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Research Paper

The heart of consciousness

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ABSTRACT:-*Can consciousness be explained in the context of present day medical knowledge? I believe it can, and a working explanation of the conscious process is essential to understanding our patient's clinical situations. Many scientists still dismiss the subject of consciousness to mysticism. Having been involved in trauma management, anaesthetics, coma care, post mortems, radiology and general rural medical practice, my curiosity was always there, but six years ago as a field of interest, I starting pursuing the questions of consciousness.Asking questions, I answered them from knowledge in very diverse areas of interest, mainly evolution, embryology, psychiatry, spiritual experiences of patients, field of symmetry in mathematics, scientific America mind journals, patients in clinical practice, standard general medical student texts, works by doctor Maria Montessori, internet, movies, experimenting with constructed boxes and mirrors, and everyday life experience. In conclusion, I believe it is possible to put forward an explanation of consciousness, changing it from mystic to a function of a beautifully evolved bilateral nervous system.*

Keywords:-*explanation of consciousness, centre of perception of conscious I (copoc), duality as singularity and neurological mirror, symmetry, thalamus*

I. INTRODUCTION

This is an ultrasound scan of a 21week human foetal head. The cross section at the thalamus level is to measure the bi-parietal diameter, a measurement used to determine gestational age [1].The thalamus appears as a heart shaped structure, in the centre of the brain. It is here, I believe, lays the most logical anatomical, physiological and clinical evidence for the overall centre of perception of consciousness.*The centre of perception of conscious I***,** will be referred to as ***copoc***, to avoid confusion in the article between the writer and conscious centreI.

I would define consciousness in the biological context, as the individual life forms ability to create a mental picture of its self in relationship to its surroundings, both external and internal. It is important to appreciate this is a perception of reality and not reality. One immediately can understand the enormous evolutionary advantage, if these perceptions are close enough to reality, to enable the life form to determine the environmental situation it finds itself and behave appropriately to ensure survival. This implies that consciousness is not unique to humans. A lion in a pride strategically ambushing its prey, must be conscious by this definition to achieve this feat. A lion's consciousness is obviously very different to that of a human, as the nervous system from sensory receptors to the central nervous system (CNS) is very different in detail but has all the same fundamental anatomical requirements as a human to be conscious. In other words it's perception of

reality is different to humans and by design more suited to being a lion. It is the CNS that in essence makes the lion what it is!

The understanding of consciousness has been made very difficult by individuals connecting it to values and beliefs. In the context that I'm using consciousness, it does not imply any values or beliefs, even though consciousness of the individual incorporates all of this.

II. ANSWERING QUESTIONS RELATED TO CONSCIOUSNESS

2.1 Firstly is there any reason to believe, that there is any energy external to the body parts to enable consciousness to occur?

I am certainly unaware of any scientific evidence for this, such as a human sitting in a lead box resulting in loss of consciousness. This does not imply the individual may not perceive an external consciousness as part of spiritual beliefs. For this article I will confine my understanding of consciousness, to within the body of the individual being. Outer body experiences have occurred in peopleas part of near death, deep meditative and anaesthesiology experiences. Thisastral body experiences, I believe, isexplainable as part of the brain's construction in context of the creation of a conscious state, this will be later explained.

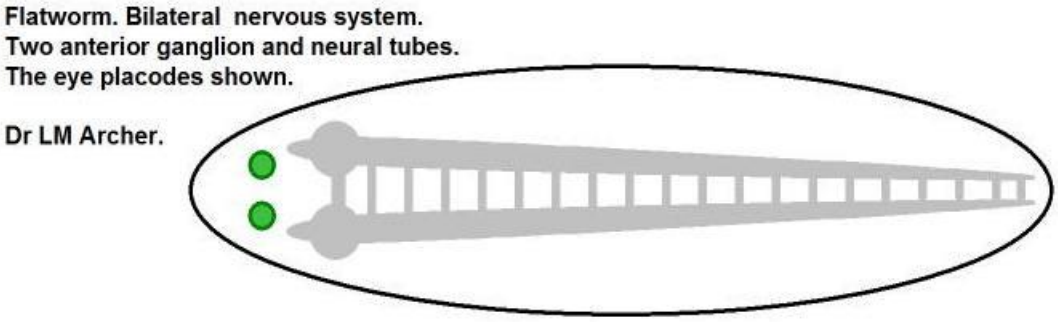
2.2 Can an entity know itself?

This is probably the hardest concept to get ones head around.Is it possible for ME or IT to know itself? This is a philosophical question, I believe of fundamental importance. Is the robot electronic machine conscious? The answer to this is no, because there is no copoc. It could perform extremely complicated variable response tasks, even beyond the capabilities of the human mind, but it is still not self-aware. It may be difficult for the observer to differentiate this process. The machine/computer, I believe, could pass a Turing test [2], which may mean it has artificial intelligence. It certainly does not need to possess consciousness to achieve this feat.

