VII - Embodiment of Consciousness

The nervous system's functions support conscious performance. It is within conscious activity that the full meaning of mind is realized for us and it is within the context of the mind that conscious operations are patterned. As conscious, we, the world, our creativity and our freedom exist for us. In this chapter we will present a model for understanding the relations between the mind, consciousness and the nervous system. In line with our previous analysis, we will see that insofar as neural events are only functions, they support, or are part of, other operations. Insofar as they are only operations, they support, or are part of, other operations or acts. It is problematic if neural operations are acts, or are free. If they are acts, there is an identity of mind and some part of the nervous system. If mind and nervous system are separate, but can have the same action described in terms of both as the same act, then there is a parallelism between mind and nervous system. If operations of the nervous system are not acts and operations of the mind are, then the mind is not identical with the nervous system, though they are related and can be coincident to some extent. Depending upon which relations one accepts as factual, one is a materialist, believes in psycho-physical parallelism, or is an interactionist. The model presented here is holistic. Our view is that many of the traditional mind-body issues do not arise in an explanatory holistic view. The issues arise when one imaginatively, descriptively or explanatorily separates (or abstracts) a part or parts from the whole and then tries to relate them to one another. Earlier we explored the metaphor of hierarchical levels of organization or complexity which introduces these pitfalls. We have not had to do that as we have shown that evolutionary differentiation works in terms of differentiations and relations within wholes so that the integrity of the organism as a whole is always maintained.

In the place of hierarchy theory with its notions of levels of organization we work within an alternative view of a non-systematic organic whole where the parts are understood in terms of nested explanatory contexts. Those contexts are situational and can be understood as operational situations. Though parts of the whole may be isolated from one another, they are not isolated from the whole itself. Though they can be studied abstractly as if they were isolated, there comes a point where their fuller context needs to be invoked to explain their operation. We can understand consciousness as an operational situation. We will not do that exhaustively here, partly because many unknowns remain in understanding consciousness and also because of the complexity of what is known. Rather we will indicate how consciousness can be understood as embodied and as situated.

We will start with the minimalist assumption that neural processes enable consciousness either as being part of the process or providing other conditions for it, as in meaningful speech. Neural structure approximates a non-systematic whole. It only approximates it because it is actually a "part" understood in the context of the organic integration of neural and non-neural organic or biochemical processes. This integration is, for the most part, constitutive of the organism as a whole. As we shall see, the same can be said for consciousness.

Neural – Somatic Integration

In addition to the motor and sensory systems, there are two other types of neural-somatic integration. These are interrelations via the autonomic nervous system and mediation of each by the other via biochemical interactions. The autonomic nervous system innervates the smooth and cardiac muscles, the involuntary muscles, and the glands among other areas. It has two principle subsystems, the sympathetic and the parasympathetic, which perform contrary operations. While the sympathetic systems works primarily through direct contact with muscles, skin, blood vessels, and so on, the parasympathetic works primarily by inhibiting the sympathetic. For example, the sympathetic subsystem can stop intestinal peristalsis, make hairs stand on end, facilitate breathing by expanding the bronchial tubes, reduce activity in the gastrointestinal tract, increase heart activity and blood pressure, while reducing the supply of blood to the skin by constricting the vessels supplying it, dilate the pupil of the eye, increase the size of the visual field by contracting muscles to cause the eyelid to lift and the eye to move forward in the eye socket. All of this occurs during the acute stress response (fight or flight). The system uses norepinephrine as a neurotransmitter which contributes to alertness. The parasympathetic can cause the blood vessels to "widen" by inhibiting their contraction by the sympathetic system. However, it also has some direct effects as in the deceleration of the heart rate and the constriction of the pupil. In the fight or flight, or acute stress response, we can think of the sympathetic system as activating and the parasympathetic as calming.

In addition to neural modes of integration of somatic functions, there also are biochemical modes. In general, activity of cells is interrelated via biochemicals that include hormones, monoamines, and peptides, which can be synthesized in multiple areas of the body. These biochemicals (ligands) work by attaching to sites which are receptors on or within cells. This can activate a cascade of processes within the cell which can lead to cell growth or differentiation or the release of other biochemicals. There are thousands of types of sites which permit a complex set of interactions. Though the brain may be the most complex whole in the universe, it was preceded evolutionarily by highly complex processes for coordinating cellular interactions, growth and behavior of more primitive organisms.

The brain influences somatic processes by producing hormones, neural transmitters, peptides, etc of its own. Their release into the blood stream can coordinate both global and local physiological responses. They are related to immune response, sexual behavior, and the acute stress response for example. The primary system works via the hypothalamus and the pituitary gland. Here there are direct neural connections to the bloodstream which permits chemicals that cannot get through the blood brain barrier to be released from the brain or introduced to it.

Neurons release hormones that affect the rest of the body directly into the blood stream at a site near the pituitary gland. This cluster of neurons also is receptive to biochemicals in the blood. This permits brain-somatic interactions to go both ways. For example, the slackening of blood vessels indicates a drop in blood pressure. This triggers the somatic release of peptides which, when received by the neurons at this site, initiates a cascade of neural processing resulting in the increase of blood pressure.

This two-way interaction contributes to the emergence of emotions and moods. The events leading to stress or to depression can originate in either neural or somatic processing. Events in the immune system can influence mood via peptides which are utilized throughout the body. Their somatic release can activate neural activity via the pituitary pathway so that emotions can have visceral as well as neural origins.

We see similar interaction in the activity of hormones produced by neurons and released via the pituitary which can relate somatic and behavioral development, the most obvious example being in puberty.

The aim of the above is not to provide an anatomy lesson, but to illustrate that the brain has multiple functions beyond enabling conscious operations and that these functions need to be understood biochemically. After all, all cells have the ability to generate an action potential that travels along the cell. Neurons are just specialists at doing so. The neural-somatic integration trades on the somatic origins of the nervous system.

These scientific results indicate that though we can distinguish the brain and neural systems from other parts of the body they are complexly interrelated as parts within the whole that is the organism. If we also consider that pheromones that are released by organisms affect the behavior of other organisms, as in mating, then the embodiment of behavior has evident somatic elements. As a side note, no mention of communication or signaling or any type of associated analogy was necessary to lay out these basic relations. When hormones reach a site they become operators in initiating processes. It is the complementarity of the varied processes initiated that enables the organization of comprehensive activity.

