Comments on 'Sentience' by Nicholas Humphrey

Chapter 1: Sentience and Consciousness

As I understand it, sentience is the ability to consciously *feel* a sensation caused by a sensory input. (pp 2-3) The sensory input is essential. Actually seeing a red poppy is sentience – but imagining a red poppy is not.

It is not clear to me, though, whether feeling a sensation which is not actually present counts as sentience; for example, an amputee may be acutely conscious of a pain in the absent limb; does this count as sentience? Does tinnitus count as sentience? I guess that it does because, even though the input stimuli are phantom the brain is still receiving signals along sensory nerves and is trying to interpret them. What about a headache? Are there sensory nerves actually within the brain itself?

But these are quibbles. If a creature is *consciously aware* of its senses then it is sentient. Humphrey uses the rather technical term phenomenal consciousness to mean the same thing. I shall stick to sentience.

Humphrey then goes on to define consciousness as 'having knowledge of what is in your mind'. (p 4). The problem with this is that a mind is defined as a thing which is conscious so the definition does not really help. Not that this matters because, even though we may not be able to define it, every conscious being knows what consciousness is and can recognise instantly if it is conscious or not.

On page 6 Humphrey lists two important characteristics of consciousness. First it ' creates a cognitive workspace which makes you more intelligent.' I suppose that what he has in mind is the ability of the conscious mind to work out problems or play with ideas in the absence of any sensory input. For example, it is what goes on in your mind if I ask you to add two numbers together or decide on what to have for lunch tomorrow. I suspect it also includes the mental processes which go on in your mind when you are dreaming.

Second he says that consciousness 'underwrites a coherent self-narrative which helps you make sense of your own and other's behaviour'. I do wish philosophers would avoid phrases like 'a coherent self-narrative'. I think what he is trying to say is that at the end of the day, it is consciousness which gives us a sense of self and of our own uniqueness.

On page 7 he introduces the term 'cognitive consciousness' to describe all those mental states which are not associated directly with the sense. (For brevity I am going to use the word 'sapience' from now on to mean 'cognitive consciousness'.) He imagines that a creature with sapience but which lacks sentience could still know its own mind, have a sense of self and be highly intelligent. Indeed, on page 9 and later in the book he suggests that such creatures may have existed in the past (because in his view cognitive consciousness evolved before sentience) and that honey bees, octopuses, goldfish and frogs (p 147) may belong in this category now. Such creatures would, in Humphreys view, posses a 'cognitive workspace' and a sense of self but would have no conscious awareness of their own senses.

I find this hypothesis difficult to accept. In the first place, my gut feeling is that sentience is a more primitive ability than sapience because sentience does not, on the face of it, require much information processing while sapience appears to involve much activity in the cerebral cortex. Secondly, it is sentience not sapience which produces in me the most immediate sense of selfhood. When my eyes are open I see the world around ME; when I touch something cold I feel the sensation in MY fingers etc.

On the other hand, when the patient lying on the operating table under a general anaesthetic is definitely not sentient, but if they subsequently report that they had a dream during the operation, they must have been sapient so it would appear that you can indeed have one without the other.

Also, the evolutionary advantages of sapience are pretty obvious; but Humphrey asks what is the evolutionary advantage of sentience? If a driverless car can navigate the streets of New York without sentience, why do we humans actually need to consciously *see* the world around us? Why could we not just be unconsciously aware of the objects around us? To be sapient but not sentient.

In my view to ask this question is also to answer it. If you already possess the mechanism for sapience, then the best way for information to be passed to the 'cognitive workspace' is in the form of a sentient sensation. Take vision. At every stage from the retina to the brain, the data is processed and simplified. By the time the information reaches the conscious brain, all the responses of several billion nerve cells in the eye have been reduced to a single concept – a red poppy. If the conscious brain had to process the raw data from scratch it would be overwhelmed.

In other words, sapience needs sentience to make it efficient; sentience needs sapience to make it worthwhile. I therefore think we can discount the possibility that there are any creatures which are sapient but not sentient.

Chapter 10

Humphrey addresses Chalmers' 'Hard problem' namely, how it is electrical patterns in the brain give rise to conscious sensations. Not surprisingly, he is not able to add a great deal to the debate but he appears to be of the opinion that it we knew *everything that happens in a brain* (p 94) we would know *everything that there is to know* about consciousness. I am inclined to agree but with the caveat that I suspect there are things going on in the conscious brain of which we currently have no conception.

