Exploring the Dimensions of Human Consciousness: Iqbal's Synthesis of Neurophysiology, Spirituality, and Philosophy

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ABSTRACT

This article is about Iqbal's views on ego, consciousness, self, space, and time, as presented in his *Reconstruction*. Iqbal distinguishes ego from the soul and rejects its identification as a rigid physical substance. The ego, he argues, operates with its own energy and interacts with time differently during life and after death. Central to Iqbal's thesis is the role of consciousness in understanding ego, which presents philosophical challenges for distinguishing between ego and consciousness. It is also described here that whether Iqbal's position aligns with dualism or monistic materialism, examining his views on Divine Time, space, and the relationship between matter and consciousness in light of modern physics and biology. Further, the discussion of neurons and their functions introduces a neurophysiological approach to consciousness, yet Iqbal distances himself from reductionist views, critiquing the limited scope of science in grasping reality. He argues that scientific observations are fragmentary and cannot fully capture the nature of consciousness, which is intertwined with both internal and external stimuli. The article also delves into Iqbal's understanding of time, distinguishing between serial time and Divine time, as well as between the efficient and appreciative self, offering a unique philosophical approach. His insights resonate with modern phenomenological ideas about inner and outer experiences and challenge reductionist science's approach to consciousness.

Ego, according to Iqbal, as we have seen, is not identical to soul in the sense in which it has been understood by the Mutakalimin. Nor is it a rigid substance occupying space like a physical object. He (ego) organizes all its acts through its own energy. His perception of time and the way it organizes his freedom, is in serial time with reference to the body and nature, but after death it enjoys the luxury of Divine Time and Divine Space. All actions of the ego are regulated, though freely, by the Directive Energy (Amr) infused ab initio at the time of fertilization of ovum by the sperm and subsequently by the accumulation of sub-egos, during embryonic development ultimately leading to the emergence of the final ego. The freedom, which the ego carries, is a deliberate act of the Ultimate Ego bestowed on man as the chosen one of God. This be so, Iqbal makes a categorical statement that it is only consciousness through which we can understand the nature of the ego. Given this approach adopted by Iqbal there are several aspects, irrespective of their soundness, which are likely to attract the attention of a concrete mind. First, whether Ego and Consciousness are two faces of the same coin? Suffice to reiterate at this stage that in our opinion, as the modern researches also show, it is difficult to distinguish between ego and consciousness on the basis of characteristics enumerated by Iqbal. We will present more evidences on this count when we deal with phenomenology. Second, we must clearly identify whether Iqbal's thesis on ego categorizes him amongst the dualists or monistic materialists or somewhere in between the two when he differentiates normal experience (experimentally verifiable) from spiritual experience (inner religious experience)? Third, whether the existence of Divine Time and Divine Space have any perceptual means for a human living in serial time? Again for the concrete mind under the spell of the world of physics, it is a fundamental issue. We will examine this as we proceed further in our discussion. Fourth, whether our concept of space and time based on Newton's laws of motion and gravity and that of Einstein's general theory of relativity which merges time with space as its fourth dimension, and states that neither time nor space are absolute, have any meaning for predication of the space of God from the perceptual space in the world in which we live? Fifth, what is the nature of matter in the

light of modern researches in physics and what bearing, if any, it has on such concepts as phenomenology as related to consciousness? Lastly, whether some aspects of biology and the complicated assemblies of neurons have some basis for consciousness? Certainly, for a student of religious psychology and that of natural sciences, these are penetrating questions, though difficult to answer, yet having a high bearing on our theme of inner religious experience (finite-infinite contact). We now proceed to address these questions relying on the information available from current literature.

But before doing so, let us dispose off mind-matter controversy. This controversy stems from several approaches which have been used for its resolution. Some of these approaches lend a powerful support to Monastic materialism and include, among others, behaviorism (William James),[1] functionalism, linguistics (Wittgenstein)[2], Qualia[3], reductionism and phenomenology[4]. As compared to this, dualism stands its ground on the basis of equally powerful arguments.

Unlike the physicalists, Iqbal makes a clear distinction between the normal experience (which is verifiable, and which is entirely based on the theory of matter as advocated by physicalists, and inner religious experience, normally non-verifiable which because of its non-material nature is apparently a consequence of higher consciousness (ego). This brings Iqbal closer to Descartes' dualistic approach. Yet, there are a few differences which will be discussed as we expand the subject subsequently. For the present we will focus our attention on consciousness (ego) as understood by adherents of monistic materialism. To be able to appreciate their viewpoint, it is considered worthwhile that reader is briefly acquainted with the structure and function of the brain. This will give us a useful insight into the emergence of consciousness from the point of view of neurophysiologists and evolutionary biologists.

Essentially, the human brain during embryonic development as it grows at the front from the neural tube is divided into three distinct regions, the forebrain, the mid-brain and the hindbrain (fig. 1).

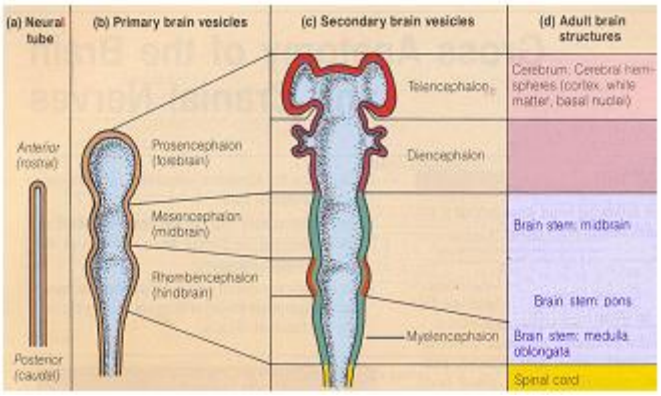

Figure 1: Embryonic development of human brain. The adult structures are derived from the neural tube shown in left column (a)

In a fully developed human brain, the forebrain constitutes the cerebral hemispheres (two, one left, one right), the thalamus and hypothalamus. The midbrain and hindbrain taken together constitute the brain stem consisting of medulla oblongata and pons enveloped by cerebral hemispheres. The cerebellum is an outgrowth from the midbrain seen behind the cerebral hemispheres. All parts of the brain are made up of nerve cells called neurons. Reference may be made to Fig 2 to get a mental picture of various parts of the brain.

