The Mystery of Consciousness

Learning from Neuroscience and Insights from Bahá'í Sacred Writings

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Abstract

This paper limits its approach to the extensive and expansive theme of consciousness. First, it places its focus, on current knowledge on the neural basis of consciousness. It next explores the concepts of mind, soul, and rational soul gleaned from Bahá'í writings and reflects on the insights therein. This writing draws attention to an unusual supposition set forth by a few neuroscientists – that consciousness may continue after the death of the brain. This paper concludes that the concepts of mind, soul, rational soul, and consciousness are incomprehensible and that we may be facing a dimension akin to that of the quantum world.

Introduction

Consciousness is at the center of considerable discourse and research in a variety of disciplines. Within its compass, it includes several essential realities, among them: individual 'human consciousness' and 'the collective consciousness' of humankind. Robert Lanza, a noted researcher and scientist, by introducing the concept of 'biocentrism', posits that consciousness is a fundamental

property of the universe and that the material world 'evolved to support consciousness'; he thus views spirit rather than matter of primary importance to consciousness in the universe (See *Biocentrism*).

Consciousness in humans has intrigued multitude of scholars and researchers from numerous fields: philosophy, psychology, psychiatry, theology, and neuroscience; enigmas yet persist. Research probing consciousness has resulted in a number of theories and hypotheses; yet consciousness continues to remain a mystery. In 2005, the journal, Science, published a special anniversary issue that featured one hundred and twenty five questions scientists have failed to answer. The second of the two top questions was: What is the biological basis of consciousness? Now, some years after, we have reached only few understandings but are faced with yet more questions.

This article introduces one facet of the extensive field of consciousness. Its aim is to first present briefly few fundamentals on the neural basis of higher consciousness in the human. Addressing multitude of questions at the forefront of the disciplines of philosophy, psychology, and psychiatry, are neither the intent nor within the scope of this writing. This paper will next introduce the concepts of mind, soul, the rational soul, and the immortality of the soul gleaned from Bahá'í writings and will reflect on the insights therein.

There is little clarity on certain fundamental questions: Where in the brain can we locate consciousness? Is consciousness dependent on the brain or can it exist independent of it? Though at some level, answers to these questions are inconclusive, nevertheless it may be anticipated, that fundamental learning from neuroscience may provide a path toward their exploration. It is hoped that at the very least, this discussion can raise our level of consciousness about the question and puzzle of consciousness.

My interest in the theme, 'consciousness', is an outcome of years of teaching neuroanatomy and neuroscience to medical and graduate students. Lecture and laboratory instruction on the dissection of the human brain raised multitudes of questions on the relationship between the brain, mind, and consciousness. Intricate and fascinating

structures of the brain, each exquisitely specialized for a highly specific function, continued to intrigue me, evoking a sense of awe and wonderment. These led invariably to the resurgence of perennial questions on the purpose of human existence and the reality of human uniqueness. As Shakespeare's Hamlet had poetically expressed:

> What a piece of work is man! how noble in reason!
>
> how infinite in faculties! in form and moving how express and admirable!
>
> in action how like an angel, in apprehension how like a god!
>
> the beauty of the world! The paragons of animals! (*Hamlet*, act 2, scene 2)

Dissecting, probing, identifying, and demonstrating various regions of the human brain, each exquisitely assigned to a specific function, among them: hearing, sight, olfaction, sensation, language, writing, and muscle movements, invariably instill a sense of wonderment and reverence. In particular, I remember an occasion in my brain dissection laboratory. A student with a human brain in his palm – a brain which had been made available, in a bucket, to each group of four students – approached me asking dispassionately, "how much do you pay for this?" Deeply stirred by the tone of his question, I turned to address all students – to emphasize the importance of reverence while handling, probing, dissecting and studying such invaluable specimen, as at one time these were the instruments of the thought and consciousness of their noble owners. Such priceless human brains were indeed bought at a paltry price. I continued on this theme until overwhelmed with emotion, I had to bring my comments to an end. Now, each year at the termination of such studies on human remains, a memorial service is held, dedicated to their unknown owners.