Neural Architecture

By neural architecture we mean the spatial relation of neurons and neural structures in general to one another and to the other parts of the body with which they interact. We will provide four examples of neural organization. The first is unicellular where one neuron affects multiple areas. For example, one neuron can terminate on multiple skeletal muscle fibers permitting a synchronous contraction of the muscle. The second is a centrally functioning neural net that is a skein or “tangle” of neurons, that project outward to multiple areas and receives multiple inputs. This is the form of the spider’s brain, for example, which functions as an intermediate net between sensory and motor neurons. The reticular formation is similarly “disordered” as are some neural nuclei which perform key functions. (‘Nuclei’ is being used in the neuroanatomical sense to indicate a cluster or group of neurons with a common function.) The third type is columnar where columns may be functional units. Similar types of neurons’ projections are limited to other neurons within the column providing a synchronized firing of neurons within the column. There also are projections from the columns to other columns or neural areas that interrelate columnar function with functioning in other areas. Likewise, reciprocating projections from other areas terminate on the columns. This type of organization is prevalent in the neocortex. The fourth is radiating. In other words, neurons with common functions converge on a central site or radiate from a central site to multiple areas. The high level architecture of the sensory and motor systems reflect this structure with sensory neurons on the periphery projecting to areas in the brain and motor neurons projecting out from the center to the periphery. Areas with broad radiating convergences and divergences would seem to be instrumental to coordinated activity across the brain or organism. Another example is the serotongenic projections from the raphe nuclei in the mid brain to virtually all areas of the central nervous system. Serotonin has multiple effects, but a key one is in the modulation of moods. Similarly architected neurons project for norepinephrine and dopamine from areas in the midbrain. They also have multiple effects including influencing moods.

The brain is not one structure, but a set of structures. Via evolution, operations were modified or added via the emergence of neural structures. According to one popular theory, if we move from the brainstem upwards to the frontal cortex it is possible to trace the likely sequence of emergence of neural structures from the reptilian to the mammalian to the human brain. For example, the limbic system is grouped above the brainstem. It consists of a set of structures which form a ring. These include the hippocampus, the gyrus fornicatus and the amygdala. [1] The hippocampus is associated with the formation of long term memories. If the hippocampus is removed a person's former long term memories remain operative, but no new ones can be formed.[2] The amygdala plays a role in the emergence of feelings. If it is stimulated during neural surgery patients will report feelings of anger or fear for example. All of these structures project to the hypothalamus and the hypothalamus has neurons which reciprocate the relation. All are also related to the thalamus which has reciprocating projections to and from the neocortex and virtually every other key neural area. The basic mammalian brain has these gross structures though the quantity of neocortex varies widely with the more advanced mammals having proportionately more.

The reticular formation is a very early emergent that may trace its origin to the primitive neural net. It extends from below the brainstem to the mid-brain and has projections to and from the neocortex and virtually all other major structures. Part of it, the reticular activating system, is associated with waking and sleeping, general alertness and attention. It is involved in virtually all conscious activity. Conscious activity itself is associated with numerous neural centers, but not all need be active simultaneously. For

[1] P125 neural anatomy
[2] P 124 neural anatomy

example, as attention shifts areas of activity in the neocortex change as centers associated with a particular pattern of activity or interest are engaged. [3]

Modeling Neural Processing

Neural architecture can be described as matrical. Minimally, the brain can be considered as a set of matrices of matrices of neurons. Combinations of neurons map to operations. This does not mean that there are mathematically infinite operational possibilities. There is an indeterminate number that is limited via constraints. Consider the network of motor neurons that enables the coordination of hand movements. The motor neural network is an "organizer of the hand", but it cannot organize independently of its materials. The range of positions is dependent on the structure of the muscles, bones, tendons and so on in the hand. Though there are limitations, the range of combinations is very large. Consider the finger positions required to play all musical instruments, for example. We find a similar situation with vision. Due to the matrical neural relations and the combinations they support, the visual system can support a bound "indeterminacy" of visual experience. First, there are more than a million rods and cones in the eye. Second, they are specialized in terms of function, creating more possibilities for sets of combinations. Third, they interact with an elaborate set of neural structures for further processing and for integration with other neural modes giving us the potential to see all possible movies or all possible sunsets.

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[3] (This has been demonstrated using PET scans).get a source

The matrical architecture is scalable. Scalability refers to the capability of an architecture to support greater complexity and size while retaining its core structure. On the macro level we find the same complexity of neural mapping we encountered in describing the organization of neural columns in the neocortex. There are reciprocating connections among all major neural structures. In cases such as the mapping of the digits on the hand to the neocortex it approximates one to one mappings with the digits having their contiguous sets of neurons. However, with the reciprocating projections of multiple areas to one another is it possible to have several non-contiguous areas involved in a single process. For example in vision there are more than 32 non-contiguous specialized processing areas in the neocortex. This multi-area processing occurs with the other major senses also.

Just as the matrical architecture is scalable, so are the conscious operations it supports. How this occurs exactly is not firmly established scientifically, but a useful model is provided by Edelman. Neural function which underlies perception and behavior relies on neuronal groups which map complexly to one another constituting a primary repertoire of operations. This repertoire is dynamically structured via mappings of neural activity across the groups. It is refined via the development of mappings. This occurs via a selective process where the degree of neural activity determines which mappings develop via both enlargements, by incorporating more neurons, and facilitation. Induced by the activation of neurons, facilitation results from individual neurons creating more synapses increasing the likelihood of innervating their other neuronal contacts. These changes facilitate the reoccurrence of similar patterned activity. The neuronal refinements support the secondary repertoire. Since the instigating aggregate can be exogenous as in sensing or endogenous as in hormonal changes, the model can be used to explain sensing as well as biologically based behavioral development. The primary repertoire is illustrated by a baby's ability to move their fingers and to grasp objects at birth. The secondary repertoire is illustrated in the development of fine motor coordination.

It also is possible to have the same process supported via different physical neural mappings. In the visual field, for example, the positions of structures are not static. Our viewing of an object is perspectival, in that we see it from different angles, in different light and so on. However, more simply, it can be the case that the perspective is virtually the same, but it has assumed a different relative position within the visual field. This means that different rods and cones are involved in seeing it. It would seem, then, that different sets of neurons are involved the constitution of the image at one time than at another, yet the same image or gestalt is presented for consciousness. In this case the neural function can be understood as a *dynamic set of operations* which can be actualized across a network of neurons. The network may map fairly tightly to the sensory sources. Since the sources themselves are equipotential with respect to providing elements for dynamic structures the network must be able to handle this variability. The network, then, exhibits its own equipotentiality and is intrinsically plastic. This means that the functioning of the network is not understood simply in terms of its elements, but also in terms of the pattern it constitutes. The network assumes different patterns, but does not determine what they are.