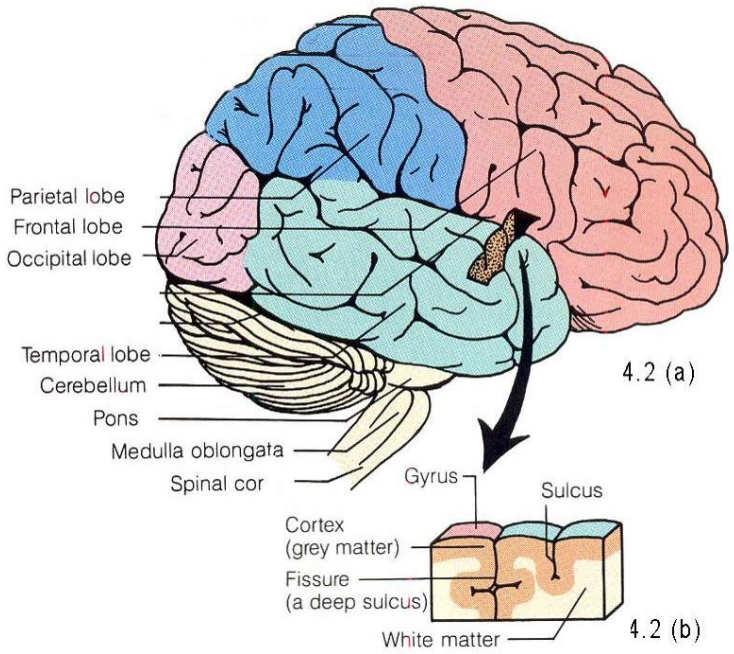

Figure 2 –(a) Right lateral view of the brain. Showing various areas of the brain; (b) a portion of microscopic structure of the cerebral cortex.

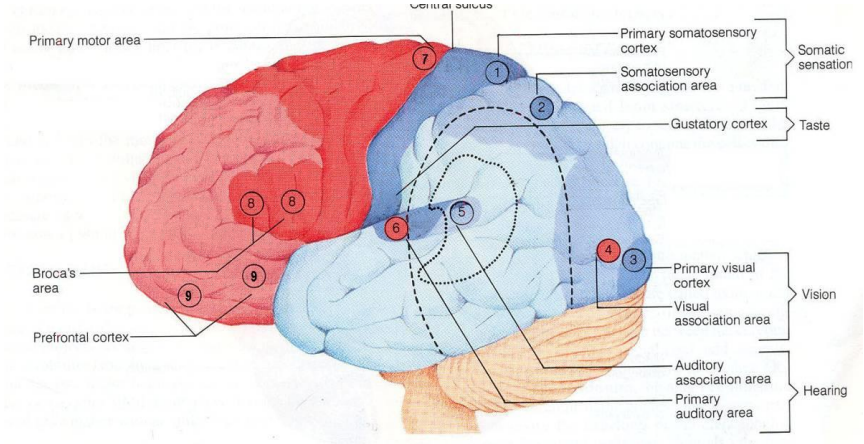

Figure 3: Functional areas of the left cerebral cortex.

The human species is characterized by evolutionary advancement of cerebral hemispheres which are larger in weight and volume (in proportion to its body) compared to any other animal species. The two hemispheres, right and left, are clearly separated from each other by a depression called longitudinal fissure. All over, on the surface of each hemisphere there are raised convoluted areas called Gyri (singular gyrus) and depressions called Sulci (singular sulcus). Each hemisphere is divisible in various lobes; namely (a) frontal in front; (b) temporal on the side; (c) the parietal in the middle on top and (d) occipital behind. Each lobe is the seat for designated functions as shown in figure 3

The designated functions for the right side of body are represented on the left hemisphere and those for the left are represented on the right hemisphere. The two hemispheres are bridged internally through nerve fibers, constituting what is known as the Corpus callosum. The inside of the hemispheres have cavities known as ventricles. These cavities and other cavities in various parts of the brain are interconnected and filled with a fluid called cerbro-spinal fluid. The two hemispheres receive messages from inside and outside the body (the sensory messages, also called afferent), process them, and then send messages back for necessary action in accordance with the requirement of the message received. These returning messages calling for action are known as efferent (motor) messages. For our purpose we can note that the cerebral hemispheres are responsible for processing the affarent (incoming) and efferent (outgoing) messages. The walls of the cerebral hemispheres are constituted by two types of materials: the gray

matter outside and the white matter inside (figure 2b). It can be imagined that the cerebro-spinal fluid is in contact with inside of the white matter. Examine Fig 3 and note that primary somato-sensory area in the parietal lobe receives impulses from the body's sensory receptors (such as those for pressure, pain and temperature). Just behind this in the parietal lobe is located the somato sensory association area which analyses the messages received (afferent stimuli)–and producing awareness about pain, coldness, light, and touch, among others. The messages from other special sense organs are perceived in specific areas located in other lobes of the hemispheres. For example, the visual area (for the eye) is located in the occipital lobe, the auditory area (for the ear) is located in the temporal lobe, and the olfactory area is deep within the temporal lobe.

The primary motor area which is responsible for sending back messages to the body for required action is located in the frontal lobe. Located in the lower part of parietal lobe of left hemisphere is a small specialized area called Broca's area which organizes the articulation of words (speech). Furthermore, of particular importance for us is the prefrontal area in the frontal lobe which is involved in intellect, complex reasoning and personality. This area will be the focus of our attention when we will examine carefully its neurophysiology on the emergence of consciousness. Generally speaking, each hemisphere is a "specialist" in certain ways. For example, the left hemisphere is the "language brain" in most of us because it is associated with language skills and speech. The right hemisphere is more specifically concerned with abstract, conceptual or spatial processes – skills associated with artistic or creative pursuits. The cell bodies of all neurons involved in cerebral function are found only in the gray matter of the brain called the cerebral cortex. The white matter below is composed of nerve fibres only (Figure 2b).