A befitting appreciation of those nameless donors of such brains finds expression through the essential knowledge humankind has gained on the marvel and workings of the human brain, in health and disease. At this point, I am moved to dedicate this article to those countless men and women whose brains I dissected and probed over many years of instruction. To them, we all remain indebted.

Consciousness In Humans

There is a general agreement that consciousness is the state of being wakeful, conscious and self aware. How should we, more precisely, define consciousness in humans? Can we define it as the state of being aware of one's surroundings? Does this sufficiently describe human consciousness? If so, all animals have heightened awareness of their surroundings. We know, however, that there must be much more to human consciousness. Is consciousness characterized by being sensate – sentient? If so, we know that the senses of animals are significantly sharper than those of the human.

Does consciousness in humans imply the capacity to feel emotion? If so, many animals are capable of feeling and showing emotion. Does consciousness in humans imply thinking and volition? If so, it can be argued that some animals are capable of thinking and the decision to act.

Does consciousness in humans imply biographical memory and the capability of planning for the future? If so, some animals are capable of biographical memory and can plan for their future, such as: the beaver building its dam; the bird building its nest and the ant collecting and storing food for its future use. It can be argued, however, that these may be attributed to instinct – inborn pattern of behavior rather than reasoning, thinking and decision making. August Forel, a distinguished entomologist, discusses the question of consciousness. He shows that insects have highly developed sensory organs as well as memory (*Some Ants and other Insects: An Inquiry into The Psychic Powers of Animals*).

Does consciousness in humans imply the ability to feel the sufferings of others; that is the capacity for empathy? If so, there are indications that some animals are capable of empathy, such as a dog who comes to the rescue of its master, or to one in distress. Does consciousness in humans imply the ability to converse through language? If so, it can be argued that animals may have their own mode of communication, their own language.

The question remains: What do humans possess that is over and above the consciousness of lower animals? 'Abdu'l-Bahá provides definitive answers to this question: The human has the unique power

of rational, analytical thinking and reasoning. The distinguishing feature, 'the power of intellectual investigation into the mysteries of outer phenomena', endows to the human a station beyond lower animals.

'Abdu'l-Bahá asserts:

> *[H]uman — the highest specialized organism of visible creation, embodying the qualities of the mineral, vegetable and animal plus an ideal endowment absolutely absent in the lower kingdoms — the power of intellectual investigation into the mysteries of outer phenomena. The outcome of this intellectual endowment is science, which is especially characteristic of man. This scientific power investigates and apprehends created objects and the laws surrounding them. It is the discoverer of the hidden and mysterious secrets of the material universe and is peculiar to man alone. The most noble and praiseworthy accomplishment of man, therefore, is scientific knowledge and attainment.* [PUP 29]

'Abdu'l-Bahá emphasizes that man's hallmark is love of transcendence:

> *Praise be to God! Man ever aspires to greater heights and loftier goals. He ever seeks to attain a world surpassing that which he inhabits, and to ascend to a degree above that which he occupies. This love of transcendence is one of the hallmarks of man.* [SAQ 217]

Fundamental to higher consciousness in humans, is the state of being conscious of one's reality. That reality, lacking in animals, is the human spirit.

> *This spirit, which in the terminology of philosophers is called the rational soul', encompasses all things, and as far as human capacity permits, discovers their realities and becomes aware of the properties and effects, the characteristics and conditions of earthly things.* [SAQ 242]

Association of consciousness with the brain

We now come to a puzzling and unavoidable question: Is consciousness associated with the brain? As we strive to grasp the meaning of consciousness, it must be recognized that not all neuroscientists are in agreement on the extent to which consciousness is associated with the brain. Few propose that consciousness may not be a byproduct of the brain and that the brain's job is simply to facilitate a dynamic pattern of interactions among the body, brain, and the world.