Edelman has a notion of the degeneracy of neuronal groups that is similar to the notion of equipotentiality. Neuronal groups need to be of sufficient size to manage multiple complex mappings of activity. For example the visual system has to have sufficient complexity to distinguish an indeterminate range of possible objects where many may not have been seen before. This requires supporting large numbers of combinatorial possibilities. The neuronal group as a part of the primary repertoire is a set of neurons, any one of which can become specific to the mapping of one of a range of mappings. Since they have no specific function, they are “degenerate”. This is akin to the notion of neo-natalism in evolution where the former ontogenic development is arrested, permitting the subsequent specification of function at a later time. The neuronal group, then, supports a bound indeterminacy of operations. The degeneracy of the group enables the development of the secondary repertoire via the further structuring of activity at the neuronal level. The recurrence of similar patterns is facilitated through the development of connections (i.e. synapses) between neurons. It cannot totally explain it because this type of processing enables multiple states but does not determine what those states are. The specification of the secondary repertoire can partially explain development, learning, memory and other operations.

These considerations underlie an operational model for memory. For example, we could have a set of elements, or neural operations, which are dynamically structured in complex patterns to support a virtual infinity of possible memories which would emerge via matrically related combinations of operations. Different memories can emerge at different times from the same complex due to different combinations within the complex. Memories, then, would not be stored, but would emerge.

Selective Systems

In artificial intelligence research one model for understanding sensing is pattern recognition. The implicit assumption is that a pattern is present or pre-existent and there is some process for recognizing it. Though this model may be useful for understanding an evolved organism, it is not sufficient to explain the evolution of pattern recognition. From the standpoint of the evolving organism, there were no pre-existent patterns, but at best, an aggregate. The aggregate is in relation to a set of cells where the cells "transduce" or change the aggregate per se in terms of the organism. For example, sensing is the selective transformation of "inputs", be they wavelengths of light, stimulation of cilia in the ear or chemical interactions in smell. To add to the complexity, the aggregate changes. The question then becomes, if there are patterns to be discerned in the sensed aggregate, how does the organic aggregate get patterned to yield the pattern for the organism?

At a first approximation, if a nerve fires in response to movement in the visual field and if the movement is repetitive, then the frequency of the firing will match the frequency of the movement. If other characteristics that have neural correlates are present the corresponding nerves will fire. There will be a de facto patterning of firing based on a one to one correspondence of one aggregate to another. For the patterning to be more than transitory, for it to "mean" something for the organism, it needs to be related to organic activity. If at the most primitive level patterns are de facto, for behavior to occur in terms of them the organism needs to be organized to some extent in terms of them. The "external pattern" needs to be matched by some "internal" patterning. For example it is the selection of patterns in terms of performance that underlies anticipation, memory and recognition itself. Edelman uses the model of selective systems to explain how this occurs neurally through his theory of neuronal group selection. [4]

In our terms, in a selective system we have an aggregate of operators (ie. neurons) related to another aggregate. The aggregate could be sensory inputs or other neurons. This means that variety on the side of the aggregate needs to be matched by variety on the side of the selective system. It is the variation on the side of the selective system that determines the range of aspects of the aggregate to which it can be related. The selective system is a priori. The a priori element is its bound operational indeterminacy. But there also is an a posteriori element that arises through interaction with its corresponding aggregate. For example, Edelman notes that "… perceptual categorization usually emerges as a result of selection during actual behavior in the real world." [5] So seeing a particular color is a posteriori. The capacity to see the color is a priori. Thus birds can see in the ultraviolet range and we cannot, but when we and birds see, we all see something.

In Edelman's model a selective system has the means of amplifying effects. Frequency of temporally linked (i.e. simultaneous or sequential) use of neurons can lead to the development of synaptic connections that coordinate their firing leading to their selection for patterning. If you recognize that different neural structures support different types of operations or different aspects of single operations, then by propagating this model across neuronal groups you get a sophisticated view of coordination via neural mapping that can spontaneously develop. For example, if frequency of use leads to development of neuronal connections, then the more frequent the instigating aggregate,

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[4] This example is pedagogical, not scientific.
[5] Need citation

the more connections. With more connections, then there is a greater probability that the set of neurons will fire in a similar pattern. In fact, we can conceive of a developed pattern being activated with fewer inputs, permitting anticipation and a type of generalization. The initial patterning then can lead to secondary amplification of other patterns which affect the final patterning which could be a unified experience itself.

A simpler example of selective systems is the initiation of a cocktail party conversation between strangers. In this case we have two intelligently selective systems looking for something to talk about. Each has their own repertoire of topics, their own aggregates. Each tosses out questions seeking some response to which they can relate, a type of sampling. When a response indicates an area of mutual interest, the topic of conversation is selected. The conversation is maintained through the amplification of the interaction based on the degree of interest. Ideally the conversation gets more interesting as it proceeds. Interest can be considered a "value", or selective criterion, which also guides and sustains the discussion. In neural processing selective criteria may be immanent in the neurons themselves when they are of different types.

While conscious, there always is a dynamic pattern of neural activity that ranges across a set of structures, but there is no fixed structure or set of structures that can unequivocally be identified as the "seat" or "center" of consciousness. All of these areas project to and receive projections from all of the others. In Edelman's terms, neural architecture utilizes complex "re-entry" networking, which probably accounts for the synchronization of functions across multiple operational areas.

To account for this, Edelman has proposed a dynamic core hypothesis where some set of functional neural clusters is constantly engaged, but the constituents change making consciousness a temporal unity that is a dynamic structure or process. For him this is the thalamocortical system, "… a dense network of reentrant connectivity between the thalamus and the cortex and between different cortical regions through so-called corticocortical fibers." [6]

Damasio[7] also recognizes consciousness as engaging multiple neural areas simultaneously including cortices, the structures of the mid-brain, the reticular formation and the cerebellum among them. He notes the significance of lesions to the reticular formation in the operational integrity of consciousness. Lesions above the upper pons will result in a loss of consciousness, but lesions below it will not. He hypothesizes that this is because the reticular activating system is operative from the pons upward. From the pons upward, the reticular formation has mappings from all the sensory systems, the neo-cortex, the emotional and memory centers of the mid-brain and virtually every other significant neural mapping available to it. Depending on where lesions occur, capabilities either are eliminated or significantly impaired. Thus it is possible for some to suffer damage and be alert, but not be able to think or speak. There is some degree of consciousness, but not in the operative sense we usually associate with full performance. This is because lesions along the axis result in the loss of conscious operations associated with the neural structures above the lesion. In other words, the basic operations associated with the brain stem remain, along with any other operations supported by neural structures up to the lesion. Consciousness still is supported. As far as we know it remains a whole as experienced, but its content and effective range is decreased since the other areas can no longer be operative as conscious.

