



Thought and Experience *Consciousness Explained*

Keith Frankish

In May 2004 I interviewed Daniel Dennett, who is Professor of Philosophy at Tufts University in Massachusetts and one of the most prolific and distinguished contemporary philosophers. Professor Dennett has written on various aspects of the mind with a particular focus on the issues on intentionality and consciousness. His work on consciousness, in particular his 1991 book, *Consciousness Explained*, aims to demystify the phenomena and show that it can be scientifically explained. In our talk I began by asking him why he thinks that consciousness needs to be demystified.

Professor Daniel Dennett

Well consciousness is of course a wonderful thing, but there's a tremendous wave of emotion and motivation for people to make it even more wonderful than it is. It seems to be the last surviving mystery, science has breached all the other walls and it's the one thing we haven't explained yet that's really really puzzling, and so people sometimes make it out as more wonderful more supercalifragilisticexpialidocious than it actually is. After all some of the views of consciousness make it out that it's the fundamental division in the universe. There's the things that are conscious and the things that aren't, and there's no more fundamental divide than that. Now I suppose they might be right but the case is not very compelling and so one of things one has to do before setting out to give a good scientific theory of consciousness is to nibble it down a little bit to chop it down to size because of this tendency that people have to exaggerate the mystery of it all. In this regard I think it's a little bit like stage magic. Magicians are often astounded at what people say, sincerely they saw when the magician performed a trick because there's this natural tendency for people to exaggerate in their own memories what marvels they've seen. So it's a sort of therapeutic measure. The first thing you have to do, you just make sure you know what the phenomena actually are, and it turns out that the phenomena are not quite as magical and wonderful as people initially suppose.

Keith Frankish

Do you think Philosophers have a special role to play here? Can't we just leave the scientists to sort this out?

Daniel Dennett

Well I think the first thing you have to realise is that as we're scientists we're lay people too. That is they can be just as philosophically confused as any non scientist and you can't do science without having some philosophical presuppositions. And if you are lucky then you're philosophical presuppositions will be largely innocent, won't get you into trouble. But very often scientists share some of the dubious assumptions of non scientists about consciousness, and here's a place where philosophers can really help. But in order to do this I think they really have to understand the science and where the scientist is coming from quite well. I think that traditional philosophy of mind, real armchair, operational philosophy of mind has actually very little to offer to the scientists but an informed, empirically informed, scientifically informed, philosophy of mine is a worthy partner of that enterprise.

Keith Frankish

You're suggesting that philosophers can help to remove obstacles to the scientific explanation of consciousness. But some philosophers think that science, at least as we know it will never explain consciousness. They think that nothing science may tell us about processes in our brains will ever explain the way our experiences feel from the inside. This is the hard problem that David Chalmers talks about. How do you respond to this attitude?

Daniel Dennett

I think this is a classic case of a very common philosophical foible and that is mistaking a failure of imagination for an insight into necessity. I think the science can tell us about the feel of experiences, can satisfy all of our substantive curiosity about what it's like to be us and the feel of our experiences. The reason that people have supposed that science can't do it is that, that they hadn't thought hard enough about what science can actually show us, and hardly a day goes by when we don't make some sort of progress on that in the sciences today. And so the leftover residue that science can't explain about our feelings is shrinking by the day and the philosophers who are sure that this residue is somehow insuperable I think are beginning to find themselves out on the end of a very long branch with no way of getting back to the ground.

Keith Frankish

Well these philosophers do have arguments for their view. The best known of these are the knowledge argument, which involves Mary in her black and white room and the conceivability argument, which appeals to the possibility of zombies. I know you think that these are poor arguments, could you explain why you think so.

Daniel Dennett

Okay, let's take Mary in her black and white room first. This is an astonishingly successful thought experiment in some regards, it's what I call an intuition pump, it's not really a formal argument it's just a little story that pumps an intuition. After you've heard the story you're all supposed to go, oh yes I see, she couldn't possibly know what red would look like in advance of that first experience of red. And I've argued that it's a defective intuition pump that there's simply no reason to go along with the gag, and suppose that Mary, knowing everything she knows would be the least bit surprised by her first experience of a colour of for that matter that she should be in any doubt at all about what colours are going to be like when she first experiences them. I've discovered that my case for this in consciousness explained was not explicit enough. People just couldn't believe that I was actually saying what I was saying, that Mary knowing everything physical about colour would be quite capable of on first seeing a coloured object of saying what colour it was. This is assumed by Frank Jackson in the original knowledge argument, he says it just seems obvious that she would learn something. And I said well that's interesting, it seems obvious to Jackson it seems obvious to many people, but in fact that doesn't count for anything at all.

I tried to sharpen that point in a new paper called *What Robo Mary Knows*, which is forthcoming, and in that paper I help people imagine how it could be that Mary would have figured out, in advance, just what colours were going to look so that she's not surprised in the slightest when she sees her first coloured object. In *Consciousness Explained* I used the example of a blue banana, I imagined that the first object that Mary sees is a trick. Her captors on releasing her decide to play a prank on her, and the first thing she sees is a dyed blue banana. And she looks at it and her immediate response is hey, that's a blue banana, why are you trying to trick me. And people say but she couldn't do that, well why not? I say she could and I've given now, in the new paper some reasons showing how exactly she would go about being able to anticipate just what the blue banana was going to look like, so that she could say it was blue. It doesn't depend as some mis readers of my earlier argument thought on my attributing to Mary complete knowledge of the worlds, so that she knew they were trying to trick her, no, I'm supposing that they simply spring this unanticipated trick on her, but it doesn't fool her for a moment because she knows what blue is going to look like to her.