If a machine took in information and simply projected it on an internalscreenin its brain, it cannot be aware of the information, as it is not being watched byitself, unless another machine watched the screen and then recognised itself as incorporated in the information as itself, thus passing the information back to original self. If this illusion of the information on the screen as selfwas not created, it would be another and not Ithat were being watching. The observer or other would suffer the same predicament as the original entity being projected. *So consciousness canonly occur in duality, as an illusion ofsingularity.* The closest everyday experience to help comprehend this concept is standing in front of a mirror. A neurological mirror of two symmetrical beings fused together is required to create this illusion and creation of consciousness. This is what conscious beings are!

The CNS is an obvious example of this. The duality of the right and left mirror images of the peripheral and CNS crossing over one to the other could create this illusion of singularity. As a medical student, I always pondered on the crisscross nature of the CNS and was never satisfied with the answers given by the lecturer. It is here that the illusion of singularity in a dual organism lies. Yes, our nervous system is two halves fused by a complex crossing over, to create the illusion of a single being. Evidence is in evolutionary biology. Look at the nervous system of the flatworm, our earliest ancestor, which has a well-developed bilateral nervous system.This bilateral nervous system is the primitive birth of the ability to develop conscious life forms. In humans this duality of the nervous system is anatomically still present, along with the two mirror opposites of the body clearly seen by the putting of the hands together.

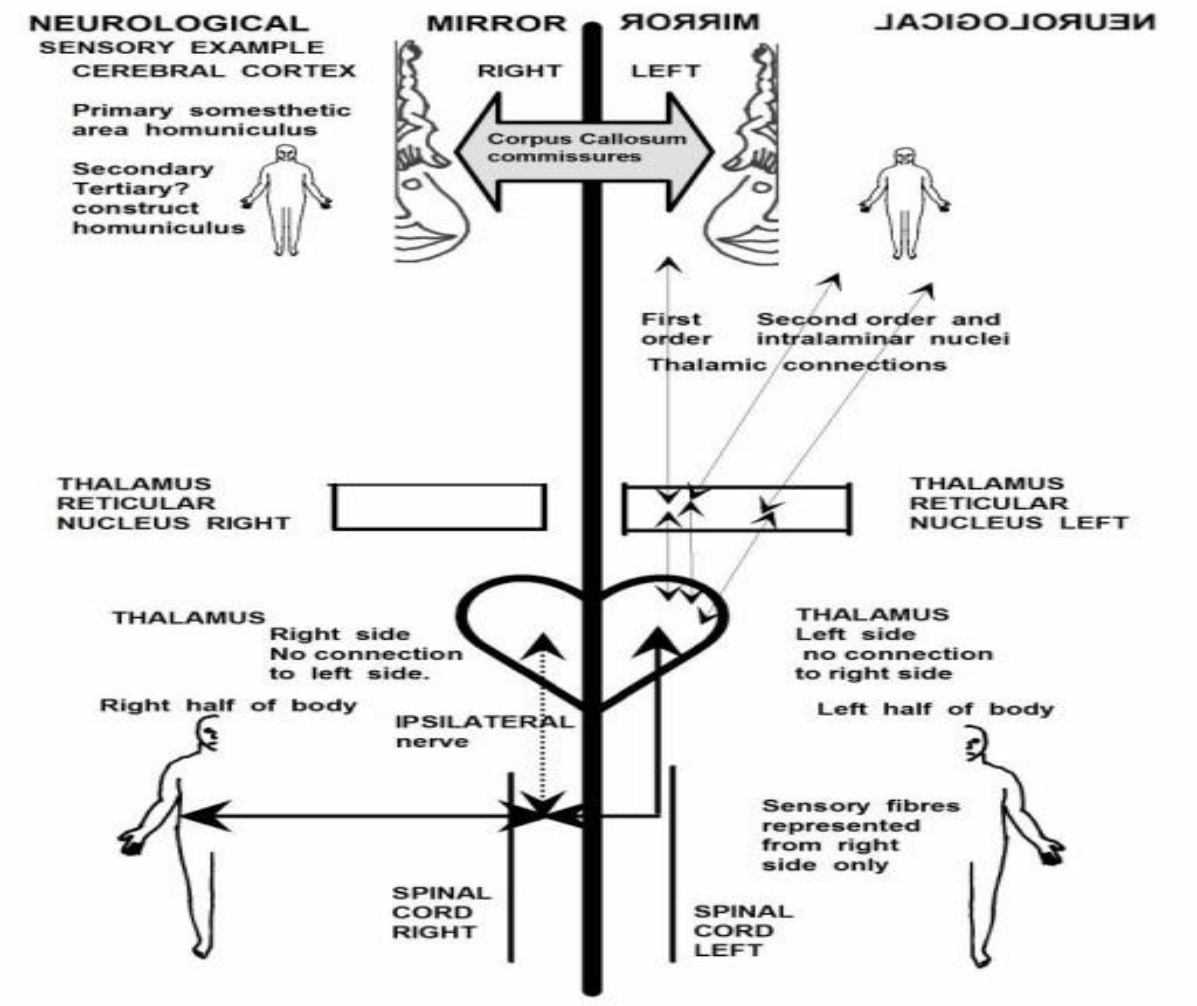
The CNSis a neurologically structured mirror of two systems facing each other and passing information back and forth, not only internally, but externally as well, through sound, visual light and touch. The understanding of humans as two rather than one entity is not difficult in modern biology concepts [3].The CNS is two halves joined together, the right and left side of the peripheral nerves and cranial nerves entering each halve. If it was not for the crossover of nerve fibre connecting the two sides, we would be two separate beings. These two individual halves, Ibelieve, would lackthe ability to be conscious. I would go as far as saying, if you could preventany information crossover of the CNS, there would be no consciousness. When the brain is surgical divided by separating part of the two halves of the CNS, such as transection of corpus callosum to stop spread of epileptic seizures, we get a glimpse of the loss of conscious awareness and the insight into two neurological entities. The two sides of the brain are so versatile, that information can cross over via the outside of the body, using speech and listening or seeing or touch. This has been shown by many ingenious experiments on patients who have had transections of corpus callosum [4,5].