[6] 43 A Universe of Consciousness)]
[7] Need reference

Consciousness

There is no consensus on how neural operations are related to conscious operations. The position to be elaborated here is that neural operations both constitute and enable the conscious operations, but do not determine them. Freedom and physiology are inadequately distinguished. Physiology leaves open the possibility of freedom The fact that neural process leaves open how it is to be patterned in its operation can be illustrated initially via its relations to external and internal aggregates in sensing and in behavior conditioned by our immune system. Earlier we discussed sensing where states are influenced by the transduced sensory inputs. We also have discussed how peptides released outside the blood brain barrier can influence the brain near the pituitary gland as well as the rest of the organism. This is one way that immune system activity can influence mood. For example it may induce depressed or flat emotional state when we are ill or injured to restrict activity. This would have survival, and hence evolutionary, value in some contexts. At more sophisticated levels, our neural state can be partially conditioned via meaning or via logical operations, for example.

Today we have limited ways to discover relations between neural processing and consciousness. Via deficits that occur to people by injuries, lesions, illnesses and so on, links can be discovered between consciousness and the brain. For example, as noted before, the loss of the hippocampus is related to the loss of the capability to make long term memories. The brain can also be stimulated directly. Wilbur Penfield would do this during neurosurgery to assist him in locating where to operate. Patients, who were conscious, would report their experiences. A third is to do Pet scans of peoples brains and ask them to perform conscious tasks. Blood flow to areas of the brain indicate greater neural activity. A number of areas have been identified that contribute to specific types of conscious functioning. However, due to the complex neural architecture where areas project to and receive innervations from multiple areas it is difficult to identify one to one links between neural areas and aspects of consciousness. Aspects of consciousness, even the simplest, appear to be complexly conditioned. However, the basic assumption is that conscious activity is related to neural activity and this is borne out by the work done so far. A major question is, how is that relationship to be conceived.

On the side of neurology we are constrained by a lack of knowledge and of better methods to attain it. On the side of consciousness we not only encounter a lack of knowledge but an open field of opinions regarding what consciousness is. Clearly, if you are going to relate one to the other both relata need to be understood. What is consciousness?

We will approach a definition that incorporates both neural processing and "experience" as conscious and provides a conceptual basis for relating two explanatory frameworks. The first framework is the neurological, which we have sketched. The second is phenomenological. We are not doing phenomenology in the spirit of Husserl, since we aim at explanation versus description, but we do understand consciousness as intentional, that is, as consciousness of.

Though there is not a common scientific definition, there is a general assumption that consciousness has a neural basis. It is related to the firing of neurons. If so, it should be possible to determine which neurons are responsible for which aspects of conscious experience. In other words, it should be possible to map aspects of conscious experience to specific neuronal activity. An example would be the ability to see horizontal and vertical lines. This has been traced to columns in the striate nucleus whose neurons fire when a subject (in this case a monkey) is presented with the respective patterns. However, though these neurons fire, it has not been determined if they are responsible for the consciousness of the visual pattern, though they may be linked to the neurons which are. However, it is not a far fetched hypothesis that, though they may not be related to the consciousness of the pattern, they at least condition the appearance of the pattern for consciousness.

If we consider that all animals are conscious when awake, then the simplest nervous systems support consciousness. For the sake of discussion it is easier to restrict our considerations at this point to mammals. Though they are more complex, there is a general consensus that they are conscious. This is philosophically more problematic for some people with less complex organisms. It is likely that some part of the common neural structure holds part of the key to the neural support for conscious behavior in all mammals. As noted above, one candidate is the reticular formation at the top of the brain stem. It is in a central, relatively protected location, develops early in embryonic life, fires when we awaken and supports much of alertness and attention. However, there are problems with centering consciousness in any one neural area. As we noted much of the reticular formation can be removed, or become inoperative, but the person will still be conscious. In some cases, though the quality and degree of attention can be affected via injury, recovery can occur.

Also, consciousness is of different types, depending on what one is conscious of. For example, we feel throughout our body. In a sense, then, consciousness extends throughout the kinesthetic system. Also, we can be conscious of feelings or emotions, images, words, memories of sensations and so on. Through work with electrical stimulation of the brain of surgical patients, it has been shown that stimulation in particular areas give rise to experiences of particular types, memories, feelings, elicitation of expressions. In most cases they are experienced as non-contextual. Experiments have shown also that there is broad activity across the neural cortex with eventual localization in the appropriate Brodmann area as one decides to perform a motor act. In addition, it has been found that as one pays closer attention to an aspect of ones experience or the content of a conscious operation in general, the area which supports that operation exhibits more neural activity. This implies that attending may be supported in each area by somehow increasing the intensity and focus of the experience. Instead of consciousness being localized it appears to be diffuse and it is diffuse via the operations that are in play.

We also have considered different types of neural organization. There is the relatively straightforward mapping of the hand and the digits to corresponding areas in the neo-cortex. This is in contrast to the reticular formation which as currently understood displays no straightforward mapping to types of experience or performance. Both types seem to be related to conscious operations.

By approaching consciousness from the standpoint of phenomenology, versus neural activity, this conclusion is confirmed. There are multiple elements within a dynamic, temporal whole which are not merely “present” but integrated in differing ways in multiple processes and performances. The variability and complexity of conscious states points to a corresponding variability and complexity in its conditioning and enablement. The flexibility of skillful performance, for example, correlates to the bounded indeterminacy enabled by neural structure. As a dynamic structure of operations, a skillful performance is analogous to the activity of Edelman’s dynamic core which enables dynamic structures of ongoing neural activity.

It seems fairly obvious that when we see we are conscious. However, this belief is confounded by the phenomena of blind sight where aspects of the visual field can be known though they may not be experienced as seen. This indicates that there is preconscious neural processing of the visual field prior to our experience of it that interacts with other types of areas. In fact, this preprocessing may be, in many cases, a condition of seeing. In vision, then, neural function is somehow related to consciousness. However, lets make a distinction between consciousness and operations. In vision, for example, we know that different neural areas support the experience of aspects of the visual field (note- not qualia, but their components – if we actually can get to qualia themselves). We also know that these areas have no strict mapping to their relative positions or roles in the visual field. This would indicate there are other organizational principles at work other than one to one mapping. In some cases neural mapping seems similar to the logical mapping in automated systems. For example, memories would not be stored in particular places, but emerge via interactions among multiple areas. How these areas interact is more important than their spatial relationships.

Whatever those principles are, we can distinguish aspects within the visual field, the neural areas that support the constitution of those aspects, the integration of those aspects as a whole, and the experience of vision, or vision as conscious. The integration of the aspects as a whole would seem to be another nonsystematic process, given the variability and combinatorial possibilities in vision. However, the visual field always is experienced as a whole, usually with no deficits, even though visual deficits can be demonstrated via testing.