Now refer to Fig 4 and examine two other important areas of the brain namely, *Diencephalons, the hind portion of the forebrain,* and the brain stem which belong to the midbrain and hindbrain. In diencephalons two very significant areas functionally stand out in human brain. These are (a) Thalamus and (b) hypothalamus. To the brain stem belong the pons and medulla oblongata, the cerebellum, another important functional area, is an outgrowth of the hindbrain. All these brain structure are constituted by nerve cells (neurons). An aggregation of neurons within the brain tissue is identified, as nucleus. Many such nuclei are present in various segments of the brain. For ease of simplicity we avoid examining them. However, we

will refer to them, if necessary, when we describe the neurophysiological basis of emergence of consciousness. Note that brain stem and other structures lie on the underside of the cerebral hemispheres almost covered by them and can thus be seen in a section of the brain cut from the middle from above downwards as seen in Fig 4.

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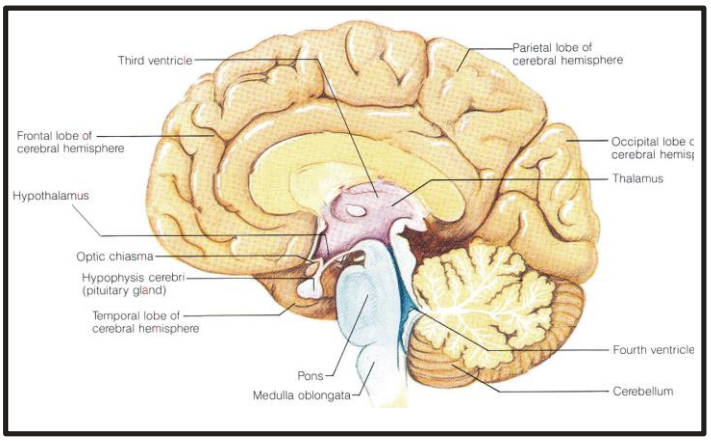

Figure 4 Section of the brain especially showing diencephalon and brain stem (adapted from Marieb, E. N. 1996).

The diencephalon though a part of forebrain occupies the front end of the brain stem. It consists of two large lobes of gray matter in thalamus. The two lobes are connected by a bunch of neurofibres. All information from sensory areas of the body is integrated through the thalamus and relayed to semato-sensory area in the cortex of hemispheres. Hypothalamus which lies below the thalamus, is involved in regulating the body temperature, water balance, metabolism, sex, hunger and thirst; sensory nerves (the optic nerves) which originate from the modified neurons in the eyes cross each other (coming one from the left eye and the other from the right) below the hypothalamus forming the optic chiasma. A relay station for olfaction (smell) is located in the mammilary bodies residing in the floor of hypothalamus.

Refer to Fig 4 again and trace the thalamus in the midbrain. At its back lies the hindbrain which comprises medulla oblongata and pons. The cerebellum is made up of outer cortical area of white mater (nerve fibres) like the cerebral hemisphere. The cerebellum is concerned with unconscious coordination of skeletal muscle activity, and control of balance and equilibrium. Nerve fibers from the

apparatus of inner ear, visual pathways, tendons and skeletal muscles etc., enter the cerebellum. In fact, then, the cerebellum presides over the state and position of body parts at all times. For example, imagine a tennis player, maintaining its varying posture and balance during a tennis game. Such activities are regulated by the cerebellum. Furthermore, we have already noted that all sensory inputs from within and outside the body are received and analyzed by the thalamus. A number of nuclei are present in the thalamus (we will not name them in order to make things easy). These nuclei on the one hand receive information from various sensory inputs and on the other hand are connected with the regions of the cerebral cortex in two way traffic through nerve fiber tracts. In essence, then, it can be stated that thalamus provides a coordinating function between the higher order sensory processing (cerebral cortex) and the sub cortical motor systems. The important point we are making is that thalamus existed prior to the evolution of cerebral cortex. Accordingly, assuming that evolutionary process has been at work for millions of years, we have no hesitation in concluding that the rise of new cerebral cortical system as a higher order integrative system continues to receive analyzed sensory information from the ancient sub-cortical structure, like thalamus and brain stem.

With this description of the brain we have cleared the way for understanding the emergence of consciousness as conceived by Physicalists and Biologist. Furthermore, the same description will be of help to a searching mind who would like to delve deep for a comprehension of any theory of consciousness. However, his understanding will be like a squandered sum of beads originally bound together by a string, unless he attains some knowledge of the units which came together in billions and constituted the matrix of the brain. These units are called nerve cells (or neurons). Man is born with a fixed number of billions of neurons with identical physiological functions, though the number of neurons which play active part in the rest of man's life is only about 25% of the neuronal cell mass of the brain. The question before us is - what is the structure and organization of a neuron and how it functions? We have already indicated that some neurons are sensory (receiving message from sense organs) while others are motor (sending messages to the body for appropriate action. Yet the structure of all neurons are identical.

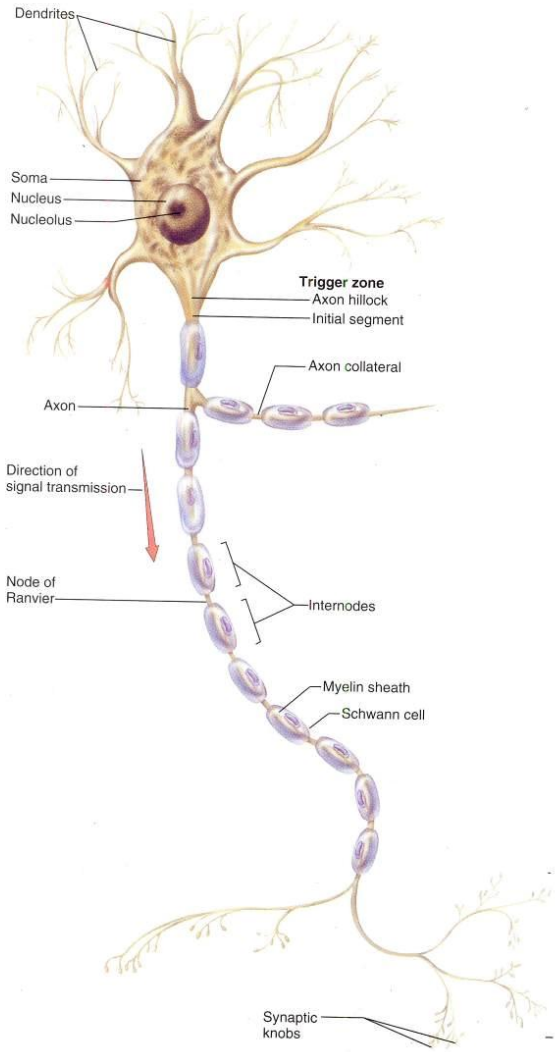

Figure 5- Typical structure of a neuron. Note the body of the cell, the dendrites and the axon