2.3 Is it necessary to get into theoretical physics to explain consciousness?

It has been suggested, that it is required to look into quantum theory, string theory or other theoretical physics to understand consciousness. I believe like other organs of the human body, a satisfactory explanation for function can come from the basic medical sciences. A concept of symmetry in theoretical physics and mathematics, I believe, is relevant to the understanding of the CNS[6, 7].This holds the answer to how the vast amounts of information is processed and held in the CNS. Shape is information, whether at molecular level or gross anatomical level. The CNS is a beautiful example of symmetry in action,whether it is genetic molecular structure, protein shapes, spatial shapes of dendritic processes or layers of nerve cells that form equilateral triangles to allow spatial mapping of the environment [4, 8].

Figure 1A diagrammatic illustration of how duality becomes singularity in the CNS. The one side of the human body's peripheral sensory system is shown.



III. WHAT CNS STRUCTURE MEETS THE REQUIREMENTS TO BE THE COPOC?

All the criteria that need to be satisfiedfor a structure to be capable of being copoc are only met by the thalamus [4, 9, 10, 11 and 12].

3.1 Access to information from the two halves of the body (duality) and separation of the two halves of singularity of copocare essential to the creation of consciousness

The duality of the two halves of the body are fused into singularity at the cerebral cortex (CC) level through the crisscross of peripheraland cranial nerve and commissures of CNS. The copoc then "see" into the neurological mirror of CC, seeing self, not realising there is bilateral representation of a right and left body, and in essence views itself as singular; hence the illusion of singularity in duality is complete. To meet these criteria the left and right copoc structures must be separated and not directly communicate, as the illusion would be lost. The thalamus meets this requirement [4]. What is interesting with the thalamus is despiteinterthalamic adhesions in brain specimensof humans, there are no neuronal connections [4, 9].If neuronal connections were to occur,this would likelydestroythe illusion,it would be like shattering the neurological mirror of the two halves of copoc, which "see"into the mirror from opposite sides.

3.2 All the internal and external senses including smell and emotion need to pass to copoc

First order thalamic nuclei (1st OTN)[9] appear to represent all the senses except olfactory, *including motor afferents from cerebellum, somatosensory, pain, kinesthesis, affective afferents from limbic system,* connections to midbrain and hippocampal formation[4,9].The second order thalamic (2ndOTN) have widespread connections with CC including olfactory CC areas [4, 9, 10, 11, 12, 13, 14].The thalamus is the only structure in the CNS known to receive all this information [4, 9]. As we were taught at medical school, the thalamus was the relay station of the brain, but why then would there be all this information passing back to the thalamus from the CC to the 2nd OTN?[4,9]

3.3 Destruction of copoc would lead toan unconscious state

The bilateral destruction of theintralaminar nuclei, considered part of 2ndOTN [4, 9] are well known to produce a deep irreversible coma [10, 12}. Unilateral destruction as expected does not cause loss of consciousness, as both right and left intralaminar nuclei act independently "seeing" the CC from opposite sides of thalamus. Destruction ofintralaminar nuclei on one side of thalamus, wouldbe expecting to causeloss of fifty per cent of consciousness and a different perception of the outer world and self. This would be similar to losing half a cerebral cortex, which in affect acts as a whole with crossover information on both sides, but specialised CC areas on one side only would cause the perception to be different [15].

3.4 The copoc must have the ability to change focus on areas of CC and increase or decrease the amount of informational content

This would require the ability to influence data transfer from CC to copoc and vice versa. This is the equivalent in the conscious experience of focusing attention on an area of interest. Information is passed from one part of the CC to the other by interthalamic connections. All this information passes through the embryological ventral thalamus, which later forms the thalamic reticular nucleus (TRN), nothing to do with reticular system [4, 9].In neuroscience terms, this relay is subjected to modulation by inhibitory and stimulatory inter neurons, also by changes in local blood flow, suggesting modification of signal without significantly altering [9]. It is now recognised, that supporting cells also play a role in influencing signal transmission [4, 9, 16].The TRN is an ideal candidate for the role of focusing information by interneurons impulses, blocking or enhancinginformation [9].

3.5 The neuronal circuitry to totally block CC information from entering the copoc

This would allow for the unconscious state of deep none dream sleep to occur.The slow rhythmic waves associated with slow wave sleep, appear to originate in the thalamus [9] and radiate to TRN, which has the circuitry capable of acting as a thalamus "shield" for information from CCneuronal input [9]. The reticular activating system (RAS) of the brain stem passes to the thalamus, allowing for this rhythmic wave of sleep to be interrupted, if the input is sufficiently strong. This in turn allows for waking [4, 9].