Chapter 12

Humphrey discusses the possible evolutionary stages in the development of sentience. He describes a preliminary stage which he calls sentition in which sensory inputs and motor outputs are coordinated in a central brain. Then some magic happens involving feedback loops and suddenly a thing which Humphrey calls the 'ipsundrum' emerges – a sense of self and sentience.

I think any attempt to explain the evolution of sentience is premature.

Chapter 13

On page 119 Humphrey finally realises what sentience is all for. He writes 'there's evidence that some non-human animals...see other animals as individuals' and ' When you see another individual – a mate, a mother, a friend, and enemy – as having a self like yours, you'll have a head start in understanding them and predicting their behaviour.' I call this ability *empathy* and I regard it as the most important reason why sentience gives its owners such an evolutionary advantage.

Chapter 14

Humhrey discusses two objections to the theory that sentience evolved because of its survival value.

Firstly, Humphrey concedes that 'Phenomenal consciousness is not a logical requirement for selfhood or mind-reading.' In his theory, there exist creatures which are cognitively conscious (i.e. sapient) but not phenomenally conscious (sentient). There doesn't seem to be any evolutionary pressure for supposedly sapient but not sentient creatures like crabs to develop sentience.

My answer to this is that sapience without sentience is grossly inefficient.

The second objection is that if sentience is so advantageous, why are we only phenomenally conscious of our *sensations*? Why don't other mental states such as (to quote) 'beliefs, perceptions, intentions, and so on' have there own characteristic phenomenal feel?

I think Humphrey is overstating the importance of the sentience as the main agent of our sense of self. I believe that the Earth revolves round the Sun. I cannot imagine what it would feel like if this belief had a phenomenal dimension. Would it be pleasant? Would it have a colour? The idea is ridiculous. But when I contemplate this belief I know that it *belongs to me* just as much as the pleasant taste of honey or the sensation of redness when I look at a poppy. His mistake is, once again, his insistence on separating sapience from sentience. If, as I maintain, you cannot have one without the other, then there is no essential difference between the state of believing that the Earth orbits the Sun and the state of perceiving a red poppy. 'I' am central to both processes.

Chapter 15

Humphrey discusses two special cases where sapience and sentience seem to be disconnected. The first is propioception (our sense of where our limbs are). Humphrey says that 'what's notable about position sense … is that you don't have any accompanying sensation. I don't find this surprising and I certainly don't think it is a case of sapience without sentience. Our sense of touch is similar. Can you currently feel what is touching your back? No, you can't. There is no sensation of being touched by your shirt because the brain has learned to discount any signals from the sensors in your back because they are normal and ever present. Basically, our sense of touch is only activated when something *changes*. In the same way, our sense of the position of our limbs is only activated when we *move* the limb. It is quite common to be in a position (e.g. when waking up) to be unaware of the precise position of your arm and you have to consciously move the arm to find out where it is. As soon as the arm is in motion I have a sensation of knowing where it is quite as strong as the sensation I have when perceiving a red poppy. The difference between vision and proprioception is the difference between a ship using GPS to locate its position and one that uses dead reckoning.

The second example is orgasm which, Humphrey claims, is all sentience and no sapience. I fail to see the relevance of this observation and, indeed, if it were true it would count against Humphrey's assumption that sapience is somehow more fundamental than sentience.

Chapter 16

What are the criteria by which we should judge whether a given creature is sapient or sentient and how reliable are our conclusions?

Humphrey lists two necessary conditions for sentience: a) a sufficiently complex brain and b) the kind of lifestyle in which sentience would be an advantage.

I agree wholeheartedly.

The trouble is, firstly we have no idea how complex a brain must be to support sentience and secondly it is almost impossible to say whether or not a given lifestyle *requires* sentience or whether the lifestyle came about *because of* sentience.

It is my belief that there is something going on in the conscious brain which we fundamentally do not understand. It is therefore not just a question of whether the brain is sufficiently complex, it more a question of whether or not it is organised in the right way and/or whether the right processes are going on inside it. Until we know what this process is, we cannot use this criterion to rule out any creatures with a nervous system. (We can probably safely use it to rule out plants and bacteria though.)