Elements indispensable to the state of being conscious

There is a general agreement that the body (a person), the self, the brain, and the mind are indispensable to the state of being conscious. Antonio Damasio, a distinguished neuroscientist, in his recent book, discusses and elaborates on three developmental levels of the Self; these he names successively: the Protoself, the Core self and the Autobiographical self (see *Self Comes to Mind*). Though we may not wish to dwell on his logic and arguments, regarding these levels of the Self, nevertheless it is evident that a self is essential for being conscious. The brain, the source of neuronal activity, is also necessary to consciousness and the mind is fundamental to being conscious.

Though the relationship of the brain to the mind and the relationship of the mind to consciousness have been extensively discussed, these yet remain enigmas. How should we define the mind? There is a general understanding that the mind includes perception, thinking, judgment, memory and consciousness. Yet there is not an agreement on what the mind is and whether the concept 'mind' also applies to animals or is it restricted to the human? Some believe that animals also have a mind. Others may argue that the general concept of mind is exclusive to the human and yet others link the mind to the human soul. Furthermore, there are a number of philosophical schools of thought, with varying viewpoints on the relationship between the brain and the mind. These range from the dualism of Rene Descartes to several other viewpoints. The view promoted by Descartes was that of 'substance dualism of mind and brain'; that is the mind is a nonphysical substance and separate from the brain.

Is the mind emergent from the brain as many neuroscientists believe? If so, what does 'emergent' signify? We understand through insights imparted by Bahá'í writings, that 'emergent' does not describe the relationship between the brain and mind. The term 'manifests' is more suitable. Between emergent and manifests is a subtle but critical difference. Emergent implies emerging or rising from; that is coming into existence, being produced by the brain, whereas 'manifests' implies displaying, revealing, or making known. Though the structure of the brain and its activity contribute to the mind, the brain must also manifest the mind. In explanation of this point, we can consider that if the brain becomes defective, it cannot manifest the mind, though we understand that the mind, nevertheless exists.

We can now look briefly at the human brain and several of its neuro-anatomical structures that are essential to consciousness, before we reflect further on the concepts of mind, soul, and rational soul in Bahá'í writings.

The Neural Basis of Consciousness

The five lobes of the human brain – frontal, parietal, temporal, occipital, and limbic – can be readily examined and studied in a number of views of the brain: superior, basal, lateral and sagittal – a view obtained through a cut that yields two symmetrical halves, the right and the left hemispheres.

The external surface of the human brain displays an impressive abundance of intricate folds and furrows. The folds, called gyri (plural of gyrus), are separated by furrows called sulci (plural of sulcus). Folds significantly increase the surface area of the brain. This leads to the question: Is increase in surface area key to higher consciousness in humans? In response, we know that the brain of a large non human mammal, a whale, has more cortical folds and greater surface area than that of the human brain. Can we conclude that the whale has a level of consciousness higher than the human? We know that the total number of neurons in the cortex of a Minke whale is 12.8 billion.[1] This is 13 times that of the rhesus monkey and 500 times more than a rat, but only two thirds of the human. Thus, the surface area of the brain of the whale is more extensive than the

human, but the number of neurons are fewer. However, neither the surface area of the brain, nor the number of neurons can explain the higher level of consciousness in the human. There must be more to the story; the mystery of human consciousness goes far beyond folds and neurons. Other factors make humans unique.

The internal structure of the brain examined on a horizontal section – made at right angle (90°) to the long axis of the body – reveals two distinct areas: an outer area of gray coloration, called 'cortex', surrounding an inner area of white coloration, called 'medulla'.

The Cortex, often referred to, as the 'Gray matter', includes neurons and supporting cells called glia. The Medulla, often referred to, as the 'White matter', contains mostly axons; these are the long projections of neurons specialized for conducting nerve impulse. Axons are surrounded by a covering, a sheath of insulation made of myelin. Myelin is composed of fatty material; thus it imparts a white coloration to the medulla.