3.6 Thecopoc needs to preserve relation to sensory receptors to avoid jumbling up of information

Homunculus man is represented in thalamus as well as CC [4, 9].It is important to note that spatial relationship is preserved as fibres and therefore information is passed from one region of CNS to the next. There may be mirror reversal, rotation and distortion of relative size, all features seen in altered states of consciousness, particularly seen with hallucinogenic and other drugs, giving us an understanding ofthe mechanism of data process in the nervous system [4, 17]. As a child suffering with malaria, I clearly remember my body being proportioned like a homunculus man.

3.7 There needs to be the ability to hold information over time

The neuronal circuitry involved in the thalamus and TRN, have been shown to be capable of tonic signal impulses [9].This would allow time for "seeing"the information data, holding thoughts or images,while other connections are made to memories and associated data, an important part of the conscious experience [18].

3.8There needs to be neuronal connection between copocand motor regions, to enable initiating conscious movement

Conscious movement can be initiated in the thalamus, as there are extensive connections between the thalamus and basal ganglion, as well as the cerebellum and motor regions of CC [4, 9].

3.9 There needs to be extensive connection to all associated CC areas

This is necessary to explain all the conscious experiences known to be connected with associated cortical areas, such as language. Some conditions are harder to explain, such as blindsight,in which a patient has a vague subconscious awareness of objects around them, despite destruction of both visual cortices,as they unknowingly walk around objects in their path [19].This may occur directly via connections of the 1st OTN to 2nd OTN or indirectly be associated with visual associated CC areas.Stroke patients have some sense of the opposite side of body, despite destruction of primary sensory homunculus area; this can be explained, as the secondary homunculus[4]is likely to have connections to 2nd OTN.

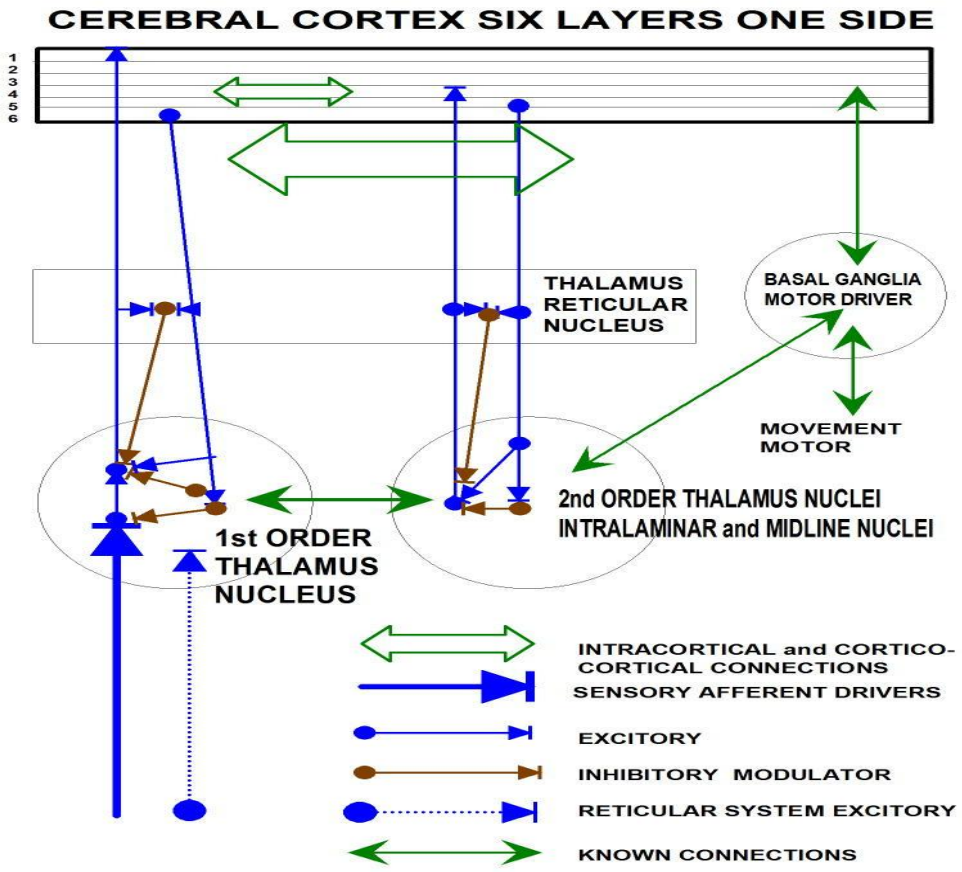


Fig. 2 Simplified diagrammatic illustration of thalamus connections of one side of the brain

IV. THE ANSWERS TO UNDERSTANDING THE CIRCUITRY OF CONSCIOUSNESS CAN COME FROM UNDERSTANDING CONDUCTION TIMES, IMAGING TECHNIQUES, ANDMAPPING OF BRAIN FUNCTION AND CIRCUITRY

It is possible, that in extreme pain or strong neurological input, the thalamus may be able to tap into less detailed data, either via 1st OTN, or 1st OTN direct connections to 2nd OTN [9], enabling shorter awareness times in a semi consciousness statewith little detail. The answer to these questions can be resolved knowing nerve conduction speeds and time of occurrence of events and individual conscious awareness. It is then possible, to get insight into the circuitry of consciousness, taking into account the type of synaptic connection

and data transfer times. Flashing strobes, pain, sporting events such as cricket, where very accurate slow motion cameras are used, help give insight into the process.