With regard to lifestyle it is my belief (stated earlier) that the most important ability which sentience confers on a living creature is the ability to recognise other creatures as individuals and to behave accordingly – what I call *empathy*. If we adopt this criterion as being essential to the lifestyle of a sentient being then we must conclude that insects, molluscs, amphibians, crustaceans, fish and cephalopods are most probably all insentient. Pushed to its limit we might also conclude that such solitary species as robins and dormice are insentient. But these examples also point out the dangers

of pushing the criterion too far. Robins may be solitary creatures but they may have inherited sentience from a less solitary ancestor; cephalopds may have developed sentience for some other reason altogether. At the end of the day, we can probably only rule out insects and molluscs – but even here, there are many who would object to the exclusion of bees from the list of sentient creatures.

Chapter 17

Humphrey begins this chapter with the default assumption that 'the vast majority of animals are insentient'. He then tries to mitigate the shocking nature of this assertion by introducing a third category of creatures – the *sub-sentients*. These are creatures which have 'discovered how to monitor this response [to a stimulus] so as to arrive at a mental representation of what the stimulus means to them.' I interpret this to mean those creatures which are sapient but not sentient. Humphrey list honeybees, octopuses, goldfish and frogs as examples of sub-sentients. (In chapter 23 Humphrey mentions the driverless car. It would appear the the latter is an excellent example of a sub-sentient being.)

I am afraid that I cannot accept that there are any sub-sentient animals. As I have said above, I do not see why evolution should create an animal which has a sense of self (i.e. one which is cognitively conscious) without also being sentient (i.e. phenomenally conscious). It seems to me that honeybees, goldfish, octopuses and frogs are either sentient or they are not; and that much more sophisticated arguments and observations must be employed in order to determine the truth in each individual case.

Chapter 18

Humphrey argues that it is only (some) mammals and (some) birds which are sentient. As it happens, I agree with him – but I think his arguments are not as strong as they could be.

His first point is that warm-bloodedness is probably a prerequisite for sentience. I am inclined to agree – but if this is true, then out go honeybees, octopuses, goldfish and frogs. So if you are convinced that bees and octopuses are sentient, then you must reject this idea. In fact there is no a priori reason why a cold-blooded animal should not be conscious. It would, presumably, just think more slowly.

Chapter 19

Humphrey turns to behavioural evidence. First he considers pain. A sentient being such as a human shows a typical reaction to a painful stimulus. If our target creature shows similar reactions, so the argument goes, it must be sentient.

Humphrey rightly points out the gaping holes in this argument. Firstly, it may be that the typical reaction to pain exhibited by humans has nothing to do with sentience but is primarily a reflex action and the sentience only comes later. Alternatively, even if the behaviour of a human is determined by his conscious brain, it does not follow that the behaviour of an insentient creature will be any different.

Obviously the question of which creatures feel pain[1] has huge implications for decisions about

1 Actually the question of why we *feel* pain is an interesting one. It is obvious that pain has an important role to play in our lives – witness those unfortunate people with defective nociceptors (pain sensors) who do themselves great injuries. Insentient animals, on the other hand, get along perfectly well without pain – so why does pain have to *hurt*?
I believe that the answer to this conundrum lies in the fact that sentient beings possess the ability to *choose how to respond* to potentially dangerous stimuli. An insentient being reacts to dangerous stimuli instinctively by means of a pre-programmed reflex action. Sentient being have learned to suppress their pre-programmed responses in favour of a reasoned i.e. cognitive response so that, when you put your hand on a surprisingly hot plate, you don't necessarily

animal welfare which is why it is so important to find a scientifically reliable and universally accepted test for sentience. I feel that Humphrey has omitted a really important observation here – namely the fact that sentient beings (i.e. us) do not feel pain when we are asleep, drugged or knocked unconscious. If we knew exactly what the difference was between a conscious brain and one that was asleep, drugged or otherwise unconscious, then we might have a pretty foolproof test to determine whether a creature was sentient or not. In fact EEG records do show discernable differences between deep sleep and REM sleep (when the brain appears to be behaving in its conscious mode) and it is for this reason that I believe that any creature which exhibits REM sleep must be sentient when awake. Only mammals and birds exhibit REM sleep. In fact, I would go further and claim that creatures which do not exhibit REM sleep are very likely insentient. It is largely for this reason that I am loth to ascribe consciousness to cephalopods. Recent research, however, has uncovered what may be an equivalent of REM sleep in cuttlefish so I remain open-minded on this.

