

## Linton v Solms

In his latest book '*The Hidden Spring*', Mark Solms claims that we have been looking in the wrong place for the solution to the mystery of consciousness<sup>1</sup>. He tells us that, up to now, it has been assumed that consciousness is a function of the cerebral cortex because consciousness seems to be a *sine qua non* for so-called higher level functions of the brain such as doing mathematics or composing symphonies – activities which are known to be carried out by certain regions of the cortex, in particular the pre-frontal lobes. Instead he draws our attention to an area of the brain stem called the reticular formation which has long been known to regulate the subjects degree of arousal or consciousness. Now, according to Solms, the traditional view is that the reticular formation is simply a kind of power source which switches consciousness on or off in the cerebral cortex. Solms disagrees. He thinks that the reticular formation is actually the seat of consciousness itself. His main evidence for this view is that he knows of many children born without a cerebral cortex who are, he says, plainly conscious. Now this is a highly controversial claim as these unfortunate children, obviously, cannot tell us whether they are conscious or not. They do, however, appear to display emotional reactions to pleasant or unpleasant stimuli. They do, also, appear to be awake at certain times and sleep at other times. Solms concludes that a cortex is not a necessary condition for consciousness and that all you actually need is a brain stem with a reticular formation.

In my book '*In search of Reality and the nature of consciousness*' I make no claims as to the site of consciousness within the brain. Indeed, one of the main reasons why I suspect quantum process are at the heart of consciousness is my belief that when you are conscious the *whole of the brain* is, in some way, entangled together into a single entity in much the same way that two photons can be separated but entangled together in such a way as to make them behave as a single unit. In my view, therefore, Solms makes the same error as the traditionalists who search for consciousness in the cortex. I do not believe that he will find it in the reticular formation or, indeed, anywhere else.

Another reason why I am sceptical of Solms' claim is that the brain stem is a very ancient part of the brain and all vertebrates including reptiles, fish and amphibians have brain stems. So the claim that consciousness is to be found in the brain stem is tantamount to claiming that all vertebrates are conscious. This may be the case – but the issue is far from proven. On the other hand, there is a strong case for arguing that cephalopods (octopuses, squids and cuttlefish etc.) are conscious. But these creatures have very different brains from ours and nothing which could be called a brain stem.

I remain entirely open minded about which animals possess the faculty of consciousness. I believe that consciousness owes more to the way the activities in the brain are organised than to the existence of certain structures within the brain. Indeed, I am perfectly content to imagine that a computer made of silicon chips could be conscious if it was organised in the right way.

This brings me to Solms' second and, in his opinion, more important claim: that consciousness is fundamentally not about the organisms ability to calculate the square root of two or compose a poem – it is about emotions or *feelings*. Solms lays great stress on Nagel's idea that the difference between a conscious creature and an automaton is that the question 'what does it *feel* like to be X?' only makes sense in the case of the former. We do not ask 'what does it *feel* like to be a laptop?' because we do not believe that laptops have feelings. Similarly, it makes no sense to ask a sleeping individual 'what does it *feel* like to be asleep?'. Having equated consciousness with emotions and feelings, Solms then goes on to ask what *use* are these feeling? His answer is that feelings enable an organism to regulate its behaviour in such a way as to maintain its internal stability in the face of a changing external environment (a process called homeostasis). An example that he gives is of a human trapped in a burning building who *feels* the lack of oxygen in the air (a condition known as 'air hunger') causing him or her to actively seek out sources of fresh air. (I do not know if Solms

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<sup>1</sup> I should make it clear from the start that I have not actually read his book but I have listened to an hour long lecture in which he summarises its content.

uses this example in his book but since he spends some time discussing it in his lecture I can only conclude that he believes that it is a good example of what he is trying to say.)