Gray matter comes in two varieties: layered in cerebral cortex and cerebellar cortex and nonlayered, made up of aggregations of neurons, called "nuclei". Nuclei are distributed throughout the central nervous system and have essential functions.

Neurons. The brain has billions of neurons; neurons make trillions of connections among themselves. Connections are made according to patterns. Such patterns constitute a wiring diagram, or depending on the sector of the brain, many wiring diagrams. The billions of neurons are organized in circuits, some are very small microcircuits. When many microcircuits are put together they form a region. Collection of axons with common origin and destination form tracts. Neurons come in a variety of sizes but all are variations on the same theme. Each neuron has three main anatomical parts: cell body, dendrites, and axon. Neurons are connected with one another through the highly specialized synapse. Neurons can be non active or active; active neurons fire as a result of voltage change. A neuron fires, due to change in electrical potential, known as 'action potential' which is propagated from the cell body and down its axon. When the firing current arrives at a synapse, it triggers the release of chemicals known as neurotransmitters, synthesized by neurons.

We are now faced with an intriguing question. How do neurons with such impressive structures, intricate machinery, extensive connections and rapid firing at the rate of 10^{27} operations per second, contribute to consciousness? Electroencephalograms (EEG) show significant brain activity with continuous waves sweeping across it. These prompt a fundamental question: Is consciousness simply a drifting wave of electrical currents over widespread areas of the brain or is there more to consciousness? Where in the brain can we locate consciousness?

Where in the brain does consciousness reside?

Studies in neuroscience tell us that consciousness is associated with the brain but it does not reside in a single entity in any part of the brain. The brain *facilitate*s but does not *store* consciousness. Few neuroscientists go so far as to say that the brain does not actually produce consciousness.

We know that a normal intact cerebrum is incapable of functioning in a conscious manner by itself. The brainstem – the stem like connection at the base of the brain between the cerebrum and the spinal cord – plays a lead role in consciousness (*The Human Brain, An Introduction to its Functional Anatomy* 283). Sustaining input is required from a structure in the brainstem, called 'the reticular formation'.[2] The portion of the reticular formation that provides the required input for consciousness is known as the 'ascending reticular activating system'. It is known that the modulation of this system has a basic role in sleep and wakefulness and that bilateral damage to its neurons and nerve fibers passing through it results in prolonged coma.

When the significant role of the brainstem in consciousness was first discovered and established, neuroscientists found it quite surprising that the brainstem, considered the more primitive part of the brain, should play a lead function in consciousness, rather than the well developed and highly evolved part of cerebrum, known as neocortex.[3]

Consciousness is the result of massive integration of signals across many regions in the brain. Neuroscientists speak of the 'triads of conscious mind'; the brainstem, the thalamus [4] and the cerebrum

contribute to what is known as 'the conscious mind triad.' There are few other structures involved in consciousness: the hypothalamus [5], amygdala [6] and hippocampus.[7] Additionally, the spinal cord sensory and motor reflexes are required for being fully conscious.

Levels of consciousness

Different levels in state of consciousness exhibit different electroencephalograms (EEG) (See *Clinical Neuroanatomy and Neuroscience* 333). Electroencephalograms are graphic records of the electrical activity of the brain. Five types of waves, measured as cycles per second, are described during various states of consciousness. From the fastest waves to the slowest, these are: gamma waves (during meditation and active thought); beta waves (during attentive wakefulness); alpha waves (during resting wakefulness with eyes closed); theta waves are widespread and recorded during drowsiness and sleep or trance'; and delta waves, (slow wave sleep) are widespread and recorded during deep sleep.

Certain Bahá'i Concepts That Relate to Consciousness

Having briefly referred to few neuro-anatomical components that are fundamental to consciousness, we can now turn to insights provided by the Bahá'í concepts of the mind, the spirit, the soul, and the rational soul. Though of little interest to neuroscientists, these are fundamental to the reality and uniqueness of human consciousness.