There are two reasons for this. First is the holistic nature of visual processing enabled via the reentrant mappings integrating the visual areas. Second is the fact that the visual field presents the context for judgments about the visual field for the person asked to interpret his or her visual experience. For example, if you are asked what is missing from your visual field you would not know how to respond unless you knew what you were "supposed" to be seeing. In some cases you can determine this indirectly. For example, if you have a deficit where you cannot see things on the right side of your body and you start bumping into things you cannot see, you may conclude that you have some sort of visual deficit, though the visual field is experienced as a whole.

By considering the visual field as conscious we are being too abstract since consciousness is a property of the other senses. As with vision, in general we can distinguish the aspects of sensitivity, the neural areas that support the constitution and emergence of those aspects, or correspond to them, and the presentation of those aspects within a whole which is the experience of sound, touch, smells and so on. As the unity, including the temporality, of visual experience has its basis in the reentrant architecture interrelating all the visual areas in the brain, the unity of the full range of conscious experience of which vision is a part is due to the iteration of these types of re-entrant mappings across all the sensual centers and other areas enabling other conscious operations.

Fundamentally, in consciousness, the operation and the content are given as one. Consciousness is a quality of the operation. As such, the operation as conscious is the presence of the content. It is by understanding that we come to distinguish the content from the operation and consciousness from both. This is possible through two generalizations. The first is that the sensitive operation is in some sense the same though the content may differ. The second is that different kinds of operations are conscious so that consciousness is always present though the operations change. As a quality, consciousness is given along with the operations. So while contents of operations are present by virtue of the operations, consciousness has the appearance, for us, of being present by virtue of itself. That is, for us, in a basic sense, it simply is. As a quality of operations consciousness is an unmediated immediacy. We do not need to do anything to become conscious, because becoming conscious is not a conscious operation.

Operations are integrated in complex ways to yield complex objects. An intended entity, such as a tree, is a unity for us only after a series of integrations of operational contents where we find the significance of the contents not in themselves, but in the transcendent object they constitute. Earlier we discussed Husserl's famous account of perception where the perceived is never fully given, but only presented perspectivally. There is a self-transcendence via perception where the perceived is more and other than the perceiver and the perception. Thus, in the case of perception, the operations themselves are oriented to what they are not, the intended object; and not to that object simply as "given" but as anticipated, as an "incompletely given". If the initial orientation of consciousness is extroverted, then the emergence of a self that is explicitly for itself is a later achievement. Consciousness per se and the operations of which it is a property or quality are subsidiary in extroverted experiencing to what is experienced. If this fundamental extroversion is integrated within behavioral systems, which have goals other than their self-presence or self-understanding, then it is conceivable that the initial sensing organisms are virtually "selfless". We will discuss this more extensively shortly.

Conscious operations as intentional are spontaneous. As we noted earlier, we have some control over them, but not total control. As we noted in our analogy with breathing, we can choose to some extent not to perform them, but we cannot choose to never perform them. Within the operation itself, we can distinguish what we can control or not control. With seeing, for example, we can direct our gaze and focus on different aspects of a thing, but we cannot choose the color of it. In the case of sensing, this is the basis of experiential objectivity. The independence of these aspects of the operation from our control permits them to be for us independently of what we do. This permits the constitution of an empirical object with which we can interact. It is the basis of some experiential objects being "other". The neural architecture provides the basic structure which limits conscious control by enabling some mappings between areas and providing no basis for other types of mappings to occur. Breakdown of this structure in hearing voices or hallucinating is aberrant.

Conscious operations have different ranges. We cannot see seeing or see hearing, but we can be attentive to both. We also can attend to our attending to what we see. Naturally, our focus cannot be exclusive in this case as it can be in focusing intently at what we are looking, but attending is immanent in its own range, while seeing is not. Thus, some operations are potentially "reflexive" and others are not. Some have other conscious operations as potential "objects", or more generally, intendens, and others do not. At the risk of being interpreted as being tautological, or even worse, obvious, we will attribute this possibility to the fact that these operations are conscious and the type of control they have, or what they do. The nature of conscious control we will consider in our discussion of the emergence of freedom. The nature of consciousness per se, or as such, we will consider now.

Consciousness is not a free-floating field within which operations and contents are present. Neither is consciousness related to any area where neurons terminate as they do on muscles with the motor system or with the senses. Rather, consciousness is a quality of operations in general. It may be that it is a quality of types of individual neurons and the collective activation of them constitutes a quality of the group as conscious. Or it may be that it is an emergent property of aggregated activity. Which is true is immaterial to our discussion. What is key is that it is a quality of operations rather than an operation itself. What does this mean and why is it significant?

As a quality of operations, consciousness is not the content of any operation nor an operation itself. Rather, it is given along with the operation. As intentional, operations make their correlates, the intendens, present for consciousness. The operations are present not by being intended, but via the consciousness which is a quality or property of intending. As we noted above, in some cases they can be intended by other operations, but that typically requires self development. Our initial orientation is extroverted. As a property, consciousness is given along with the operations. So while contents of operations are present by virtue of the operations, consciousness has the appearance, for us, of being present by virtue of itself. That is, for us, in a basic sense, it simply is. We do not need to do anything to become conscious. This is because becoming conscious is not a conscious operation.

If consciousness is a quality of operations and not an operation, then we can dismiss some common views of consciousness. First, consciousness is not perception or self perception, rather any such perception is conscious. If consciousness were a type of perception, then self consciousness would be a perception of a perception, and we are off on an infinite regress.

Likewise, consciousness is not a type of knowing and self consciousness is not a type of self knowledge. Rather self-knowledge is conscious. There is a sense in which we know ourselves and "become conscious" at the same time. When we know ourselves, we become for ourselves as we are in ourselves. This "becoming" is a becoming intelligible for ourselves. But we typically understand that we were conscious of those parts of ourselves we come to understand prior to our understanding of them.

Finally, if consciousness is not an operator or an actor, then consciousness is not free. Since freedom is self-causing in its activity and consciousness cannot cause itself to emerge, consciousness is not freedom. However, since acts can be free and can have different types of consciousness, freedom can be conscious and consciousness can be chosen.

If consciousness is neither an operation nor an act then what is it and what is its function? What is its evolutionary advantage? The key is that consciousness as presence is “self”-present. By this I do not mean that consciousness is necessarily consciousness of a self, but that consciousness is present to itself in the conscious operations that are the making present of the "object". As presence, it is an immediate, or unmediated, relation to itself.   We will see in the next section that it is this immediate self relation that presents the possibility of freedom with its range of different principles of control instantiated in conscious operations. In system’s terms, the emergence of a free central operator opens up ranges of possibilities. These are familiar to us as the operational situation available via, and immanent in, extroverted consciousness.