It takes about 150 milliseconds to separate the different colours of a flashing light [18,20,21].If red and green lights are flashed at 100 milliseconds, the consciousness sees yellow [18]. The copoc is in the past and "sees" a perceptual CC association area construction and not reality. The time taken to do certain sporting events, such as a slip catch in cricket, can be calculated exactly. Knowing nerve conduction times and synapse transit time, the neuronal circuitry mustmatch these times. For the most part 1st OTN are associated with specific senses, making them more relay and data manipulationcentres rather than copoc. The 2nd OTN also relate to senses, but the data has now been interpreted by associated CC areas.The intralaminar thalamic nuclei are the most likely seat of copoc in the thalamus as they are not sensory specific [9].With the mapping of the circuitry and function of brain areas, specialist will understand the detailed workings of the healthy and diseased brain better [20].

V. HOW IS THIS VAST AMOUNT OF INFORMATION PROCESSED SO FAST AND HELD IN CONSCIOUSNESS?

5.1 The conscious experience

Imagine looking ata bowl of fruit, with part of a pear showing. Not only is the pear named and visualised in its entirety, one assumes the temperature to touch, smoothness, shape, consistency, taste, smell, crunchy noise of eating, whether you feel like eating it and then making a decision to eat it. It is obvious that consciousness is a mixture of projected visual image, reinforced bypresent sensory input and compared with projected memories, learnt facts, emotion and behaviour. Consciousness is a personal unique experience. Your toddler on seeing you pick the pear up, may copy you, but think it's an apple. Initially the toddler is confused and explores the object, watches what you do and copies, forming a new experience.

5.2 The steps of the neurological process of consciousness, refer to the diagrams

The conscious experience is a summation of the informational data of the whole nervous system's interpretation of associated body and environmental conditions. Briefly the main steps to conscious awareness can be broken down into:

- sensory input, secondary sensory input from possible unconscious motor autonomic nervous system(ANS) reflexes such as blinking
- 1st OTN (e.g. subconscious awareness blindsight [19], severe pain)
- TRN, probably responsible for focus and holding data
- primary sensory CC areas, secondary sensory CC areas [4], limbic system, hippocampus
- back to TRN, 2nd OTN(copoc) at which point a conscious awareness starts to occurs
- Reverberation between connected areas(the equivalent of thinking), neurons responsible for behavioural sequences (visualisation of motor action? mirror neurons), possibly choice or will to act.

5.3 CC Constructs

The CC constructs, I refer to,are not standard terminology. These are CC associated areas that are responsible for analysing sensory input to solve a functional purpose such as language [4], 3D orientation in space, a global positioning system in the brain(found in hippocampal CC of rats) [8] orsuch tasks as facial recognition [22,23].Many CC associated areas are as yet notidentified; hence the terminology CC constructs to embrace all associated CC areas, with a functional purpose known and unknown. I believe, all sensoryinterpretations, even as simple as the boundary of the body require CC constructs, hence the clinical experience of one's body merging with surroundings [15].The CC constructs are hard wired genetic neuronal circuitry constructions for a functional purpose, that are filled in later with learnt informational data (memory), such as the recognition of individual faces [22,23]. There also appears to be limit for CC constructs, for examplelet's say 800 words for a gorilla, 500 faces for a human.

5.4 Failure of CC constructs

If a construct fails in a conscious experience, ajoltoccurs, as these challenge a fundamental process. A sensory or motor homunculus can be challenged experimentally, by placing a mirror in a box with both arms in a hole on either side of the mirror. When the arms are observed from one side, an illusion is created of the hidden arm behind the mirror. On motor movement or touch of the hidden arm, a jolt occurs in the consciousness, as the CC construct has failed to make sense of what the hidden arm is doing or feels [24].This like many neurological processesis adaptable, if repeated the conscious brain will rationalise the event. When a construct is no longer appropriate, as in the brain of an amputee whose missing hand is cramping, the same model can be used to fool the brain that the phantom limb's hand is being unclenched, thereby relieving the patient of this discomfort [25]. This also indicates that the body constructs are filled in early in life with informational data and are permanent; otherwise the phantom limb would not be there.

5.5 Disorders of CC construct

Many clinical disorders can only be explained by the absence of these constructs. A person, who has an injury to the construct of his arm, will view it as a piece of unwanted attached meat that should be removed [26]. If there are no facial recognition constructs, there is no ability to recognise faces [23]. There are many of these constructs responsible for simplifying the process of consciousness. These may be revealed in extreme circumstances, such as near death experiences [27]. An outer body experience can be explained as a CCconstruct, this CC construct needs to exist to enable us to visualise ourselves from above in a three dimensional platform, for example in a group of hunters ambushing a pray. If this construct becomes dominant over the body image CC construct, which is a very basic essential construct, one may find yourself looking down at your own body, the so called outer body experience. It may be a way of escaping extreme pain, as the outer body construct may have no pain association. The clinical understanding will become clearer as science unravels the various CC constructs.