In reflecting on these concepts and their current usage in Bahá'í writings, we face several challenges as well as barriers. It is important to recognize that the terminologies used in Bahá'í texts are translations from the original Persian into English, of concepts which are in essence: profound, shrouded with numerous understandings, and surrounded with layers of meaning. Furthermore, several rounds of translation, over time, have added to this complexity. Therefore, in these discussions we face the challenge of translation of concepts whose depths are difficult to plumb. At the same time, we are encouraged to reflect and meditate on them, perchance we can uncover some of the mysteries therein.

In Bahá'í writings, the terms: 'mind', 'soul', 'rational soul', as well as 'spirit' are frequently used. How should we relate these to the concept of 'consciousness', in vogue in our times? Does the term, 'consciousness' as used in neuroscience and other related disciplines, resonate with the Bahá'í concepts of mind, soul and specially with the rational soul – an entity we believe endures beyond the death of the brain? It should be noted that few neuroscientists have used expressions, such as: 'the continuing of consciousness' and 'endless consciousness' (*Consciousness Beyond Life* 245, 283). We can reasonably infer that these allude to an entity which survives the death of the brain and continues on. Avoiding the word, 'soul', used by followers of many religions, they employ such innocuous terms. These clearly imply belief in an entity which can endure beyond the death of the brain. Several eminent neuroscientists, such as Penfield and Eccles, unabashedly declare their conviction in the immortality of the human soul, as presented further down below.

Can we relate these to the concepts: 'soul', 'rational soul' or 'spirit' found in Bahá'í writings? In these sacred texts, 'soul' and 'rational soul' take on additional significance and specific meaning. It is of value to probe and discuss these concepts while remaining mindful of the challenges of translations and the incomprehensibility of their essence.

Does Consciousness Survive the Death of the Brain?

As we reflect on consciousness in humans, we are faced with an inescapable question: Does consciousness survive the death of the brain? Where does consciousness go after the death of the brain? Where does the mind go after the death of the brain? Classic Studies on death and dying can provide few valuable insights. Elizabeth Kubler Ross and Raymond Moody are credited with introducing this theme, thus encouraging the development of a sizable literature on the question: Does some mode of consciousness endure the death of the brain?

In response to this question, several noted neuroscientist have expressed their convictions. Wilder Penfield, based on a lifetime of experience in neurosurgery and research, came to the understanding

of the duality of brain and mind. He considered the nature of the mind a mystery and believed in its immortality. He writes that in order to survive after death, the mind must establish a connection with the source of energy other than the brain.

> If, however, during life, when the brain and mind are awake, direct communication is sometimes established with the minds of other men or with the mind of God, then it is clear that energy from without can reach a man's mind. In that case, it is not unreasonable for him to hope that after death the mind may waken to another source of energy. (*The Mystery of the Mind: A Critical Study of Consciousness and the Human Brain,* 88)

Sir John Eccles, neurophysiologist, recipient of Nobel prize for his research on the neuron and its synapse, became a staunch believer in the reality of the human soul. Based on his experiments on brain-mind relationship, he came to the belief that the conscious selfhood of man is endowed with an immortal soul. He writes poetically about the uniqueness and immortality of the human soul (*Evolution of the Brain: Creation of the Self* 238, 243).

On the spiritual reality of the human, he writes.

> I maintain that the human mystery is incredibly demeaned by scientific reductionism, with its claim in promissory materialism to account eventually for all of the spiritual world in terms of patterns of neuronal activity. This belief must be classed as superstition ...we have to recognize that we are spiritual beings with souls existing in a spiritual world as well as material beings with bodies and brains existing in a material world. (*Evolution of the Brain: Creation of the Self* 241)

Eccles expresses unequivocally, his belief in the human Soul:

> Since materialistic solutions fail to account for our experienced uniqueness, I am constrained to attribute the uniqueness of the Self or Soul to a supernatural spiritual creation. To give the explanation in theological terms, each soul is a new Divine Creation which is implanted into the