Origins of Consciousness

When we state that consciousness is a quality, we mean that consciousness is something that cannot exist independently of something else. In this case we are claiming that is a quality of operations. What type of operations? Evidence (ie. PET scans, direct neural stimulation) shows that in many cases they are operations requiring neural functioning. This leads to the supposition that consciousness also is a quality of neural processing.

It is possible that consciousness was a quality immanent in the original neural networks. Its emergence was coincidental to the interrelated firing of neurons. We find primitive networks today in jellyfish. The simplest has two types of neurons. The first type is sensitive and the second is motor. They are directly connected to each other. An incipient intentionality is immanent in this primitive network as the sensitive neurons are related to what is other and the motor neurons permit transformation of the organism and its behavior in terms of the other as mediated via the sensitive neurons. The next most complex network has neurons between the sensing and motor neurons permitting self mediation of sensitivity and movement. Rather than terminating directly on motor neurons, sensory neurons terminated on the intermediate ones which in turn innervate the motor neurons. Thus, the intermediate neural net emerged which led to the evolution of the brain. The intermediate net is self mediating in that it acts in terms of its own operations. Since the state of these operations can be conditioned by what is not the organism, the other as mediated via the senses, there is an analogical structure linking the organism and the other. Since the neural net can also “sense itself”, it can organize itself in terms of its own state, which encompasses the state of the other for it. This enables the organization of movements in terms both of the other and of the state of the organism itself. The analogical relation between birds’ movements and the building of a nest would be a sophisticated example of this.

Minimally in the case of the initial neural networks motor patterns could vary based on sensory patterns. The sensory patterns also would vary based on motor activity. The network enables complex behavior. Given this, it makes sense that the evolution of the brain and the evolution of behavior are linked. If we consider that sensory-motor behavior was conscious from the beginning, then the evolution of the brain and consciousness both occurred with the evolutionary differentiation of function and increasing complexity of behavior. The distribution of conscious operations’ neural correlates throughout the brain would argue for this hypothesis. Also, stochastic models of neural function such as selective systems and complex adaptive systems cannot account for unity amongst the aggregates nor their states. If consciousness were a later emergent from a pre-existent neural aggregate it is more difficult to explain why it emerged as well as the original role of the neural net as an aggregate versus a unity. (Of course, this does not rule out this alternative.) Finally, in animal development conscious activity is necessary for neural development. Imprinting periods provide clear examples.

The evolutionary homologues to the primitive sensory system are the cognitive structures while those of the motor system are what may be called, in the broad sense, the motivating structures that condition behavior. This distinction is artificial to some extent since motor activity is part of cognitive behavior and cognition certainly is part of making choices. For example, the mnemonic and anticipatory functions probably emerged together as undifferentiated within the same neural processes. At its core, memory is a specification of the ability to repeat an operation. If motor operations are transformed via the intermediate net in terms of that net's transformation via recurrent sensitive patterning we have a form of memory. Since the pattern is temporal, it is de facto anticipatory since it implicitly assumes the changing situation to be one it can accommodate with the next action or possible range of actions. So the existential notion of the temporality of consciousness is immanent in the simplest learning or neurally based recurrent operation. The present is the anticipation of the future in terms of the past. With a memory-anticipation structure, innovative activity must emerge to make adjustments in the present situation between the operational situation as anticipated and as actual. This provides evolutionary pressure for the emergence of freedom and intelligence.

The Possibility of Freedom

Unless we confine our definition of freedom to the ability to make meaningful choices, the emergence of freedom in nature is the emergence of a pre-conceptual mode of control. To the extent that it is free, it ranges from being predeliberative and approximating a type of impulsive behavior to the pre-linguistic intelligent insight and deliberation where chimpanzees learn how to unlatch their cages or use tools to get food . Our hypothesis is that some animals have freedom to perform. Our challenge is to provide a plausible account of how this is possible given the notions of neural architecture and consciousness we have discussed so far.

Actually, this section should be titled “The Necessity of Freedom” because the organism cannot foresee all the situations it will encounter and will not have the resources to determine how to act appropriately in every case to deal with novelty successfully. Actions taken or not taken can have deadly consequences. The actions taken also will rely on the organism’s immanent motivations. The emergence of an evolutionary gradient for motivating operations is clearly related to the need to make choices in the situation. Choice is used broadly here and does not always imply freedom, for in many cases the choice or option may not be free as in the performance of a stereotyped set of escape maneuvers. If we consider freedom in terms of the systems theory notion of degrees of freedom and combine this with the neural model of selective systems, we can get an intelligible account of how the differentiation of motivations could have occurred. We need to be careful to not lose the context that it is the animal deciding rather than the brain.

Though animal decision making may be impulsive, there is an evolutionary wisdom built into it. The “choice” minimally is the invocation of action. It is not some structure or operator within the organism or within consciousness itself that does this. It is the organism itself that does it consciously. It is with the emergence of consciousness that global action can be invoked from a single active center for the organism. That active center is commensurate with consciousness itself.

A way to understand consciousness as an active center commensurate with itself is to consider conscious focusing. Focusing is not simple, but complex, and involves the whole organism. In gestalt terms, it provides the figure with the non-focused penumbra providing the ground. Though a visual metaphor, the penumbra should not be understood in terms of sight alone, but in terms of the whole conscious state. Focusing is selective. When any other conscious operation takes the lead it provides the focus which transforms the state of consciousness and the penumbra. This is a transformation of context. The ancillary operations immanent in the achievement of a conscious act are readied. For example, when we try to understand something, the imagination is immediately transformed without our doing anything other than trying to understand.

We can conceive of animal behavior as a set of performances enabled by motivational cycles. This allows us to conceive of freedom for the animal within the context of specific operational situations constituted by "drives" or strong motivators, such as mating, hunting, playing and so on. The more primitive the animal, the more cybernetic the behavior can appear. The male stickleback, for example, will defend its nest against any red patch, whether it's a real fish or not. Geese will roll round objects into their nests whether they are eggs or not. These are stereotypical instinctual behaviors with few degrees of freedom. These behaviors can be both too specific and too indiscriminate. Though "error" prone, they were evolutionarily effective since they evolved to deal with ecologically recurrent states versus the experimental states in which their limitations have been revealed by isolating the acts from their natural context.