5.6 Sensory input [21]

This includessensory data from involuntary action such as reflexes, shivering from fever or knee jerk from patella hammer. The information sent along the nerve fibre is determined by the sensory end organ stimulation and the supporting structures [4, 9, and 21]. Even supporting glial cells of the CNS have been shown to play an active role in influencing information transfer by exhibiting electrical/chemical activity in a local region and therefore affecting the information transferred along neurological tracts [4, 9, and 16]. The supporting sheaths of neurons have been known for a long time to influence conductivity rates of impulses [4]. Through a process of divergence and convergence the contrast of the informational data is enhanced to help CNS interpretation [4, 21].

Other data input is from the primitive brain, information such as the instinctive senses, made up of ANS, endocrine, immunological and other chemical agents which can influence the nervous system and therefore consciousness, for example adrenaline of fight or flight response. Included in instinctive sensory input is primitive emotional data. The ANS, limbic and endocrine systemsare hard wired into the evolutionary early brain and all influence conscious perception. It contains the basic survival tools of senses, such as osmolality detection resulting in the conscious sensation of thirst. Basic human emotions and desires arisein the limbic system and may fundamentally involve pain and pleasure. Being at aprimitive level of conscious sensations these include thirst, hunger, hot, cold, lust, increased exploration, hibernation, rage, fear, anxiety, joy, sad, envy, care/nurture and home. These instinctive inputs are relayed via the thalamus to CC constructs such as the neo CC where basic emotions become complex emotions such as love and compassion. The basic primitive emotions which contribute to these facets of consciousness, involve clearly defined areas in the primitive brain [4].The amygdala body is the neuronal nucleus responsible for fear [4]. Genetic absence results in the individual having a total lack of the knowledge of what fear is. These primitive survival emotions can have profound effects on consciousness, extreme hunger or thirst can become all-consuming in one's conscious awareness.

5.7 CC

The Cerebral hemispheres role in consciousness is probably the informational storage and interpretation of informational data, while also merging a dual system of two bodies symmetrically opposite halves into one [4,5].The role of the CC is being rapidly worked out by neuroscientist, mapping each area of the cortex and its function [20].The CC of the different hemispheres have developed specialised functions, sometimes only on one side. Anatomically because of the corpus callosum, anterior commissure and posterior commissure, the cerebral cortex acts as a whole, transferring information throughout. Within a CC hemisphere information is transferred laterally incortical layer 4 by intracortical neurons, which are more prolific in the sensory areas [4].Cortical-cortical fibres transfer data to other CC areas in same hemisphere [4]. Clinical evidence has shown no single area of the cortex is responsible for overall consciousness [10, 12].Any destruction will cause change in consciousness with respect to the function of that area, but not loss of consciousness of other areas [4].This is demonstrating clearly in young children who have a whole CC left or right removed. The duality is still present,as fibres from left and right side of the body still reach a single hemisphere. The multiple intralaminar nuclei on the right or left side of thalamus still "see" one CC to create the illusion of singularity. The CC primary sensory homunculus represents half of the body; the secondary sensory homunculus is a bilateral presentation in both cerebral hemispheres [4].An interesting condition in the area of written language which supports this specialisation of CC constructs and the bilateral nature of CC hemisphere representation is an inherited condition known as mirror writing [28].Here children with the condition have the ability to write naturally in mirror writing, as written on our emergency vehicles. This demonstrates this mirror construct of the CChemispheres of the brain with the ability to "see" it from right or left thalamic nuclei. The common error of mixing up b and d is not surprising. So this mirror image is so crucial to consciousness that it can lead to problems in such specialised cortical constructs, such as mirror image shapes of the written letters.

5.8 Thalamus/copoc

To understand consciousness one must appreciate that the thalamus " sees" CC constructs of senses and not what is actually at the sensory organ, for example the picture on the retina as in a pin hole box camera, is far from the truth. It is an illusion that we gaze out of our eyes. Easier to understand is the vibrating minute hairs of the cochlea organ that detect sound, the cochlea nerve sends informational data to the primary auditory CC [4,9,21]. From here to associated CC area [4,9,21] where constructs in association with body image and three dimensional matrix [8] create an image in copoc, that the sound is perceived to come from outside of our ear, from the direction we see the source of the noise, avoiding confusion of the senses. The sensory organs all send messages to the brain as electrical impulses in nerve fibres [4, 9, and 21], not pictures. You can only see a CC construct from past memory or learnt process, otherwise it is a process of learning through exploration and forming a new memory. If there is contradiction of data, there is feeling ofconfusion or uneasiness and we try to make it fit. Since consciousness is a projection of a memory or learnt process, it becomes easy to explain many fascinating human conditions. A coat behind a door at night appears to look like a man standing there. If a close friend is being badly missed, you see their face in passing strangers. The double picture illusion of a face or vase can only be looked at in one way or the other, as your brain fills in one or the other and not both. Stereoscopic pictures are the same. Words can be written incorrectly with letters jumbled, but if they are of correct length and start and finish with the correct letters, you will read them without difficulty. The CC constructs fills in the gaps, using available informational data. We see what we have learnt; a doctor will see features of a congenital abnormality, which a lay person will not notice.