> growing fetus at some time between conception and birth. (*Evolution of the Brain: Creation of the Self* 237)

Insights from ‘Abdu’l-Bahá

We can now turn to the insights ‘Abdu’l-Bahá provides in His Tablet to Professor August Henri Forel, a distinguished Swiss entomologist. Forel was also an eminent neuroscientist who had made significant discoveries on the structure of the human brain – the deep connections named after him, as “Fields of Forel”. Professor Forel wrote to ‘Abdu’l-Bahá. In response, he received a letter known as ‘The Tablet of Forel’. In this Tablet, ‘Abdu’l-Bahá makes significant contributions to the discussion of consciousness. Subsequently, August Forel professed his belief in the Bahá’í Faith, both in his writings as well as in his will.

Forel wrote:

> “This is the true religion of human social good, without dogma or priests, uniting all men on this small terrestrial globe of ours.” I have become a Bahá’í. May this religion live and prosper for the good of mankind, this is my most ardent wish. (*For the Good of Mankind*, *August Forel,* 18 and *Baha’i World Volume 18*, 970)

In this Tablet, ‘Abdu’l-Bahá, with scientific and spiritual logic, proves the existence of God and expounds on the reality of the human soul, mind, and spirit. ‘Abdu’l-Bahá affirms that the soul is: limitless, changeless, free from all agencies, has full strength, continues to exist despite loss of reason and is imperishable. The following are few quotes from this Tablet.

> *The soul hath limitless manifestations of its own.*
>
> *The soul changeth not. It dependeth not upon the body. It is through the power of the soul that the mind comprehendeth, imagineth and exerteth its influence,*
>
> *The soul is a power that is free from all agencies. The soul as thou observest, whether it be in sleep or waking, is in motion*

> *and ever active. Possibly it may, whilst in a dream, unravel an intricate problem, incapable of solution in the waking state.*
>
> *The soul is ever endowed with full strength.*
>
> *Despite the loss of reason, the power of the soul would still continue to exist. The soul hath limitless manifestations of its own.* [TAF 37-43]

In the Tablet to Forel, 'Abdu'l-Bahá draws a connection between the mind and the soul but also makes distinctions between the two. He explains that 'concerning mental faculties, they are inherent properties of the soul' and likens the connection of the mind to the soul as to the connection of rays of the sun to the sun. He asserts that: mental faculties can change but the soul is changeless; the mind is limited, but the soul is without limits; and that the mind comprehends '*by the aid of such senses as those of sight, hearing, taste, smell and touch' while 'the soul is free from all agencies.*' He further explains that the soul is in motion and active whether in sleep or waking.' It can dream and unravel mysteries, whereas the mind '*understandeth not whilst the senses have ceased to function*' and asserts that '*the soul is ever endowed with full strength.*' [TAF 37-43]

Therefore, we understand that the soul is changeless, limitless and independent of the senses while the mind is limited, dependent on senses and subject to change. Yet the mind has essential connection to the soul. Despite the loss of reason, the power of the soul continues to exist.

It is important to note that both terms: 'soul' and 'rational soul' are used throughout Bahá'í writings, at times interchangeably. Rational soul can be viewed as the soul of man, endowed with higher consciousness. We understand from 'Abdu'l-Bahá's writings that the terms 'spirit' and 'rational soul' both refer to the human soul, distinct from the soul of animals lower than the human.

As to the relationship of the rational soul to the body, 'Abdu'l-Bahá responds to the following question: "After the body has been cast off and the spirit has taken flight, through what will the rational soul subsist?"