Examine the structure of a neuron as presented in Fig 5. Note (a) the cell body with a nucleus in the center; (b) a large number of tree like branches coming out of the cell body called dendrites; (c) a single long process, called axon, making contact with tree like branches of dendrites of another neuron; and (d) in cases where axon does not go on to make contact with dendrites, its tip branches off and makes contact with the muscle fibers. The message carried by the axon, let us say for contraction of a muscle is chemically passed on to the muscle along a gap between the point of contact of

the axon and the muscle. We are now able to understand that bundles of axons from modified neurons in sense organs of the body (eyes, ear, smell, touch etc.) make up what may be called sensory nerves. The bundle of axons from motor neurons of the brain (various parts) makes up what may be called motor nerves. Repeatedly we have used the word message or impulse. What does this mean and how is this impulse generated and propagated by the apparatus of a neuron? Indeed, as we know it today the whole process is electrochemical and electromagnetic. This is depicted in Fig 6. In simple words this may be described as follows: (For a larger image see end of the book)

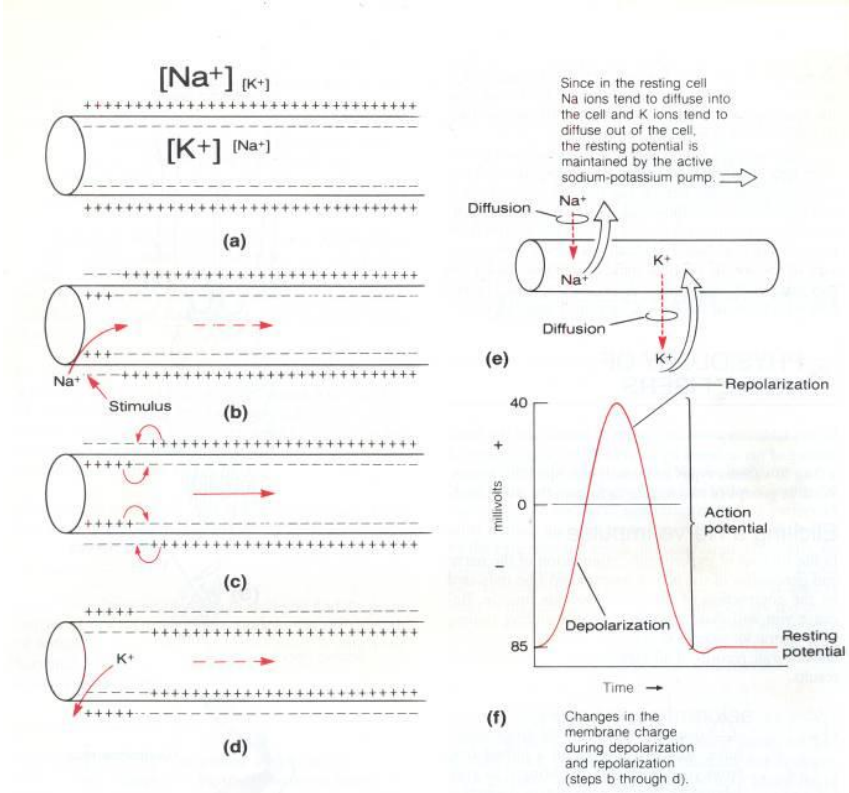

Fig. 4.6: Showing the physiology of nerve impulse

The nerve impulse. (a) Resting membrane potential (−85 mV). There is an excess of positive ions outside the cell, with Na^+ the predominant extracellular fluid ion and K^+ the predominant intracellular ion. The plasma membrane has a low permeability to Na^+. **(b)** Depolarization—reversal of the resting potential. Application of a stimulus changes the membrane permeability, and Na^+ ions are allowed to diffuse rapidly into the cell. **(c)** Generation of the action potential or nerve impulse. If the stimulus is of adequate intensity, the depolarization wave spreads rapidly along the entire length of the membrane. **(d)** Repolarization—reestablishment of the resting potential. The negative charge on the internal plasma membrane surface and the positive charge on its external surface are reestablished by diffusion of K^+ ions out of the cell, proceeding in the same direction as in depolarization. **(e)** The original ionic concentrations of the resting state are restored by the sodium-potassium pump. **(f)** A tracing of an action potential.

Figure 6: Showing the Physiology of Nerve Impulse:

(a) Resting Membrane potential (-85 mV). Note excess of positive Sodium Ions [N^+] outside and the excess of positive potassium [K^+] Ions inside.
(b) Depolarization which reverses the resting potential; Sodium Ions enter inside and action potential is initiated.
(c) The resting potential is restored; behave Sodium goes out, and K^+ comes in
(d) A tracing of an action potectia

