Establishing and Measuring Consciousness:

Stanley Wilkin: 2012.

This article examines recent scientific research into the part neural activity plays in the development of consciousness through the recently expounded concept of phi and current conclusions on the role of memory. The aim of this article is to further examine the development of consciousness.

It is possible that consciousness is a product of memory. Recent research into locating engrams, the physical substrate of an event or memory, has situated the processes of memory creation and storage in proteins in synapses, which exist as gaps between neurons. The chemical processes involved may initiate the process, the complex awareness of environment, we call consciousness. The idea of an engram[[1]](#footnote-1) belongs to the earliest days of research into the brain[[2]](#footnote-2), and the belief that stimulus can permanently affect the brain. Richard Semon put forward the notion of the mneme as the embodiment of memory. Research in the 1950s by Karl Lashley[[3]](#footnote-3), a neurologist and behaviourist, demonstrated that the capacity for memory was spread throughout the brain, not located in any particular area. Both these outlooks describe the outside source, stimulus, reception and embedding of memories. The engram describes the permanent alteration of the brain as the result of memory embedding.

Engrams are spread throughout the brain. If , no matter where in the brain the engram is formed, the processes are similar this may create self-identification based on quantifiable events that appear consistent. Nevertheless, the approach by neuroscientists is the same as those I have critiqued elsewhere[[4]](#footnote-4). For neuroscientists and psychotherapists, for example, the processes are restricted to the individual. Memory here is treated as a whole, with certain mechanisms. The stimulus or event creates autonomous responses that build up the individual’s perception of their discrete nature. According to Semon, hereditary factors play a part in the formation of discrete natures.

The above is reflected in psychoanalytical perceptions of memory. Only the mechanisms appear slightly different.

More recent research has undermined the foundations of the Lashley engram. Richard Thompson in the 1980s discovered that certain memories can be destroyed by removing a set of neurons. These findings have been advanced on by more recent neuroscientists. Research has discovered that the production of messenger chemicals such as cyclic adenosine monophosphate as a consequence of neurotransmitter serotonin activity, if it continuous occurs over a lengthy period, modifies protein, creating embedded memories. CAMP Response Element-Binding protein, or CREB, binds to DNA which then switches on genes even when the initial stimulation no longer occurs.

The conclusion is that who we are is the result of stimulus upon the brain, modifying, creating to construct our discrete natures. In this view experience is all, although it requires chemical processes within our brains to create our personalities and, it is assumed, our individuality. This is a new neurological process to conclude an old idea, which is both causal and contingent. The above neurological insights described above claim, directly or by inference, that mind is manifest as a consequence of wholeness, including all of the brain, or strength of activity, localised but frequent with in addition repercussions in other parts of the brain. Mind is therefore the product of intensity and organisation. This informs us of the mechanisms towards an observable effect, viewing consciousness as a process of embedding and subsequent alteration of the brain.

Neuroscientists with similar interests have taken the matter further, in the process making ever larger claims. Pioneers such as Frances Crick[[5]](#footnote-5) and Christof Koch, who hold that consciousness is scientifically traceable, and may be related to short-term memory. Crick and Koch established neuronal correlates of consciousness (NCC) which correspond to ephemeral experiences. Awareness of sunlight, passion, taste etc, thereby is direct evidence of consciousness. Many neuroscientists refer to these experience-events as qualia. In order to further explicate their insights, they used the concept of phi, based upon the notion that conscious experience is both highly differentiated from other conscious experiences and unitary. The fundamentals of their concepts are no different thereby from the above.

Phi[[6]](#footnote-6) is distinguished by being a measurement of conscious experience or of the interactive processes of experience. By examining phi the nature and intensity of an experience can be assessed. They thereby hope to be able to map out consciousness in the brain, and perhaps even control experience and anticipate reality. These are the chips that make up a computer.

In effect, this is no more than a continuation of the above arguments. Experience is received and embedded discretely and consciousness is the result of such activity extended throughout the brain. Therefore, consciousness is the direct result of the complexity and size of the human brain. This is in contradiction to the apparent cognitive abilities of crows, for example, which possess tiny brains. This theory nevertheless accounts for different states of consciousness, evidenced by the shape produced by firing and non-firing neurons, between fantasising as a conscious state and direct experiencing.

In each of the above models, brain malleability is accepted as a consequence of the nature of experience, which is perceived of as direct and unadulterated. The environment is thereby not negotiated by language for example.