Freedom within this context is most likely confined to freedom within performance. The animal does not choose its motivational cycle. Rather it performs within its context. This provides a clue that it is like the type of freedom enabled by skills and that the learning that occurs within animal development is like the learning that occurs in the refinement of skills. In Edelman's terms, the innate ability is conditioned by the primary repertoire. The refinement is via the self-control of the organism in varying its performance in terms of the object or goal. So the hawk controls its dive and adjusts tacitly in terms of the movement of its prey. Self-control is immanent in the dive, but it is not self-control in terms of itself. The control of the performance is conscious, but not known, immanent not explicit. It is not deliberate, but only spontaneous. The learning and honing of skills can occur by the successful repetition of the spontaneous performance so that operational memory and its correlative anticipation make the subsequent performances more efficient.

Until one gets to the higher mammals, it is likely it occurs spontaneously within the immediate situation. At its more complex, it can involve novel organizations of actions via trial and error or via insight as in experiments with chimpanzees who need to use objects in the environment to get food that is not directly accessible. But the reorganization of the "self" is in terms of the other. The result is a refined or altered interactive, behavioral structure; or, as in the case of the chimpanzees, discovery of a new way to relate to the other. Minimally we have an instance of conscious control. Immanently it is self-controlling since it is the animal that is performing the operations, but it is not self-controlling in the sense that it has any idea of what it is doing or choice regarding not performing. Instead, it is choice only in the context of the extroverted, performative context.

Individuation

In the broadest sense, individuation requires some knowledge of oneself as distinct. This implies that there is some other thing or things from which we distinguish ourselves. A gorilla that looks in a mirror, sees a piece of colored tape on its forehead and removes it, has some notion of itself. This example is fairly sophisticated since the gorilla also recognized itself in the mirror. The self, as conscious, is immanent in all operations. The self as individuated typically is constituted for consciousness as a subset of operations. That subset constitutes self-identity. The general distinction is between self and other, though it need not be articulated or grasped at that level. It is commonly thought that one source of the distinction is that when we touch ourselves we also feel ourselves touching ourselves. However, when we touch something else we do not feel ourselves touching ourselves. So animal self grooming appears to have its own ease and familiarity about it. A second occasion is the immanent distinction between what we can control and what we cannot control. For humans, for example, we have some control over our imagination but not sensible content. It is that independence of sensible content from our control that probably lies at the origin of experiential objectivity. The evolutionary benefits seem evident.

But operations are different in what they do. Not all conscious operations are created equal. Seeing cannot see seeing, nor see hearing, but we can pay attention to the seen and heard and to the seeing and hearing and to attention itself. Thus, consciousness as an unmediated immediacy is within its own "field" without doing anything, that is, it is not an operation. It is given along with everything else via operations. There are conscious operations that can act upon other conscious operations and others, like seeing, that cannot. At the core of consciousness is attentiveness. For us, attentiveness can cover the full range of consciousness. However, consciousness has a richness we still can discover, for in some cases we need to be directed to elements within consciousness to be able to attend to them. This is the case with things in our visual field and with our own operations such as the positioning of the tongue in pronunciation. For us, attentiveness has a degree of freedom.

We can choose to pay attention. It also can be directed via neural processes as when we experience a sharp pain or something unexpectedly whizzes past our ear. It also can function within the context of feelings in behavioral cycles and the performances they motivate. Attentiveness is an example of a reflexive operation since we can pay attention to paying attention. We can pay attention to it because, as conscious, it is given. But we also can pay attention to it by virtual of its own capability.

However, we also can conceive of attentiveness being operative, but never being self-attentive. It is a difference within consciousness, but it is never intended. In an undifferentiated, extroverted consciousness this could be the case with all conscious operations which makes the emergence of the self, for itself, problematic. There is the self which is for itself simply as conscious. For this type of self there can be free conscious operations, but they are performed in terms of the other, or in terms of the self as "object", i.e. Grooming behavior. So there can be conscious control, without self-control. This leads us back to a more cybernetic view of animal behavior as "driven".

With humans the situation is more intelligible, since we can know ourselves. The self becomes an "object" of concern and we have the emergence of complex psychological relationships. Earlier we noted that self-knowledge is the result of a process where we become for ourselves as we are in ourselves. We become who and what we are. Our operational situation is constantly changing and developing and who we are within it is too.

The Unity of Consciousness

The interdependence of the organism's processes is understood in the context of performance, either as enabling performance or as a component of it. In animals differentiation of behavior occurred. Most generally the behavior regards the homologues of movement, eating, reproduction, and fight or flight and so on. Here too we find complex coordinated relationships, which indicate that mind and body are not separate, but, at most, refer to different types of coordinated operations of a unity. Different complexes of operations emerge at different times to actualize motivational cycles

Consciousness, as a quality of operations, can differ depending on operations. There is still a quality about the operations that permits them to be present in a unified conscious field. Though multiple organizations may complexly condition that presence, for consciousness it can appear unmediated and immediate. If consciousness is a quality of operations, and operations are disparate and supported in different neural areas, how can consciousness be unified? The neural architecture supports the unity of consciousness with the multiple pathways to and from the operational areas. There are two other types of unity, operational and intelligible, which neural organization enables.

We can take a clue from the evolution of the brain. In the more primitive organisms neural networks evolved which coordinated sensing and motor activity. The brain evolved from these networks. Since the beginning its role has been as a central coordinator or control. Rather than consciousness emerging as disparate and in need of unification, the disparateness of operations emerged as differentiations within a pre-existent unity. Assuming that consciousness is at least conditioned by neural activity, then conscious operations became more differentiated as the neural support for them did.

If consciousness is a quality of operations, then would not each operation have its own consciousness? The principle of evolutionary differentiation would indicate that they do not since differentiation occurs within a pre-existent unity. Consciousness is a global property enabled by the operations of large linked populations of neurons working in parallel. Modularity applies to neural function, permitting some independence of modular function from that of the whole, but the "independent" operation is understood as related to other operations that enable performance. For example, multiple questions can be handled simultaneously by neural processes though we are not currently focused on answering them. This is the well-known "incubation" period prior to insight. The insight is not chosen, but occurs spontaneously, often when we are not actively pursuing it. Also, the development of long-term memory is a quasi-autonomous process, though its operation may be manifest in dreams.

The arguments for multiple consciousnesses rest on experiments with split brain patients and cases of multiple personality disorder. The "multiple consciousnesses" of split brain patients are revealed via experiments where input is restricted to one side of the brain. If it is not restricted, the performance in response to questions is integrative. The fact that integration does not occur in all cases when brain processing is isolated due to the experimental set up and the severing of the corpus callosum is evidence for the holistic functioning of the healthy brain and reduced self actualization resulting from impairment. Multiple personality syndrome is a behavioral solution to trauma which "works" because there is a unity of consciousness within which the personalities emerge. The unity can be understood in the reintegration of the personality. Again, this illustrates not that there are separate consciousnesses, but that psychological disorders can involve isolation of performative complexes thereby inhibiting full self-actualization.