'Abdu'l-Bahá's answer:

> *Some hold that the body is the substance and that it subsists by itself, and that the spirit is an accident which subsists through the substance of the body. The truth, however, is that the rational soul is the substance through which the body subsists. If the accident – the body – is destroyed, the substance – the spirit – remains.* [SAQ 276]

'Abdu'l-Bahá continues his response to this seminal question, shedding further insights on the association of the rational soul with the body:

> *Secondly, the rational soul, or the human spirit, does not subsist through this body by inherence – that is to say, it does not enter it; for inherence and entrance are characteristics of bodies, and the rational soul is sanctified above this. It never entered this body to begin with, that it should require, upon leaving it, some other abode. No, the connection of the spirit with the body is even as the connection of this lamp with a mirror. If the mirror is polished and perfected, the light of the lamp appears therein, and if the mirror is broken or covered with dust, the light remains concealed.* [SAQ 276-277]

'Abdu'l-Bahá expounds further on this theme:

> *The rational soul – that is to say, the human spirit – has neither entered this body nor existed through it to begin with, that it should require some substance to depend upon after the constituent parts of the body have decomposed. On the contrary, the rational soul is the substance through which the body depends. The rational soul is endowed from the beginning with individuality; it does not acquire it through the intermediary of the body. At most, what can be said is that the individuality and identity of the rational soul may be strengthened in this world, and that the soul may either progress and attain to the degrees of perfection or remain in the lowest abyss of ignorance and be veiled from and deprived from beholding the signs of God.* [SAQ 277]

That entity which survives the death of the brain, is the immortal human soul. Life after death is discussed in numerous passages from the vast treasury of Bahá'í Writings on this theme.

Baha'u'llah describes the transition at death, as an unveiling:

> *O My servants! Sorrow not if, in these days and on this earthly plane, things contrary to your wishes have been ordained and manifested by God, for days of blissful joy, of heavenly delight, are assuredly in store for you. Worlds, holy and spiritually glorious, will be unveiled to your eyes.* [GWB 329]

As to the state of the human soul, Baha'u'llah affirms:

> *Verily I say, the human soul is exalted above all egress and regress. It is still, and yet it soareth; it moveth, and yet it is still. It is, in itself, a testimony that beareth witness to the existence of a world that is contingent, as well as to the reality of a world that hath neither beginning nor end.* [GWB 162]

We understand, from numerous passages in Bahá'í writings, that a departed soul can make discoveries in the 'heavenly' world and be informed of mysteries. Departed souls can be conscious of one another, associate, commune and be aware of one another's state and condition [GWB 169-170]. We understand that the departed soul can remember its earthly life and recognize persons with whom it had been associated.

However, through insights provided in the Tablet of Forel, we also understand that memory is an attribute of the mind and that the mind is dependent on the senses. Here, we face an enigma which compels us to reflect on the relationship of mind and memory to the soul. Such matters are mysteries and are ultimately paradoxical.

The Enigma of Consciousness

We are faced with enigmas on two fronts:

On one front, in neuroscience, we are faced with an enigma in understanding the relationship of neurons and their connections to

mind and consciousness and that neither the mind nor consciousness can be located in the brain.

On another front, we are faced with the enigma of relationships between the mind and the rational soul. Notwithstanding the complexities of semantics and translation of concepts, their nature and essence remain elusive and incomprehensible. Baha'u'llah writes:

> *Thou hast asked Me about the nature of the soul. Know verily that the soul, is a sign of God, a heavenly gem whose reality the most learned of men hath failed to grasp, and whose mystery no mind, however acute, can ever hope to unravel.* [GWB 158]

At some level, these mysteries are paradoxical. Paradoxes are intrinsic to the nature and essence of reality. Reality is vast and multi dimensional; thus it can never be fully explained, fully stated nor fully grasped. In the quantum world, light is both particle and wave; this is clearly a paradox. As we attempt to explore these concepts and the insights therein, it is likely that we may be facing mysteries comparable to those of a quantum world, as proposed by several neuroscientists.

Consciousness may be on the edge between the quantum and classical worlds

It has been suggested that observations and findings in quantum mechanics, may bear relevance to the relationships between the brain, mind, soul, and consciousness. Few, among such phenomena are: complementarity, quantum entanglement, nonlocality, the uncertainty principle and 'the observer effect'. A brief reference to these follows.