Chapter 20

The next test which Humphrey puts forward is the existence in some creatures of 'qualiaphilia' – the seeking out of sensations apparently just for the pleasure it brings. As examples, he lists infant play, adult play, aesthetic appreciation, masturbation. Once again, the only animals which play or seek out sensual experiences for pleasure are confined to mammals and birds.

Chapter 22

Humphrey argues from an evolutionary perspective that birds and mammals are the only sentient creatures and that there may be many birds and mammals that are not sentient. On the whole, I agree.

He also expresses the somewhat unfashionable opinion that octopuses are not sentient. Although the jury is still out on this one, I tend to agree. The more we know and come to know about the potential capabilities and behaviour of insentient robots the less we shall need to rely on sentience or even sapience to explain the apparently 'intelligent' behaviour of creatures like cephalopods and bees. (However, see my note on cuttlefish above.)

Chapter 23

Humphrey expresses the view that it may be not be impossible to build a sentient robot out of inorganic materials. He also suggests reasons why mankind might want to build such a robot in the future. I agree with the former statement but I do not think it would be wise to try.

Summary

It will be apparent that I broadly agree with Humphrey's conclusion that sentience is restricted to some mammals and some birds but I do not think that he has mentioned all the evidence which supports this hypothesis. In my own book *In Search of Reality* I list four behavioural traits which, I believe, only conscious animals can display. Briefly they are:

imagination – the ability to generate new ideas or new ways of doing things

empathy – the ability to recognise other creatures of the same species as individuals

intention – the ability to plan ahead and foresee the consequences of their actions

emotion – the ability to love and hate, to feel jealousy and compassion, to laugh and cry, to feel fear

have to withdraw your hand instantly, you have time to consider whether the plate is sufficiently cool to allow you to carry it to the table before you damage your hand. In order to assess the degree of danger accurately, you need the sensation of pain.

and awe etc.

To this list I must now add another which Humphrey has pointed out:

enjoyment – the doing of actions for the sake of the action itself (what Humphrey calls qualiaphilia)

I could, perhaps, add a sixth member to the list, **experience**. It is my view that consciousness is intimately connected with an animals ability to retain long term memories. That is not to say that non-sentient animals cannot have long term memories, only that to be truly conscious, you must have a bank of remembered experience to provide a context for your current conscious experiences. In other words, animals without long-term memories cannot be conscious.

Humphrey rightly emphasises the importance of empathy. It is largely because of a sentient creatures ability to recognise other members of its own species as individuals like itself which enables social animals like elephants and primates to live in family groups, hunting animals like whales and wolves to cooperate in the hunt and animals which pair for life like many birds to recognise and bond with their partners after long periods of separation.

But Humphrey completely fails to mention imagination and only mentions intention in passing. It is my belief that consciousness is intimately related to the idea of *free will*. I do not believe that a robot constructed out of the current generation of silicon chips could ever exhibit free will. You can program a driverless car to take you to the station or even to take you to a restaurant which the car chooses at random – but you will not expect the driverless car of the future to suddenly decide of its own accord that it does not want to go to either a restaurant or the station but to the beach instead.

On the other hand, I fervently believe that I am capable of doing just that if I want to. And herein lies the difference between sentience and mere sentition (the ability to respond appropriately to sensory inputs). I believe that only sentient beings can exhibit free will and if we knew exactly what makes certain brains sentient we would understand both the nature and possibly the limits of free will as well.

Now it may well be that, owing to the highly controversial nature of the claims I have just made, Humphrey has deliberately omitted to discuss intention and free will. I think this is a mistake. Humphrey is a dog lover and every dog lover knows that, when the pet places a ball at his masters feet, his intentions are crystal clear. Any creature which shows *evidence of intent* must therefore be conscious. However, in order to use this principle to determine which creatures are conscious, we must proceed with some caution. When a spider starts building a web, is it displaying its *intention* to catch flies? I don't think so. It is pre-programmed to build webs. When a bee follows instructions from a fellow bee to find food, does it *intend* to find food? I doubt it. Notwithstanding this, I believe that evidence of intent is a powerful way to identify consciousness.