5.8 The development of a consciousness and learnt memory

Consciousness develops and grows with maturation of the nervous system and becomes awakened in the embryo, neonate and infant [29, 30, and 31]. A baby will suddenly startle and panic for the first time when a ball rolls towards it, for no apparent reason, as this has been done before with no reaction. It appears similar to a startle reflex in horses, if something moves in its peripheral vision. It is as if copoc has connected to the amygdala and a primitive CC construct for danger of possible predator threat. The stick pictures our children draw may be what their consciousness sees. The CNS from a basic genetic constructionhas a much more fluid development determined by sensory input [29, 30, and 31].This allows for moreplasticity for further neuronal cell and supporting glial cell development throughout life. The formation of new connections enabling new memory and learningthat is related to individual sensory exposure. In essence this enables individual adaption to the person's environmental situational circumstances.The capacity for memory is extensive in the nervous system [4, 32, 33, and 34].The hippocampus has bidirectional axons known to have connections with intralaminar nuclei of thalamus [4, 9]. Long term memories reside in the hippocampus probably in the form of dendritic neuron connections and protein structures. The fact that the thalamic hippocampal connection is bidirectional, may explain memory recall, imagination and creativity. Copoc may switch on memories and not only receive memories related to sensory input stimulation. Copoc ability to switch on memories or behavioural sequences (mirror neurons?) is like an artificial simulator, enabling visualisation prior to action, a very valuable evolutionary tool.

5.10 Anaesthetic gases

If there is no ability to recall memory or create memory in the CNS, there is no interpretation of sensory input and therefor clear alertconsciousness. This may explain how anaesthetics gaseswork, as they are known to affect protein shape by altering small electrical forces (Van Der Waal forces) that are responsible for holding the shape of protein structures [35].If the protein structure is changed, the memories or learnt part of CC constructswill not function, which in turn would cause a loss of consciousness. The sensory data is not interpreted, an essential first step to alert consciousness which allowscopoc to form consciousness from sensory informational input.

5.11 Learning, mirror neurons and consciousness

Learning requires sensory input and explains why sensory deprived children's brains fail to develop normal neuronal circuitry, and so are never able to regain the intellectual or full conscious capacity they should [27, 28, and 29].Maria Montessori MD [36] recognised that the developing individual brain at a particular age in this process, seeks out certain learning experiences, when it is ready. These windows of opportunities are sequentially staged and should not be missed, as they are difficult to regain. The milestones doctors use in paediatric development, help doctors to evaluate this process. At birth, a process of species specific imprinting occurs on the brain via the various senses, well documented in animal models. The mother's heart beat would be one of the earliest brain imprints, then soon after birth the face of the mother. Consciousness would be very limited, as there are few memories or learnt behaviour. The individual infant's brain probably then starts copying by neuron firing in different CC construct centres for different senses, such as hearing. This may allow

transfer of language, hence language learning. This in effect is an informational data transfer from brain to brain. It is likely this process would involve mirror neurons [37, 38, and 39].The mirror neuron recently discovered in monkeys, demonstrates the species specific pattern of firing of these mirror neurons on seeing the behaviour of other individual monkeys. This is in essence a mirror outside the individual,allowing species specific information transfer, much in the same way as the internal neurological mirror of the individual. This may be the fundamental basis of learning. The old adage Monkey see, Monkey do. Mirror neurons are a good example of how a single neuron in the CC construct can form bits of memories of behaviour, throwing an apple or another for picking it up [37, 38, and 39]. It would be interesting to know if mirror neurons are bilateral axon conductors, enablingcopocto triggerbehavioural visualization processes.

VI. UNIQUE CONSCIOUSNESS

Any condition influencing the input of information will influence the conscious experience, which in essence is an overall concise summary of all the input sensory data [21].Any interference will alter the consciousness of the sensory experience, for example in sight;

- If there is no light, darkness is experienced
- if the lens is opaque as in bilateral cataracts, cloudiness is experienced
- in retinal detachment, shape is distorted
- in macular degeneration, there is loss of central vision

In conclusion, any injury along the visual tract results in explainable change in consciousness [4, 9, and 21]. Each individual interpretation of reality isdependent on the nervous system of their individual brain and body.