In my view, Solms has completely missed the point of consciousness and the potential benefits which it can bring to an individual. If it was really just a question of maximising your chances of survival in a burning building it would be perfectly possible to build and program a robot that could detect carbon dioxide levels and other cues which would enable it to escape from the building without the need for consciousness. In fact, the more skilled we become at building autonomous robots that can navigate the streets of a city or search for life on a distant planet, the more obvious it becomes that consciousness has very little to contribute towards an individual's ability to maintain its homeostasis. There are two reasons for this. Firstly, the conscious brain can essentially only attend to one thing at once. The human brain receives information from more than 100 billion nerves, any one of which might, at any time, signal some life threatening situation. No conscious brain could possibly monitor and process all this information. At every level in the brain, this information is pared down and simplified to the point where, all the conscious brain becomes aware of is the fact that someone has just shouted 'Fire! Get out now!'. Secondly, the conscious brain is far too slow to react on the millisecond timescales that is sometimes required. If you accidentally put your hand on a hotplate you do not need to wait for the pain to register and then to work out the consequences of the syllogism 'hotplates are dangerous' 'this is a hotplate' therefore...

In my view the benefits of consciousness to an individual are as follows:

1. Conscious animals are capable of 'thinking outside the box'. In other words, conscious animals possess *imagination*.
2. Conscious animals recognise other animals of the same species as individuals like themselves and can put themselves in their position. In other words, conscious animals are capable of *empathy*.
3. Conscious animals can plan ahead and will modify their future actions in the light of past experiences. In other words, conscious animals have *free will*.

This is not the place to argue the case for these claims (and the third is very contentious) but all have obvious evolutionary benefits. The first enables whales, for example, to invent new ways of catching prey; the second permits penguins and albatrosses to pair for life greatly enhancing the chances of survival for their offspring; the third enables wolves to act together as a team when hunting. I would also claim that if you can definitively show that an animal displays either imagination, empathy or intent then you can be pretty sure that the animal is conscious. Conversely, an animal which does not display any of these traits is almost certainly not conscious. (This is why I do not regard fish, reptiles, amphibians, crustaceans and other invertebrates as conscious)

Notably absent in my list is the word *emotion* – the very word that Solms regards as so important. I have to admit that I find it difficult to understand why feeling happy or sad has any evolutionary benefit to an individual. Some 'emotions' like lust and anger are not really emotions at all but simple physical reactions to stimuli. And other so-called emotional states like depression or euphoria can either be induced or controlled by drugs so they do not seem to me to be essential features of consciousness – more like unintended side effects.

One 'emotion' or *feeling* which does need explaining is pain. It is often asked – if my automatic reaction to putting my hand on a hotplate is to instantly withdraw it, why do we need to go through the agony of feeling pain? Many animals which we do not normally consider as being conscious show strong reactions to potentially life threatening stimuli but we usually explain these reactions in terms of an automatic or pre-programmed reflex. Humans have plenty of automatic reflexes too so why do we need to feel pain as well?

I believe that the answer to this important question lies in the fact that conscious animals have *free will*. Animals with free will can override their automatic reflexes. If I want to, I can keep my hand

pressed on the hotplate. Pain is there to warn my conscious brain of dangers of continuing to carry out my foolhardy wishes. Pain is also a vital component in the process of learning how to cope with your environment. Having once discovered that putting your hand on a hotplate leads to pain, you are a lot less likely to repeat the action in the future. Of course, if, as I believe, animals which are not conscious do not have the ability to foresee the consequences of their actions, pain is of no evolutionary benefit to them and it follows that there is no need for such animals to experience pain.

It will be obvious from all I have said that I do not agree with either of Solms' main theses. The reticular formation may, indeed, play a vital role in regulating the conscious experiences of many vertebrates but it does not follow that the reticular formation is the seat of consciousness or even that it is a necessary condition for consciousness; it also seems to me that he grossly overstates the importance of emotion in explaining why consciousness exists and what benefits it confers on those creatures which possess it.

I think I shall hang on to my £20.

J. O. Linton

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