An important element of the above theory is daydreaming. This is seen as evidence of conscious effort which resides in the brain and responds to negative or deterrent outside stimuli. There is a correlation here with Freud’s use of dreaming to confirm the existence of the unconscious. Both states appear removed from direct experience. Dreaming, we now know, is part of the processes of memory, and that the remembered dream may not reflect the actual unconscious state but be more closely aligned to the recovering conscious state. Thereby, daydreaming may not be evidence of a conscious state but of one that requires reframing. The awareness that attends a, probably small, number of experiences usually occurs seconds after the experience. Although reflection is considered part of conscious states, it is closely connected to language.

**Memory and specie survival**

Chemical processes cannot by themselves create the illusory state we call mind, but only perhaps the individual’s participation in it. Such an approach says nothing about the nature of experience or why experience should be remembered. As a survival tool it clearly has advantages. Memory allows us to know on a daily and yearly basis who our kith and kin are, as distinct from others. We remember our environment. How to acquire food, what not to eat, who we should work with to acquire food. But those things, objects or events, we remember are also part of the mechanism. Participation in or with objects and events creates a relationship which requires continuous assessment and definition. The construction of memory is not sufficient by itself. I am aware of my memory, but also of my participation or relationship with the object or event that seems to cause my memory. Although each event appears discrete, that may merely be a way of creating wholeness, connecting each event to an action or reflection, making tenable the chaos of existence, and associating each event with a subject-me or you. A memory undergoes a process of association before it can be referenced subjectivity.

Are we only memory and nothing more? Such a belief rests on notions of identity and of our discrete natures. If our memories go it is likely that nevertheless our responses remain but are no longer focussed upon specific objects or events. They would be free-floating. We would still therefore be capable of behaviour. While it is widely known that autobiographical memories can be destroyed, what of the memory of other kinds of experiences, such as sunlight or colour? If an Alzheimer patient forgets the name for the colour ‘red’ that does not mean they have forgotten the means of experiencing it. Again, some processes of signifying can be lost but not the capacity to experience.

**Experience**

If qualia (sense-data), its reception and organisation, is evidence of consciousness it is because it is a form of knowledge. The expressed difficulties over classification of qualia within the processes of consciousness are perhaps to do with its imagined connection with self, a problem raised erroneously by both scientists and philosophers. By insisting on the primacy of qualia as knowledge means that it can be separated from the initial experience. [[7]](#footnote-7)Feeling the sun touch the skin does not require individual examination of the phenomenon. It can be sufficient by itself.

Perhaps the good Doctors are confusing knowledge, experience and consciousness? In this matter, knowledge is a profoundly cultural concern. It is or appears to be non-conceptual. Doesn’t this conflict with other notions of cognition? [[8]](#footnote-8) Light, heat and taste require further reference and are not sufficient by themselves to assume aspects of consciousness within an observed mechanism.

Also, experience needs to be broken down and independently considered. What sensations accompany the event, the time and space involved? The experience is concerned with other chemical reactions that are outside the individual. Does cold for example embed memories more efficiently than heat? Is daytime more amenable than night-time, or does it make no difference? Do combinations of senses embed a memory and alter it? The relationship between events and memory cannot simply be mechanistic.

If I pick up a flower, there is more involved than object and sensation. The flower needs to signify something beyond an object stumbled upon without relationships to other objects. The scent associated with the flower requires definition and its relationship with other experiences determined. By giving a flower a name, we control and determine the experience. At what point is all this done? Before or after the activity of proteins?

On the surface this does not explain shared consciousness, why we apparently view the world the same way. Why we see colours exactly the same even though research suggests ‘colour’ is a contingent property. The answer of course might be that we share the same brain properties but that actually enlarges the problem. Is our experience of the world a consequence of those properties and if so where does that lead us?

If we share a belief in the nature of ‘blue’ as a colour, do we share a belief in all other aspects of the world around us? Does the world begin in our brains or outside in the environment? Of course the immediate answer is that outside stimuli activate perception which we class as experience. But that also means we have within each brain a concept of ‘blue’. This does not appear to be the case. The Ancient Greeks saw blue as red. Other cultures see it as a form of green. This suggests that experience has properties distinguishable from those associated with brain mechanics. The process identified by the above theory has to be considered in the context of other concerns, such as the cognitive function of impact of language.

But our good Doctor’s have assumed the classical empiricist position, conflating inner knowledge of things with belief in non-inferential knowledge which provides evidence ‘*for all other empirical propositions’.[[9]](#footnote-9)*

Still, this remains one and two dimensional.

Neurons-reflecting back

Experience

The activity is probably even more complex. It is a process of reflection upon reflection.