Stimulus is any thing which can bring about a change in *status quo*. Take for example the number of individual sparks (stimuli) triggered by the reading of this sentence at this moment, the neural impulses ignited by this book in the relevant neurons of the brain cannot be calculated. But we do know as to what is happening in each neuron - which for all intents and purposes for a neurophysiologist (or psychologist) is the smallest indivisible unit of consciousness and can help us appreciate the "beauty and complexity of summed up mechanics of the units of human consciousness (?) We may not necessarily agree with this. Let us now find out how this simple unit works? Examination of Fig 6 will show that the nerve fiber, and indeed the cell body of a neuron are bounded by a membrane identical in all types of cells. The membrane separates the inside of fiber from the outside. At rest (status quo) Potassium ions inside have high concentration but the electrical charge on the inside is negative. Correspondingly, the potassium ions have low concentration outside. Thus, according to law of diffusion these ions tend to move outside, but are stopped by electrical potential difference between inside and outside resulting in zero flow. At the same time the concentration of sodium ions is high on the outside compared to inside. These ions tend to move inside, but are prevented by the same electric potential difference (-65m volts). Now what happens when stimulus arrives at some point in an axon? The stimulus, if good enough in strength, changes the permeability for sodium ions at that point, opening what are called sodium gates in the membrane. Resultantly, sodium ions enter in an bring about change in the inside and outside charges on the membrane at that site of the stimulus; the inside becoming positive and the outside negative. The electric potential difference falls to –45 mv. In this way an electric wave is generated (see Fig 6). Since this is an electro chemical process, energy is generated and a stimulus is provided for further propagation of the nerve impulse. Two points should be noted. At the site left behind by the nerve impulse, the potassium ions again move in and sodium ions are pushed out. And are restored as in the resting state. Accordingly, *Status quo* is resumed; the electric potential again rising to -65 mv on the inside. Also the

propagation of nerve impulse is an all or none phenomenon, meaning that if the stimulus is weak, that is below the threshold, then, in spite of the presence of weak stimulus there will be no change in the permeability of the membrane and consequently there will be no nerve impulse. The rise of nerve impulse and its propagation only happen if the stimulus crosses the threshold.

This raises another important question. If one tree in a forest is put afire, not only the fire may spread to the whole tree, but may also set ablaze the whole forest. Now we know that there are billions of neuron having trillions of dendrites in the brain. Thus, like the forest, as one nerve cell is stimulated, many other cells are activated because of axon-dendrite connections. However, in practice this may not happen since at the branching points of the dendrites the stimulus may be stopped and may not be allowed to pass into the body of the cell and onward to the axon of the cell. This mechanism is of special interest to us for exploring the theory of consciousness based on nerophysiological approaches.

The process can be best described in the words of Pico (2000). "All sensory realities are based upon cellular functions (of neurons) where physics of matter and energy become the biology of nerve impulses and neurotransmission." This is a straightforward materialistic view point, which recognizes the transformation from physical to the biological. If this line of argument is pursued then, there is little we can present for a further transformation of biological to spiritual, a subject which received highest attention from Iqbal in *the Reconstruction*. However, to be able to stay with Iqbal we need to explore further the properties of a neuron, the unit of consciousness, so that we can locate a genuine basis, if any, about the mechanism involved in the proposed contact of the finite with the infinite. This is problematic, but not without rationale. The difficulty however is that even at this time, the search for knowledge and understanding of the biological universe, its operational manual and secrets – are not fully known: For instance, we do not know about the absolute basic code of information transmission from neuron to neuron in the nervous system. We do not know the full set of computational rules that operate in a single neuron or a network of neurons. We do not know exactly if, where, and how the nervous system represents the external and internal environments. Does it happen in the same way as the electromechanical circuits and mathematical equations, expressed together in computer simulation? In our opinion, the physics and mathematics of computing are all man made constructs and are far removed from the complexities of information processing in biological systems like the neurons and the

neural networks. We have, therefore, no hesitation in making a statement that we, as yet, are far removed from a further understanding of mathematical operations-the algorithms, of the nervous system. A computer scientist may be proud of creating a binary code (0/1) which through a series of basic state transitions can solve both simple and complicated mathematical problems, yet no such code, as we know, is applicable to the non-linear mathematical computations taking place during the stimulation of a neuron. How do the neurons then function? And what is the basis on which the code, computes the representations resulting from sensory stimuli? Shanon and Weaver (1949)[5] and Weiner (1948)[6] have suggested that "information is present in any system in which entropy and order change, from quantum states to biological events, to the electronic circuits of computer systems to neural networks". On the face of it, this statement may be of considerable importance. However, there is a wide conceptual gap between the digitized mathematical computations by trillion of binary operations performed by computers and the computational process in the synaptic zones of the nervous systems. Essentially, the difference lies in the fact that a single neuron is performing a spatiotemporal integration of each stimulus moment which may or may not result in generation of action potential. This explains as to how we impose our concept of computation on a nerve cell function. Interestingly enough, computation by a single cell and computation by a neural network may or may not follow the same set of operational rules. *This be so, and as Pico (2000) has remarked:*

> Hype, hope and illusion must be understood and respectfully separated from insight if we are to make progress in our efforts to reveal the neural computational code.

The issue we have raised about the computational process residing in a neuron and a neural network are germane to exploring our understanding of the nature of religious experience as predicated by Iqbal from the mystic experience of great Sufis of Islam. In fact, even in the prevailing state of our knowledge, one must yield to the impression that "it is only recently that we have begun to understand and conceive the nervous system as the substrate of computation and behavior. We are limited and humbled, in our understanding of the basics of neural function when we begin to speak of such thing…. This is not a sad state of affairs, as the nervous system is the most complex biological system known. It is mere an indication of how much more we have to discover, how much more beauty and excitement holds for the interested" (Pico, 2000)[7]. Are we, then, standing at the same level of conceptualization of inner religious

experience as in 1930 when Iqbal presented his discourses in *the Reconstruction*. Perhaps yes, perhaps no. This we will examine as we develop the subject further for the appreciation of the concrete mind. Indeed, for this purpose we have to come to terms with genetic code which resides in the deoxyribose neuclaic acid (DNA) expressing itself differently in different cellular groups. On this count, it is enough to point out that behavioral activity exhibited by a sum of cells in a house fly is not identical with the behavioral activity exhibited by a sum of cells in a pigeon. The difference lies in the evolutionary scale of DNA and much expanded neural networks in the pigeon, let alone man in which it reaches new heights of complexity with an underpinning for the rise of consciousness.

