exist within the present day science to study mental activities.

Law of Inertia: Conscious life exhibits *free will* that seems to act against the law of inertia. The law of inertia states that a body continues to exist in

a state of rest or uniform motion unless disturbed by an *external* force. For example, a piece of rock at rest or the rotation of earth on its axis exhibits inertia. However, I, a human being, am sitting on a chair and whenever I *want*, I get up and walk away purely by an internal free **will**. No *external* physical *force* has been applied on my body. What is this *internal force or Will?* The process of issuing neuro-muscular commands up to the act of walking are performances of the biological life, but the force or the wish which *prompts* me to walk originates from the conscious life, from within me.

If self-awareness has no effect on brain then it implies the denial of will power and it is difficult explain personal experience of autonomy purely in terms of chemical and physical laws in the neuro-physiological structure. By postulating self and brain as independent entities and assuming bi-directional interaction then one can envisage one's personal will exercising an influence on the nervous system and the physical inputs producing aversion or attraction on the self. One then becomes responsible or accountable for one's actions.

In the mechanistic notion, self is an effect caused *by* the nervous system and self can't produce an effect *on* the nervous system. Some scientists deny the existence of free will stating that it is merely picking out randomly one of the many available choices (one of the neuronal paths firing). One is unaware of the internal (sub-conscious) processes leading to the decision and hence it appears to be a deliberate choice. This would lead to disastrous consequences on ethical and moral values and social accountability.

If there is no free will, it implies that thoughts are purely physical and that thoughts can be controlled with appropriate physical inputs. In other words one's belief system can be changed by appropriate inputs. This is

counter productive since hypothetically, one may find such an input as to force one's thought to believe in free will.

Subjective Factors: Reaction to an external object is determined not only by the object but also by the conditioning (disposition) of a subjective self. Different persons react to the same object in different ways because the perceived object is a combination of the external object plus the conditioned *values and knowledge* of the self who perceives the object. If conscious life and external object are both properties of matter (obey laws of physics) then subjective experiences of all persons should be alike or purely random in a given situation.

Psychosomatic Factors: Biochemists can explain the effect of drugs on various enzymes and chemicals within the body. Health of a person is determined not only by the physiological status but also by the psychological (mental) status. We are aware of psychosomatic illnesses. The environment of family and society also play a role on a person's health. Health of a person has to be viewed 'holistically'. Aspects other than the biological that determine the health of a person are clearly beyond the scope of objective (physical) sciences.

Dreams: In dreams there are situations that violate the laws of physics. For example, 'flying in air', 'walking on water' experiences in dreams. If thoughts were to be determined by laws of science, how can dreams violate the laws, its very foundation?

Para-psychological states: Many individuals have experienced telepathy premonition, precognition etc. One can't dismiss such experiences as exceptions since a single exception is adequate to disprove a scientific theory. These experiences violate the known laws of science such as communication without a physical medium[19], anti-causality (foreseeing a future event) etc. It is believed that we float in a psychic sea and we have access only to a part of it depending on the individual's development and receptivity[21a]. Persons for whom para-psychological states are real may question the validity of any scientific theory that can't account for them.

Hyper Dimensions: There are persons who can imagine higher dimensional objects, i.e., objects of more than three dimensions! [21b] What does it mean? The projections of a three dimensional (3-D) object (view from top or side etc.) are two-dimensional (2-D). For example, a TV screen appears as a square or rectangle from the front. A cylinder (coffee mug) appears as a circle as seen from the top. A cone (ice cream cone) appears as a triangle as seen from the side. Similarly, the projections of a four dimensional (4-D) object would be three-dimensional (3-D) objects. A person who claims to be visualizing a 4-D object can physically construct the 3-D solid object projections. Some persons can visualize objects of dimensions even greater than four. How is one sure about the validity of such visualizations? Based on mathematical considerations it has been shown that 3-D projections of 4-D objects constructed by such persons are indeed valid! The kind of mathematics required to validate such constructions is highly advanced and persons who have mental images of higher dimensions are not mathematicians. Higher dimensional objects are not only abstract mathematical concepts but are also experienced as visual objects. Science is built only on three dimensions of space and one dimension of time but thoughts can visualize objects in space of higher

dimensions! Present day physical science may be considered as a projection (shadow) of the actual reality into the three dimensions of space and one dimension of time.

2. 10. 2. Self Vs Science

A self initiates thoughts. One is aware of an 'I' in every experience, cognition and perception. Here are some more arguments[1] to justify the postulate the existence of a self.