**Reality and Memory**

So where can we discover consciousness? If, according to Lashley, the manipulation of memories involves the manipulation of reality we are caught up in Berkley’s paradigm where the world is simply an illusion, and all reality is contained by the brain’s negotiating sensation. Sense-data is incoherent and is given substance by the brain. On the surface, this appears absurd. If an individual is struck by lightning, however they construct the experience, they more than likely will die. This involves the localised elimination of sensation through the elimination of the body and its capacity for further perception.

Does it then require memory which is embedded to ensure planning and recognition? Memory could make phi permanent. The result then is a retained consciousness, not one temporarily obtained and then quickly ejected. Memory allows experience to become layered rather than subject to time and contingency. Here we have a possible model for cognition. As particular experiences are built up on by repetition, with the addition of new similar or contradictory experiences, the collusion of memory and phi, results in self-awareness.

As a model this serves as well as any. But again it concentrates on internal actions of the brain, with no role for any other phenomena.

**Subject and object**

I will take here a diversion and consider one of the enduring concerns of psychology, subject-object. For many thinkers in the field this dichotomy establishes the growth of self-awareness and consciousness. As a child establishes autonomy and separates itself from the mother (primary object) it creates self-awareness and signals growing self-identification. This notion creates a process of consciousness which operates differently from the above. The individual’s separation from the environment differentiates and thereby establishes identity. I am separate from you as each of us appears to operate with separate intentionality. I have properties that separate me from objects such as tables and chairs. Without such separation, self-awareness is impossible.

The reception and recording of experience cannot satisfy this necessary sense of separation of subject-object. Such a separation works on a number of levels, in a variety of ways involving concerns with intentionality. It not only involves stimuli sorted by the brain but such processes through the body as a conduit. The object plays a part in creating the subject, as the subject references itself continuously through the object. Scientific researchers appear to stress only the subject as if the object had no equal existence.

The concept of phi leads to the ascendency of the environment. The activity of the engrame and the exponential growth of memory are determined by the environment. Once the process has begun the brain apparently becomes capable of constructing its own experiences. This can help with planning, establishing vision, imagination and daydreaming. The directing of thoughts creates consciousness. This model provides an historical basis for consciousness and leads on to my own conclusions.

It has taken several millenniums to reach a point where consciousness has assumed a priori position in our understanding of the world. We discuss the nature of mind, our own and others, without embarrassment. We seek its roots without concerning ourselves about its existence. Phi and engrams express the malleable nature of our brains and therefore the possibility of lifetime changes in brain structure but also changes from century to century not evident in fossil records. Consciousness is a point we have reached, not perhaps one inherent within us as understood in the present day. A possible place in the brain, the inferior parietal lobule, close to the occipital lobes (vision), parietal lobes (touch) , and temporal lobes (hearing), for human mimetic tendencies responsible for accumulated cultural constructs, combined with memory and the constituents of phi, have aided in the creation of the mind existing outside and beyond ourselves.[[10]](#footnote-10) Human culture.

1. Semon, R. (1921). [*The Mneme*](http://en.wikipedia.org/w/index.php?title=The_Mneme&action=edit&redlink=1). London: George Allen & Unwin [↑](#footnote-ref-1)
2. Shachter, Eich, Tulving, Journal of verbal learning and verbal behaviour 17, 721-743 (1978) [↑](#footnote-ref-2)
3. Lashley, Karl S. 1950. In search of the engram. *Society of Experimental Biology Symposium* 4: 454–482. [↑](#footnote-ref-3)
4. Critique of Mind/Intentionality. [↑](#footnote-ref-4)
5. [*The Astonishing Hypothesis*](http://en.wikipedia.org/wiki/The_Astonishing_Hypothesis)*: The Scientific Search For The Soul* (Scribner reprint edition, 1995) [↑](#footnote-ref-5)
6. Nir Y, Tononi G. [Dreaming and the brain: from phenomenology to neurophysiology.](http://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613%2809%2900267-8) Trends in Cognitive Sciences, 14(2):88-100, 2010. [↑](#footnote-ref-6)
7. V.S.Ramachandran: The Tell-Tale Brain. Windmill Books. 2012 [↑](#footnote-ref-7)
8. Michael Williams: Problems of Knowledge-a critical introduction to epistemology. Oxford Uni. Press. 2001. [↑](#footnote-ref-8)
9. Michael Williams: Problems of Knowledge-a critical introduction to epistemology. Oxford Uni. Press. 2001.

 [↑](#footnote-ref-9)
10. V.S.Ramachandran: The Tell-Tale Brain. Windmill Books. 2012: pp 117-135 [↑](#footnote-ref-10)