So much for the functional operation of a neuron, and to some extent of the neural networks. We will now present a brief account of sensory and motor inputs and outputs to which a cursory reference has already been made earlier. The sensory inflow reaches the brain through sensory nerves from the ear (auditory), eye (visual) nose (olfactory), tongue and digestive system (gustatory) and chemical, mechanical and thermal receptors from the body (somato sensory). The later sensory tracts travel along the spinal cord and in the main enter the brain stem. Thalamus is the major site where the sensory stimuli are received in its various nuclei. The thalamus, through various tracts is in a two way contact with the cerebral cortex (neocortex). It should be of interest to the reader that thalamus is the ancient brain. In animals without a cortex, the thalamus performed both sensory and motor functions. However, as the cerebral cortex evolved, the thalamus was made subservient to the higher order control exercised by the cerebral cortex. We have already noted the map of motor and sensory areas in the cortical lobes of the cerebral hemispheres. At this stage, further description of thalamus is beyond our scope. However, two areas of the thalamus, namely, the hippocampus and subiculum must be kept in sight because of the significant role they play in the overall memory system operating in the brain. Through these areas, the thalamus maintains a two-way traffic with the prefrontal cortex to be discussed soon. But first we will have a look at the cellular composition of the neocortex in which the cells are arranged in six layers (Fig. 6).

Thousands, then millions, then tens of millions of neurons form the cortex. The basic six layers of neo-cortex are in place by the sixth month of foetal development. Cells in various layers are organized to perform sensory or motor functions as dictated by the messages received from thalamus and other parts of the brain. For example, afferent (sensory) messages brought from thalamic nuclei form very

dense synaptic zones in layer III, but layers I and III also receive information from other neocortical areas. Efferent (motor) axons emerge from layer II and III. Similarly axons from layer III are projected into the thalamus. Apart from this, it must be mentioned that fibres from thalamus ascend virtually to all parts of neocortex. This holistic picture of inter connectivity between thalamus and neocortex along sensory and motor pathways not only illustrates the complexity of neural networks, but also illuminates the evolutionary stairway of consciousness which, according to Iqbal, is subservient to the Directive Energy of God from conception through human development.

Now we are left with one more area of the neocortex, namely the prefrontal integration module (PIM) which is known to be associated invariably with the emergence of consciousness. Fig. 7 shows the inflow of messages to and from the PIM. For a physicalist the neurobiological model (as proposed) of consciousness rests upon the foundation of structure-function relationship. Thus, corner stone of this foundation is the prefrontal integration module (PIM). This module is supposed to undertake physical computational function (integration). In structure it resembles the design of neocartex. The difficulty though is that so far we have not been able to define the exact dimensions, cellular components, synaptic patterns, informational content or specific biomathematical operations performed in the PIM.

The operational process may therefore at best be considered as a "heuristic construct". One PIM is present in each prefrontal lobe of the two hemispheres and as indicated above, informational products from various parts of the brain converge upon PIMs (Fig 7). The biologists consider it as a "*Living, structured, multi model information space and that …… it is a location where the other two multi modal representation*, constructed in parietal, and frontal cortical lobe and in the hippocampus systems may be further transformed into even higher order representation." Now after due analysis, the apparent output from each PIM disseminates this representation to other regions of the cortex and to entire neural axis. It is important to note that the information which

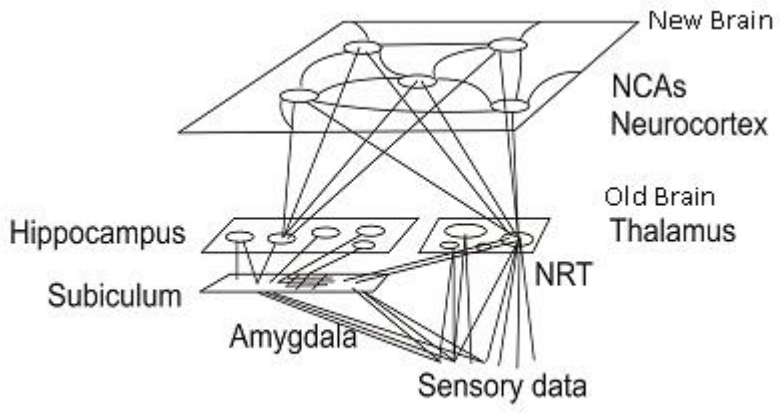

Figure 7- Inflow and outflow of messages from the outside world into and out of two strata of the brain namely thalamus (the old brain) below and cerebral cortex (the new brain) above.

converges upon the PIM includes (a) representation of all external unimodal and multimodal and internal stimuli from the sensory worlds; (b) representation of the real time spatial environment; (c) representation of the recent and distant past sensory movements (memories) and (d) the timing and coordinating influence of the thalamus. Furthermore, the efferent fibres (motor) that arise from various sites of PIM include (a) cortical fibres to adjacent PIM; (b) Fibres connecting the PIMs in the two hemispheres; (c) projections to neocortical regions; (d) projections to hippocampal areas; (e) projections to memory system cortical areas; projections to thalamic nuclei, (basal ganglia and amygdla and several descending tracts).

> In summary, then, it can be concluded that "it is in the PIM that we see the most complete representation of the sensory worlds, the ultimate point representation that can be achieved by nervous system computation, the most comprehensive binding in time of two dimensional (2D) and three dimensional (3D) stimulus information possible. (Pico: 2000)[8]."

The same author has reduced the whole concept into a simplified mathematical equation. In sum, the computations performed in the synaptic field of PIM (a region of electrochemical and electrogenetic, graded current flows) is proposed to be an integral function (see also Hebb, 2001)[8a] created by the biophysical structure of the sustaining cellular and extracellular system of organic brain. Importantly enough, it must be emphasized again that in the model suggested, "the biophysical methods by which the brain derives information from sensory processing may be radically different from the many theories that relate the brain's operations to those of electric circuits, computers or point-to-point so called neural networks. How embarrassing for a student of physics and a philosophic reductionist. Needless to say that there exists something higher than presently established laws of physics, or even the advanced approaches of

psychology. Keeping in view the perspective of Iqbal's concept of inner religious experience, suffice to say at this stage that even from the pure physicalists point of view there is considerable room for moving in this direction (see, for example, Popper and Eccles, 1972)[9], keeping also in view *that the functional consequence of PIM activity may be seen as reinforcement or inhibition of ongoing behavioral and homeostatic activities, in addition to its contribution to the memory system* (Pico, 2000)[10].