The phenomenon of complementarity, is demonstrated by the behavior of light which acts either as particle or as wave – never both at the same time – depending on the design of the experiment. Quantum entanglement, implies that a pair (or pairs) of particles generated from the same source remain correlated, intimately and permanently connected. Nonlocality, is an outcome of entanglement, as entangled particles remain connected over time and space creating

non local relationships. Their connection is such that when one particle is measured or manipulated, its counterpart is affected instantaneously, regardless of the distance that separates them. The uncertainty principle, known as Heisenberg's uncertainty principle, is a fundamental property of wavelike systems, such as the quantum system. It places limits on precision in which measurements can be made of particle position and momentum. Furthermore, 'the observer effect' contributes to uncertainty in measurements as it implies that the mere measurements of certain systems can fundamentally alter the observed object.

Einstein, the co-founder of the quantum mechanic theory, referred to nonlocal action – an absurdity of the quantum world – a 'spooky action at a distance'. Among many who have expounded on this theme, are Robert Lanza (*Biocentrism; How Life and Consciousness are Keys to Understanding the True Nature of Universe*) and most recently, George Musser (*Spooky Action at a Distance*).

In summary- Consciousness may be at the edge, between the quantum and classical worlds. Realities exist in multiple states simultaneously: unified but separated realities remain connected over time; multiple realities can condense into one unified entity; precise location and momentum of quantum realities are indeterminate. The quantum world is a world difficult to comprehend, as expressed by Richard Feynman, Nobel Prize physicist in 1965, "I think I can safely say that nobody understands quantum mechanics." [8]

Conclusion

Human consciousness, remains a mystery. The concepts of mind, rational soul, and spirit can be probed, reflected on and explored in order to garner the insights therein. At some level, however, these remain elusive as our brains are limited and can grasp only partially and incompletely. Our senses are limited: our vision can only detect a limited range of the electromagnetic spectrum and our hearing only a limited range of frequency.[9]

In trying to grasp the mystery of consciousness, we arrive at an impasse. While yet in this earthly plane of existence, we can not overpass this limit. We can, nonetheless, continue to seek understanding, inspiration, enlightenment and contentment from the

rich treasury of Bahá'í writings on the reality of the human soul, its immortality and progress in the realms beyond.

This article started with, "The Mystery of Consciousness" and concludes with, "The Enigma of Consciousness". With a sense of reverence, we stand in awe before the mysteries of the mind, consciousness, soul, and the functioning of the human brain – its billions of neurons and trillions of synapses and the rapid firing of its neuron, at the rate of 10^{27} operations per second.

Sir John Eccles has suggested that the body and the brain may be regarded as a superb computer, with the Soul or Self as its programmer? (*Evolution of the Brain: Creation of the Self* 238). The metaphor of the brain as computer has few proponents as well as numerous opponents.

It has been expressed: "Nothing rendered in silicon even remotely resembles a conscious mind."[10]

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NOTES

[1] blogs.scientificamerican.com/news-blog/are-whales-smarter-than-we-are

[2] Reticular formation is a diffuse network of neurons and nerve pathways in the brainstem

[3] Neocortex is the part of cerebral cortex which serves as the center of higher functions in humans.

[4] Among the numerous functions of thalamus is: It acts as relay between different subcortical areas and the cerebral cortex..

[5] Hypothalamus is part of the brain, below thalamus, concerned with body temperature, hunger, thirst and other autonomic functions.

[6] Gray matter (neurons) inside each cerebral hemisphere involved in experiencing emotions

[7] The hippocampus plays an important role: in consolidation of information from short term memory to long term memory; and in spatial memory.

[8] See Richard Feynman, *the Character of Physical Law*. MIT Press, Cambridge, Massachusetts, 1995, 129

[9] Between 20- and 20000 KHz

[10] J. McFadden. *Journal of Consciousness Studies* 9 (4):23-50, 2002.