Experience: In the absence of a self, the *physical electrical activity* itself is considered as *mental experience*. However, the nature of electrical activity and the nature of experience are not comparable at all. A scanner or an electrical camera converts the brightness and color of a picture into electrical currents. Can we say that a scanner or a camera understands the meaning of a picture? Only a subject or a self can interpret the meaning of a picture. Even an intelligent human being finds it difficult to interpret an abstract drawing. Hence, even an accurate and comprehensive physical description of brain's activities (in terms of electrical discharges) does not constitute the *experience* of a subject. All electrical currents are local and are *within* the brain and nervous system. Yet, even a child is able to *project out* the image into an external world at the correct distance (as implied by focusing on the object). Where does this experience of the external object emerge for the first time from the purely internal electrical activities? Further, all sensations reach the brain and nervous system in the form of electrical currents. Yet, these electrical currents are interpreted as visual, olfactory, or tactual experience and as a sensation of pleasure or pain. How do the electrical currents become a colorful and lively experience? [22]

One may argue that a computer attached with a camera can interpret the images. Recognition of an object is merely putting a label on the picture. Perception is not only labeling but also establishing a *relationship* between the subject and the object. Labeling an object and experiencing it belong to two different domains. Whether or not a computer has successfully identified or interpreted an object has to be *validated by us*. Success of a computer recognizing an object only implies that much of the work done by the brain and nervous system in labeling can be done using a computer with appropriate programs. Deficiencies with sensory organs can be rectified by the use of aids. For example use of spectacles, hearing aids etc. Similarly problems related to cognition may partly be replaced or aided by a computer with appropriate software such as in speech synthesis. Ultimately an experience implies a subject apart from the instrument that interfaces the objects of the universe and the subject. Brain and nervous system act as instruments for a subject.

Interpretation: Self is required to *interpret* sensory data. There are many kinds of optical illusions. Sometimes an optical illusion occurs even when the subject *knows* about the impossibility of such a situation (See Fig. 2.1). Certain geometrical drawings requiring subject's estimates of lengths are of this category. In another type of optical illusion the subject completes a picture from a partially provided information. Sometimes one and the same picture can be interpreted in two ways. Since there is only one physical object and the corresponding neuronal firings, how can there be two interpretations? These illusions suggest that a subject has to *interpret* the raw neuronal data. Without assuming an interpretive subject, explanations tend to be unconvincing or circular. For example, if we postulate that the brain itself hypothesizes an object, who is going to

decide its validity. What is the criterion of validity? This ultimately leads to meaning or purpose that makes sense only to a subject.

Attention: Senses are passive and a self does the interpretation. Neural activities do occur even in an anesthetized patient but no experience results since no *attention* is paid to the activity. Although a person may be looking at an object, if the person is pre-occupied (or pre-conceived), he may not identify even a familiar object. This is an everyday experience of parents who try to draw the attention of their children immersed in books or TV shows. When a person is deep asleep, external sounds *do* enter the eardrum and fire the neurons, yet the subject is unaware. Similarly a person asleep is unaware of a mosquito bite. One has to postulate a self who can direct the attention to the desired stimuli. If we assume that brain itself focuses the attention then selection or directing of attention has to be based on some criterion. Is this act a random decision or purposeful? If former, our experiences have to be chaotic which is not true. If the decision is purposeful, purpose makes sense only to an unchanging subject.

Creativity: If mental activities are determined only by the physical actions of the neurons it is difficult to imagine how *creative* works can emerge. If novelty were to arise because of certain randomness then how does one recognize when a given neuronal pattern is nonsensical and when it is novel. Hence, a self has to be postulated with an ability to know when the conceptual thinking has resulted in a meaningful or interesting result.

Cause and Effect: A mechanist states that the physical activities are the cause and the awareness is the effect. Latency of neuronal potentials can

be used to verify the delay between the occurrence of a thought and the expected response. If mental activities are identical to neuronal actions then there should be near simultaneity between thought occurrence and change of neuronal states. However, it has been found that there are measurable latencies (delays) between the instant when an intention arises to move a finger and the corresponding neuronal activity to execute the movement. Similarly, when attention has to be shifted, there is a time lag between the instant the desire arises to shift the attention to the instant of change of neuronal state. These latencies seem to suggest that the conscious efforts of the subject precede the neuronal activity.