We close this discussion with a statement that thoughts and consciousness are linked in tandem. In the state of consciousness PIM produces thoughts encoded in axon systems that reach the other PIM, creating a time sequence within the PIMS. Whereas, the representations of the sensory world drive the computational model, the indivisible temporal dimension of consciousness is embedded therein. The infinite variation of thoughts in a way is associated with experience and thrown back into memory by the PIMS as unique to the past, present and future of consciousness. Still the caveat remains, for instance of space-time in the serial and Divine modes. This may call for a different frame of reference. A reference to which Iqbal alludes to repeatedly in his discourses.

Having dealt with brain with some understanding of the structure and function of neurons and neural networks, we now proceed to examine in some detail approaches to consciousness which have emerged during the last century. First, we will explore the scientific and philosophical basis of consciousness and then follow it up with its psychic dimensions which have been of intense interest to spiritualists and mystics (as is the case with Iqbal. See also, for example, Forman (1994)[11]. However, at the outset we will like to draw the attention of the reader to the confusing use of terminology dealing with the central theme of consciousness. For instance, one may find the use of such terms as mind, cognitive system, system of mental states, psyche, soul, ego and consciousness. Yet, their overlap of meaning cannot be overlooked.

Having developed the neurophysiological basis for the functions of the brain in the preceding sections for the concrete mind we are now in a position to take up Iqbal's views on time, space and consciousness. Since consciousness has been a subject of extensive research during the last few decades, it will be of interest to discuss the new information in the context of Iqbal's vision as presented in *the Reconstruction*. To begin with, let us find out how Iqbal weaves a golden fabric studded with glittering jewels through a well coordinated array of ideas, thoughts, logic and metaphysical acumen. In his discourse on "The Philosophical Test of the Revelations of Religious Experience", Iqbal makes a beautiful presentation on the

genesis of various levels of experience including consciousness in the following words:[12]

> Passing now to other levels of experience – life and consciousness, consciousness may be imagined as a *deflection from life*. Its function is to provide a luminous point in order to enlighten the forward rush of life. It is a case of tension, a state of self-consciousness, by means of which life manages to shut out all memories and associations which have no bearing on a present action. It has no well-defined fringes; it shrinks and expands as the occasion demands. *To describe it as an epiphenomenon of the process of matter is to deny it (as having) an independent activity, and (thus) to deny the validity of all knowledge which is only a systematized expression of consciousness.* Thus consciousness is a purely spiritual experience of life which is not a *substance*, but an organizing principle, a specific mode of behavior essentially different to the behavior of an externally worked machine. *Since, however, we cannot conceive of a purely spiritual energy, except in association with a definite combination of sensible elements through which it reveals itself,* we are apt to take this combination as the ultimate ground of spiritual energy.

In the above quoted passage, Iqbal makes a few intriguing statements which call for an in-depth analysis. **First,** Iqbal does not accept that consciousness is an epiphenomenon of the process of matter, which denies it an independent activity. Soon we will argue about this in the context of recent literature on phenomenology. **Second,** that knowledge *per se* is a systematized expression of consciousness. **Third,** that consciousness is not a substance. It is a purely spiritual experience, and is simply an organizing principle. **Fourth,** since consciousness as spiritual energy is difficult to conceive of a concrete mind, it can only be legitimized in "association with a definite combination of sensible element through which it reveals itself. **Fifth,** the conclusion is drawn that the combination of the spiritual energy with sensible elements can be taken as 'ultimate ground of spiritual energy'**.** Thus, taken together, the arguments advanced are illuminating, though difficult for a concrete mind to assimilate. Furthermore, by denying that consciousness is not an epiphenomenon of matter, Iqbal rightly distances himself from the proponents of monistic materialism; not–withstanding the fact that he identifies sensible elements (sense perception), for example, the neural networks and organized structure of the brain which in combination with sense organs constitute the substrate of consciousness. This position brings him somewhat closer to Descartes, who talked about the mysterious connection between mind and body (though for Iqbal soul is nonmaterial). This we believe places him amongst the dualists? However, more exciting is the conclusion that combination of

"consciousness" and sensible elements can be taken as a ground for spiritual energy. Earlier, we have built up arguments on the strength of Iqbal's distinct differentiation between "Khalq" (creation) and "Amr" (Directive Energy). In line with that we maintain that in the above paragraph it would have been more appropriate, for reasons of intellectual consistency, that the word Directive Energy should have been used in place of spiritual energy. It may be recalled that earlier we have taken refuge under the umbrella of Directive Energy when we were describing the emergence of ego (consciousness) or even sub-egos. In our opinion, experience, memory and thought are a compact of consciousness (ego). Accordingly, experience whether spiritual (so called non verifiable) or non spiritual (verifiable) remains experience as a part of the same compact. Accordingly, spiritual experience cannot be considered in isolation simply because of its alleged non verifiability scientifically, which by and large is a consequence of human limitations. This also does not mean that one has to fall necessarily in the trap of monistic materialism. This brief critique on the paragraph cited, in no way, is meant to lessen the importance of Iqbal's thoughts on consciousness. Nor an attempt to nullify its significance If anything, we intend to amplify the same so that the concrete mind, which, as Iqbal desired, should be able to get a fuller appreciation of the process involved in experience – consciousness relationship. May be for this purpose we have to move away from metaphysics and take shelter under the biophysics of the brain.