Imagination is another feature of conscious creatures which is a lot less controversial. A pod of whales which have invented a new way of washing seals off an ice floe is clear evidence of imagination and forethought and, in my view, is pretty conclusive proof that whales are conscious. When a crow uses its intelligence to fashion a new tool for digging grubs out of a hole (i.e. one that it has not seen other crows using) it is doing something that I cannot see a pre-programmed automaton ever doing.

The fourth member of my list, emotion, is a difficult one. I define emotion as a *physical* reaction to a *mental* event which apparently has little or no obvious benefit to the individual. When a woman bursts into tears on finding a jewel which she thought she had lost, she is displaying a purely emotional response. When I have that gut-wrenching feel of disappointment when England looses a penalty shoot-out, I am being emotional. The apparent emotion which two penguins display after a long absence may not be emotion at all – it may simply be empathy; the event itself (the meeting of the two individuals) is not just a mental event, it is also a physical one. The apparent hatred which causes a stag to drive off potential rivals is not an emotional response because it has obvious

evolutionary consequences. Even the chimpanzee who goes into a tantrum when denied something he wanted may not be displaying his anger – it may simply be a way of getting what he wants after all.

Defined in this way, emotion may be confined to humans and, perhaps, to very few other species, if any. In fact I suspect that these emotions have arrived relatively late in our evolutionary history and are a kind of by-product of our recently acquired ability to cope with highly abstract ideas through the medium of language and, perhaps, art. Even that most archetypical emotion – love – (when it is divorced from that more basic instinct, desire) is an abstraction. We do not so much love a person as the *concept* of that person. And when I say that I love the music of Brahms, it is obvious that I am in love with a concept, not a thing.

Dogs are said to love their owners – but since they obviously benefit from the relation, it may not be love which drives them, merely expediency. Elephants appear to show signs of emotion when they return to the scene of a traumatic event. But examples are rare. Humans appear to be the only creatures which cry in response to mental events. Is it possible that humans are the only creatures which truly have emotions? Some animals appear to enjoy music but it is only humans which a moved to tears by music. Is it emotions which set humans apart even from chimpanzees?

Humphrey has mentioned two criteria which, he claims, can rule out certain classes of animals as sentient namely the lack of complexity of their brains and their simple lifestyle. I would like to add a third criterion: animals without long-term memories cannot be conscious.

Humphrey came to his conclusion that mammals and birds are the only creatures which are conscious largely through considering how consciousness could be of evolutionary benefit to those animals. He also considered the evidence from enjoyment which I had missed. If you couple those arguments with the observations that only mammals and birds show imagination, and intention and exhibit REM sleep I think his arguments would have carried a lot more weight and his conclusion greatly strengthened.

In my book *In Search of Reality* I listed seven questions which must be answered by anyone who proposes a theory of consciousness. Lets see how Humphrey (NH) fares. My own views are indicated with JOL

A) *Are there degrees of consciousness?*

NH: Yes definitely. A sighted person is more conscious than a blind one; a sentient being is more conscious than one which is only sapient.

JOL: Yes, but for entirely different reasons. Blind people compensate for their inability to see by sharpening their other senses; all sapient creatures are sentient. On the other hand, being conscious is not the whole story. A new born baby is conscious in a technical sense but since its past experiences are so limited it cannot be said to be conscious *of* very much. Consciousness is not an all or nothing thing, it is intimately related to our long term memories. Regrettably I would say that humans with advanced Alzheimers or anencephalic children are less conscious than normal adults.

B) *What creatures, if any, other than human beings possess consciousness?*

NH: Most mammals, many birds

JOL: ditto

C) A*t what stage in its development does a human child become conscious?*

NH: Not discussed

JOL: Technically at about 30 weeks gestation (when the foetus begins to exhibit sleep patterns) but true consciousness only develops with the acquisition of experiences.

D) W*hat are the evolutionary benefits of consciousness?*

NH: Ability to exist in social groups; empathy; ability to learn through play

JOL: All those plus the ability to use imagination to create new opportunities and to solve problems and to use free will to plan for the future.

E) *Will it ever be possible to obtain a proper scientific explanation of consciousness?*

NH: I don't see why not

JOL: I very much doubt it

F) *Would such an explanation shed any light on the age-old problem of free will?*

NH: Not discussed

JOL: Yes, definitely

G) *Will it ever be possible to construct a machine which is conscious?*

NH: I believe so, and, in fact, I believe that it is inevitable

JOL: Quite possibly but I think there are good reasons why we should not even try

J Oliver Linton

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