Validation of Science: Science is supposedly objective. However, laws of science are to be validated by a scientist, a conscious human being thus questioning the claims of the objectivity of science. One may argue that validation is determined by objective logical rules applied on measured data and not dependent on the subjective bias of a scientist. Measurements can be carried out by instruments or a robot that may be fed directly into a computer programmed for validation thus by-passing a subject. There is a basic indeterminacy in measurements. The formal system of logic is incomplete. Cent per cent validation of science is impossible. In fact the indeterminacy in physics and incompleteness of logic are determined intuitively by a conscious human being.

2. 11. Mind-Body Dualism Problem

Generally self/mind and brain are assumed to be made of distinctly different kinds of stuff, non-physical and physical or spiritual and material respectively. Self/mind imply the presence of a sentient being and hence the presence of consciousness. Consciousness is also considered as

spiritual. This notion results in the metaphysical difficulty of explaining the manner of interaction of the non-physical and physical. Does the spiritual self/mind interact with the physical brain and body? How do they interact? Is the site of interaction physical or non-physical? Is the interaction one-way or both-ways? Can the physical affect the non-physical? Can the material stuff (say molecules) affect the spiritual stuff (say, God)? If the spiritual doesn't interact with the physical then how can the existence of the self/mind be validated and why should one postulate such entities.

Various Dualistic Schools - Their Solutions

Solution of Vedanta : Vedanta proposes a non-dual philosophy as mechanists. Yet, Vedanta recognizes the independent existence of consciousness/self/mind. How does it achieve this reconciliation? This is discussed in Part-II.

We have given several arguments to defend the existence of mind and self. This may sound as a return to the mind-body dualism hypothesis with concomitant philosophical problems. The next obvious question is to understand the nature of the mind and self and how they interact with the world. Vedanta proposes a non-dual philosophy yet includes mind and self in its paradigm. This reconciliation is presented in the next part.

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APPENDIX-A

Reductionistic Approach: Further Comments

One of the criticisms on reductionistic approach is that 'whole' is said to be greater than the sum of its 'parts'. Hence it is argued that reductionistic approach can't fully predict what emerges when parts are put together. This criticism has been countered very elegantly with examples. It is shown that meaningful structure can emerge from an initial random distribution. It is shown that 'whole' *can* show new properties that are absent in the parts.

Taken from Lerner, 'Parts and Wholes', MIT Press. Imagine a box with thirty-two tiny billiard balls. Initially all the billiard balls are assumed to be in random locations with random initial velocities. Then the balls are set into motion. When a ball hits a wall it is assumed that it reenters through the opposite wall to form a closed system so that there are always thirty-two balls. If a movie is taken of their movements one observes that the billiard balls arrange themselves into *orderly groups* and stay in such an arrangement for a while. Then again go into chaotic movement. After a while rearrange themselves into another orderly group. Order seems to emerge out of random movements and without any understanding between the parts.

Another example: Taken from Hofstadter, 'Godel, Escher and Bach'. Ants construct hills. Each ant is a part and the anthill is a whole constructed by its parts. Each ant deposits a quantity of mud that is proportional to the slope at the location of deposit. An ant doesn't even know that it is constructing an anthill. Perhaps ants can't even see the completed hill as we do from a distance. This once again shows that an ordered whole can emerge from parts that don't have intercommunication. Action of the parts has been determined by a simple law.

Yet another example, taken from Lerner, ‘Parts and Wholes’, MIT Press. Magnetization is explained by imagining a magnet as being made up of a large number of tiny magnets. Each tiny magnet has its North-pole pointing in the upward or downward direction. When all tiny magnets are pointing randomly then there is no overall magnetism. However, when all tiny magnets point in the same direction then order emerges. The material exhibits overall magnetism. It is hypothesized that each magnet tends to point in the same direction as its immediate neighbors. (Rule: 'behave as neighbors do'.) When the temperature of the material is altered then at some particular temperature suddenly an order emerges from an initial random distribution of magnets.

The above examples illustrate that order can emerge from an initial random distribution and an additional simple rule of behavior (interaction) amongst the parts. This also denies any purpose or knowledge by the parts towards achieving a whole or goal. The 'whole' exhibits new properties that were absent in its parts. New properties emerge even when *identical* parts are put together. More so, if parts are of non-identical. Such examples have been put-forth to argue that consciousness emerges as a property of matter.

However, such examples don't *completely* justify the reductionistic approach. Firstly, in the examples given above one may ask *why* an ant deposits just that amount of mud or *why* a tiny magnet behaves as its immediate neighbors do etc. One can't say that these simple rules are without a purpose. In case of the billiard ball experiment, it is incorrect to state that the initial positions of the balls were totally random in view of the fact that there are only thirty-two balls. One can fit a thirty second order polynomial whose roots give the initial conditions.