Iqbal certainly distances himself from reductionists and dose not subscribe to the view that the discoveries of Newton in the sphere of matter and energy and those of Darwin (1859) in the sphere of natural history reveal a mechanism based on physics, energy and atoms with self-existing properties. On this count Iqbal rightly conceives that reductionists have no respect for spiritualism, because of their sole reliance on reality as revealed by science. Indeed, on the question of arriving at reality through scientific observation and experimentation, Iqbal submits it to a critical analysis. For him, and rightly so, "what is called science is not a single systematic reality. It is a mass of sectional views of Reality – fragments of a total experience which do not seem to fit together. Natural science deals with matter, life and mind; but the moment you ask the question how matter, life and mind are mutually related, you begin to see the sectional character of the various sciences." Nothing could be farther from truth as the above statement depicts. What to speak of other sciences, even in physics, so far attempts to develop a unified theory for resolving the dilemma between the classical physics and quantum

physics have met with little success. The string theory proposed by modern physicists is only a beginning in that direction. We have already argued elsewhere that in relation to consciousness, cause, which, according to physicalists, is prior to effect, takes a different "garb of end and purpose." The last two act from within unlike "the cause which is external to the effect." The position taken by Iqbal, however, does not in any way deny the response of the body to external stimuli. Yet, it gives a new meaning to consciousness responding to both internal and external stimuli. This line of thought is consistent with the idea explored by Iqbal that ego (consciousness) reveals itself in "combination with sensible elements." What happens and how it operates when detached from the body at the time of death is a subject related to the immortality of the ego (consciousness) which we do not intend to bring into discussion at this stage.

Another feature of consciousness on which we will place high emphasis in expanding Iqbal's theory of religious experience is described by him in the following words:

> It is a case of tension, a state of self consciousness, by means of which life manages to shut off all memories and associations which have no bearing on the present action.

We are amazed at the clarity and ingenuity with which Iqbal has isolated the periods of ego isolated from the sensible world (somato sensory) for the purpose of an end which it finds in the infinite. When he wrote these words, neither neurophysiological nor physical basis were available to support this contention. However, we now stand at a different pedestal. The new advances in psychology made in the last couple of decades throw a fresh light within the frame of reference exercised by consciousness (ego). How? We will expand it subsequently using a set of evidences drawn from adherents to monastic materialism and dualism. Suffice to refer at this stage to a quote from Alwyn Scott (1995)[13] that

> Throughout the past century, the chasm between details of mechanistic explanation of the brain and the ever present reality of conscious awareness has continued to yawn. Whatever mechanistic explanation one might construct to explain the nature of mind (consciousness, ego?) one can well imagine the same mechanism working without the feeling (sensibility). Reductive materialism fails to bridge the gap.

Let us now take a brief plunge into the relationship between consciousness and time as conceived by Iqbal. We have already dealt with serial time and to a limited extent, with Divine time as well. The observation of Iqbal that "conscious experience means life in time", gives new dimension to our frame of reference in consciousness of what he calls the movement of self from center-outwards. On this

basis he identified two aspects of self, namely, the appreciative and efficient. The efficient self interacts with the "world of space" and is the one invariably appreciated by psychologists (the practical self of daily life). In this format it "discloses itself as nothing more than a series of specific and consequently numerable states." This leads him to the conclusion that in this relationship with the outside, self lives in serial "time" which we predicate as long and short and which forms the fourth dimension of space. On the other hand appreciative self which reveals itself "in the moments of profound meditation, when the efficient self is held in abeyance (and) that we sink into our deeper self and reach the inner center of experience. In the life process of this deeper ego (consciousness) the states of consciousness melts into each other." In making this distinction between efficient self and appreciative self, on very legitimate grounds, Iqbal presents a unique approach which has no parallel in the history of scholastic philosophy. However, it is only recently that Barry Daiton (2000)[14] in agreement with Iqbal's thoughts has drawn attention to the distinction between inner and outer experiences in the following words:

> By outer experience I mean sensory experience (efficient self of Iqbal), the experiences of the surrounding world our sense organs give us, the deliverances of sight, touch, taste and smell. The realm of inner experience includes all forms of consciousness that seem to be located within our bodies – (certainly), the range of experiences that seem to occur within our head, those which we take to be most intimately associated with our minds (conscious thinking).

Further, the depth of Iqbal's insight becomes obvious when he observes that "the unity of appreciative ego (self consciousness) is like the *unity of the term in which the experiences of its individual ancestors exist,* not as plurality but as a unity in which every experience permeates the whole". This beautiful expression has been interpreted by us previously when we evoked the biological principles of ontogeny repeating phylogeny during development, notwithstanding the fact that the process continues throughout life; its abode being the appreciative self in which serial time is "Pulverized into a series of now – a pure duration unadulterated by space." This may have sound metaphysical basis; yet, it will not be surprising if it is challenged on scientific grounds which seeks verification of every postulate in spite of its sectional nature in grasping reality piece-meal. Happily, however, this view of Iqbal is supported by an indefatigable modern philosophical idealist, Ruth Nanda Anshen and we quote from her: "what has natural science to do with consciousness? In the first place science should recognize its limitations. It cannot, for example, examine the numenon (object of intellectual intuition

devoid of all phenomenal attributes) through its scientific methodology. Since science is concerned exclusively with the phenomena, science is inevitably reductionist. Science should become more humble …… The program of science is the correlation of cause and effect (instead of purpose and end as proposed by Iqbal), and as such no examination of consciousness is possible for science."

The exploration of human consciousness has long intrigued scholars across various disciplines. In the modern context, scientific advancements in neurophysiology provide insights into the physical workings of the brain and its relationship with consciousness. However, this scientific lens often limits understanding to the material aspects of human existence. In contrast, the philosophical and spiritual dimensions of consciousness, particularly those explored by thinkers such as Allama Muhammad Iqbal, offer a broader and more integrated perspective. Iqbal's philosophical work, particularly in *The Reconstruction of Religious Thought in Islam*, attempts to synthesize spirituality, philosophy, and the emerging sciences of his time, such as neurophysiology. He proposed that understanding consciousness requires going beyond the empirical study of the brain to embrace the metaphysical and spiritual realities that give depth and meaning to human experience. His synthesis suggests that human consciousness is not merely the product of biochemical processes but is deeply tied to spiritual evolution and intellectual development.

Iqbal's synthesis of neurophysiology, spirituality, and philosophy offers a comprehensive understanding of human consciousness. It acknowledges the significance of modern scientific insights while highlighting the importance of spiritual and metaphysical dimensions. Iqbal's exploration challenges the reductionist views that limit consciousness to mere physical processes, presenting instead a vision where the human mind and soul are in constant evolution, striving towards the Divine. His work remains relevant in contemporary discussions on consciousness, inspiring a balanced integration of science and spirituality to explore the full dimensions of human existence.

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