Since consciousness is a global process, intentional operations, as singular pose a theoretical difficulty in understanding its unity. Earlier we spoke of focusing as elemental. If we consider that multiple operations are occurring simultaneously focusing on a goal, an object, a tennis ball approaching and so involves selectivity and concentration. All other elements recede. Peak performances are the clearest examples.

Peak performance requires concentration and single mindedness. There is a “loss of self” in the detachment from anything else. All conscious subsidiaries are integrated in terms of the performance. This degree of detachment and concentration can be learned. It also can occur spontaneously as exemplified in the marvelous English phrase, “death concentrates the mind”. Athletes can experience this as “being in the zone”.

Peak performance can be accompanied by peak experiences, positive or negative, pleasurable or not pleasurable. Normal performance has a similar structure, but there typically are other aspects of experience and concerns that are distracting. Performance is impaired if these concerns are so strong that we cannot concentrate sufficiently to accomplish our tasks. For example, we “fall to pieces” or “cannot get it together”. Sometimes this occurs because we have a values conflict where it is difficult to concentrate on the mundane because we have a larger concern. Other times it occurs and we do not know why. This is one symptom of neurosis or psychosis. Difficulty in concentrating is a symptom of depression. Illness or pain also can affect it. There is a spontaneous reorganization of consciousness to deal with them, but the reorganization does not permit peak performance. The whole person is affected by the inability to fully focus on the task at hand.

It is focusing that brings single intendens and intendings to the fore so that we have a conscious foreground and a background. It is intentionality analysis that distinguishes and relates conscious operations. In doing so, it must be remembered that they occur within a unified conscious context.

There also is an operational unity of consciousness. In humans, attention typically is sublated by intelligence. However, our attention can shift depending on other factors, such as an object whizzing past our ear, or the creaking of beams while walking on a shaky roof. Attentiveness is the fundamental conscious operation that is sublated by questions and the subsequent cognitional operations. Attentiveness also brings aspects of our experience to the fore. Waking up is a process of becoming more attentive. We also could argue that dream consciousness is a form of attentiveness. Though we always are attentive to a greater or lesser extent while awake, there is an element of freedom in attentiveness. We can choose to be more or less attentive and we can choose what to pay attention to. Indeed, one of the goals of meditation is to "purify" and gain more control of attentiveness.

If the freedom to pay attention is a fundamental freedom of consciousness, then we can approximate the operational unity of consciousness. Neural activity increases in those areas of the brain that support the operations to which we attend. Given the matrical structure of the brain attentiveness could be an operation supported by a number of areas. When we attend to something in particular the core consciousness of attending is supplemented by the consciousness of the particular operation. For us the content emerges within consciousness. The neural pathways provide a physical link. Sublation of attending by other operations would be the emergence of those operations, the activating of the neural networks supporting them and the attending to them. That is, the operations would include paying attention as part of them. Thus, the operational and neural context expands. This provides some understanding of the basic unity of consciousness as experiencing, or attending.

The identity of intelligence and intelligibility in understanding is the intentional nature of knowing. This is also the case in judgment where we can know that the known does not depend on knowing for its being, though our understanding of being may be in reference to our knowing.

For us, the unity of consciousness is also intelligible. If unity is grasped in an insight which relates elements to one another as being one, then the unity of consciousness as intelligible would be the unity of consciousness as understood. The unity of the self would be the self as understood. Above we noted that there is a unity of consciousness that is given in which different elements may not be understood as parts of consciousness or the self. Thus, the unity of consciousness as understood can vary from the unity in itself. The same is true of the self. There is a remote intelligible unity of consciousness in the sense that it is one consciousness that is understanding. However, the intelligibilities are not fully interrelated and do not constitute an intelligible whole. The unity of consciousness as intelligible for us is typically a unity within consciousness. The same is true of the self for us. There typically is a gap between ourselves as we are for ourselves and in ourselves. This gap is bridgeable in principle, but permanent in practice. It can be overcome heuristically, but not fully explicitly. To do so requires knowing that there is an identity between sensing and the sensed and understanding and the understood. In turn, this requires transcending extroverted consciousness. Part of the process involves working through perceptual, subjective and objective idealisms. We cannot lay out that journey here, but a complete scientific explanation of the brain and consciousness requires it.

A Note on Objectivity

For the naïve realist the question of experiential objectivity is the issue of distinguishing the already out there now from the already in here now. For the objectivist it is a question of making sure that anything that is the self is not surreptitiously being assumed in the affirmation of what is real. Since the real is independent of the self , affirmation of the real cannot rely on anything subjective. Because neural mapping is operational and the performance is global you cannot map the naïve realist view of reality in the brain or understand the brain as evolving within a context defined in those terms. For example, different senses have different relative importance across species and account for differences in behavior. The eyesight of the eagle versus the dog’s sense of smell enable different hunting behaviors. The philosophical issue is that via sensing, the object or the other can be acted on as already out there now and distinct from us, but as intended there is an inadequate distinction between the self and the object as sensed. The real distinction is made in judgment. The quality of the sensed content is dependent on neural processing. Though qualia are subjective, their occurrence is only conditioned via neural mediation, not determined.

So we need to make a distinction. Neural processes are constitutive (in the sense of being part of) of sensitive contents. But since they do not determine their own state, they enable the self-transcendence of the organism in terms of the sensed other. The distinction of this sense of constitution versus enablement allows us to understand how meaning can have neural conditions but not be neurally constituted. We cannot lay out the whole argument, but only indicate the possibility by distinguishing between expression and speech. The mere difference, or nothingness, of signs permits them to be meaningfully arranged, since they are not constitutive of the meaning expressed. Neural processing (along with physiological structures) is constitutive of expression, but it does not determine its meaning. Rather it enables the expression of any meaning we can conceptualize.

Similarly, consciousness as quality is an unmediated immediacy which is self present, but not as a content or operation. If we consider consciousness abstractly, one role it has is to make differences possible. There is a sense in which the differences are simply de facto. For example, two sounds can be different in tone. The neurology can account to some extent for the experience of the two different tones, but it does not account for their difference. The difference simply is. What is conscious as content is dependent on which neural centers are activated. Likewise with what is conscious as the corresponding operations. As conscious, differences just are. Because it is an unmediated immediacy consciousness adds nothing to the field other than its presence. For example, consciousness makes it possible for there to be a field for inquiry which includes the inquiring itself as conscious and as potentially its own intended content. If we consider consciousness only in this abstract role, we end up with the radical self transcendence of consciousness as “nothing” enabling the emergence of self and other for the organism simultaneously, which is the context in which we have come to understand neural architecture.