More importantly to understanding consciousness, one has to appreciate that it is unique to the individual. It is *a perception of reality and not reality.* This is species dependant such as wavelength of electromagnetic spectrum or hearing range in hertz. Echo sounding of bats. There are also differences in individuals of the same species due to genetic variations in physiology and anatomical structure. In red- green colour blindness, the individuals see a different world of colour. Medicine is full of examples of how different design leads to different consciousness. The CNS designs are important to understanding consciousness, because it shows how genetic CNS neuronal construction is required to do a simple task. Again there are many clinical examples, such as facial recognition. Some of these, we are not aware of until illness, disease, drugs or injury reveals them to us. The more published examplesare the effects of LSD, causing the distortion of size and reality, as in "Alice in wonderland". There is probably a construct that corrects the sensory distortion of receptor distribution which is disrupted by hallucinogenic agents. If CC constructs were to overlap because of genetic variance or disease one would get synaesthesia, consciousness would mix up the senses such as colours associated with numbers [21]. Blind people, who are blind before learning to draw, have the ability to drawlater in life by feeling an object [40],.This would be explainable in terms of CC construct. All the senses are likely to feed into the construct for relationship three dimensions shapes in space, forming a picture in the head, which in turn can be recreated by drawing, using either visual input or touch input [40]. If a patient from a CNS injuryloose the CC construct for a limb, this part of the body becomes an attached piece of flesh, and they will request it to be removed, even though it functions perfectly normally [25,26].

VII. DREAMING

Consciousness, as explained before, is a projection of bits of memory built from constructs in the CC, stimulated by like sensory input, matching up with previous memory or learnt information, which in turn triggers further memories and learnt associations. The fresh sensory input adds clarity and direction to theprocess, sharpening up the image and guiding the sequence of neurological firing [4, 9]. When sensory input is reduced or absent, it is not hard to understand that in rapid eye movement (REM)sleep,when the TRN shield is not operational, that these bits of learnt memory or imagery maybe triggered off, if in aheightened state, giving images of consciousness. Since there is no strong sensory input guiding the process, it is not hard to understand the randomness and lack of clarity of the dream state.The emotional limbic system is well connected to thalamic nuclei, so it is hardly surprising dreams have strong emotional and autonomic system components to them.It is also thought that memories are consolidated during sleep [34]. If this process occurs while awake, without associated sensory input, it will result in hallucinations. In the clinical setting hearing is the sense most prone to hallucination. Sleep walking and all the diverse levels of consciousness can be explained by this model.

VIII. AREAS OF INTEREST THAT MAY HELP FURTHER UNDERSTAND CONSCIOUSNESS

Evolutionary biology and embryology holds the key to understanding how the nervous system is structured. The terminal nerve and olfactory nerve are interesting in that the olfactory bulb and thalamus have similar glomeruli nerve structure as the thalamus [13, 14]. It can be argued, that the olfactory bulb and the

thalamus have a similar origin in our evolutionary past [14]. The olfactory nerve also divides before entering the CNS. On entering the CNS it goes to a primitive part of frontal lobe [13, 14].Does this more primitive structure explain why smell is not a strong feature of dream consciousness? May it be possible that spontaneous 1st OTNdischarge trigger dreams, hence the reason smell would not feature, as 1st OTN are bypassed in the sense of smell.

IX. SUMMARY

In conclusion, consciousness isan illusion of *I*created by*aneurological mirror*in an individual CNS mirroring its external and internal surroundings. The information used to enable this interpretation of the environment in relationship to copoc,iswithin the narrow spectrum of the *sensory organs.*The anatomy and physiology ofthe sensory organs, are important determinates of the nature of copoc.The sensory datais then transmitted to the CNS. It is at the thalamic level, that it is first possible for the *copoc* toreceive information. The sensory information data then enters the TRN and ontothe primary sensory areas of CC, from here onto*CCconstructs* enabling the transformation of sensory informational into memory bits, possibly the equivalent of mirror neurons. These scattered CC bits then transmit back to 2nd OTN where the *singularity illusion of the duality occurs at copoc. Copoc* "sees" into opposite sides of a *neurological mirror*.This consciousness is held by tonic impulses in copoc and the focussing of the TRN set up an echo of pulses to CC, hypothalamus and other areas, making associated connections with the held image, thought or imagination. This may hold learnt sequences of actions, which if strong enough or emotionally charged will be focused and acted on. This would involve thalamic connections with motor areas,such as corpus striatum. This process of thinking again is a trained, learnt, and memory experience and is not there automatically. If the illusion of a construct is challenged, a sensation, best described as a *jolt*,is experienced until an adaptation of CNS occurs. If the senses disagree, a feeling of uncomfortable confusion occurs. In both instances the CNS tries to force a solution. The RAS has extensive connections with the thalamus, and it seems likely that stimulation from this system, via brain stem, will alert the thalamus into consciousness, stopping electrical slow wave patterns. An explanation for dreams is also possible, as in REM sleep the CC memories would be discharging haphazardly, without sufficient relevant sensory input, to clarify detail and coherence of this information being transmitted to the copoc. There are also thalamus connections to limbic and hippocampal cortex, which may play a role in consolidating short term memory into long term. If impulses are initiated from copoc in a conscious state, this is the equivalent to an artificial simulator. This mental seeing of images in the mind is the basis of thinking or visualisation, which in turn allows choice by playing different scenarios, resulting in a will, which I believe, to be the essence of a higher conscious entity. Correct choice from a rational mind, that has an understanding of the reality of our universe, is the pinnacle of evolutionary advancement that any life form can hope to achieve. Philip Freneau 1752 to 1832 expressed this well in his poem. *On the powers of human understanding [2]*.

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