Another thing that's wrong with the Mary argument is that Jackson asks you to imagine that she knows everything, all the physical facts about colour and I submit that nobody knows how to imagine that. It's a little bit like imagining, suppose somebody had all the money in the world, well what on earth does that mean? If you think you could understand what that means you're almost certainly mistaken. And the case of Mary knowing all the facts, the physical facts about colours I think the situation is even more extreme. Unless you suppose that Mary knows it all the argument is simply invalid there's no conclusion at all to be drawn about anti physicalism unless one can help ones self to the premise that Mary knows all, not most, not tremendously many but all the physical facts about colour.

Keith Frankish

Okay, so that's the Mary argument. What about the conceivability argument, the one that appeals to the possibility of zombies?

Daniel Dennett

The arguments for the possibility of zombies seem to me to be similarly broken backed because people don't imagine zombies correctly. Zombies are behavioural duplicates by definition of human beings, and that means that among other things they don't believe there are zombies they believe they're conscious and they respond to everything, including all their internal responses, just exactly the way conscious people do. Where conscious people by this presumed definition have a stream of consciousness, zombies have a stream of unconsciousness. This is very hard to imagine, and so in fact people don't imagine it, they don't imagine the case correctly and so whatever intuitions they have about zombies and the possibility of zombies are simply negligible once you look closely at the details. Imagine somebody saying that we really hadn't made any progress on understanding what life is because they can imagine something which has DNA and has a metabolism and is capable of self repair and growth and reproduction and so forth but isn't alive.

Well what do you mean you can imagine that? Well I just imagined this thing and it was running around and eating and reproducing and so forth, but you know I just imagined that it wasn't alive and I found I could do that. Well I find it hard to believe that anybody would take that argument seriously and I think the argument for the imaginability of zombies is approximately as forlorn.

Keith Frankish

So why then do so many people feel convinced that they can clearly imagine zombies?

Daniel Dennett

I think that the mistake people are making is actually a sort of simple failure of subtraction. They're fooling themselves with a sort of con game where they imagine taking all the things they know people can do and imagining they think all of them being present in something which nevertheless isn't conscious and what they're actually doing is imagining something slightly different. They're imagining most of those features being present and there being something missing, which they think they don't have to say, well what is this something and how do you know you didn't simply contradict yourself in supposing that this was missing, when in fact you've already provided for in your list of things that the zombie is actually capable of. I don't think anybody knows how to keep score in this exercise in the imagination. And I think people simply like the idea that this is an intuition that they should trust to the hilt and that it provides a handy bulwark against encroaching science. I have a name for this intuition I call it the zombic hunch. If you think you can imagine a perfect zombie, a philosophical zombie and see in your imagination that it differs from a conscious being then you're not just having the zombic hunch, but you're crediting it. Now I can feel the zombic hunch just as well as anybody, I can experience it, I just don't credit it, I dismiss it. In the same way I can feel that the sun goes around the earth but I've learnt just to dismiss that. For various reasons philosophers, many of them want not just to feel the zombic hunch, we can all feel it, but they want to credit it, and that I think is simply a mistake.

Keith Frankish

Why do you think they want to credit it?

Daniel Dennett

Now we're getting into psychotherapy maybe, why do people want to credit the zombic hunch because it defies heartless mechanistic, mindless science, it defies reductionism and that makes them feel Hollister and thou.

I'm sure that's not true of all of them, but certainly it's true of many that this is a popular idea. Ah ha you nasty scientific encroachers on human privacy and human subjectivity, I've got a way of keeping you all at bay and it's the zombic hunch and I feel it in my bones and I trust it

and so the arguments aren't any good but nevertheless you can't make me abandon this intuition. Well if that's the way they feel then I agree I can't make them abandon the intuition I can simply say, well maybe you'll outgrow it.

Keith Frankish

There's another idea which you think is an obstacle to understanding consciousness, and which you have attacked, both in your book, *Consciousness Explained*, and elsewhere. This is belief in what you call the Cartesian Theatre. Could you say something about this belief and why you think it should be rejected?

Daniel Dennett

The obvious view of the mind is that it's not the brain that something that is some how in communication with the brain this is Descartes famous dualism, interactionistic dualism. And ever since Descartes put it forward it has both seemed extremely attractive and extremely problematic. Descartes himself recognised that the interaction he was positing between the mechanistic material and the non mechanistic immaterial mind was a major anomaly that he couldn't himself explain. And in the 20th Century, certainly in the second half of the 20th Century the consensus was pretty well established that interactionistic dualism is a non starter, we're going to be materialists we're going to be monists about the mind. And then people threw away only half of Descartes tempting idea, they threw away the dualistic part, the interactionistic part, but they continued to suppose that you could take the events that happen in a human being and divide them into those that happen in the special place where consciousness happens and everything else. There's nothing more natural than thinking of consciousness as a privileged place of some sort, now in the brain rather than in the Cartesian raceogitants and supposing that only some of the things that are going on in a persons body make it into that charmed circle. Well crossing the line into that charmed circle is the most natural way of thinking about consciousness that we've encountered, but it's just wrong this is a very tempting mistake.

There is no second transduction, that is, think of it this way, let's consider vision, most people concentrate on vision we could use audition as well. Light enters our eye and that's in the medium of electro magnetic radiation, or photons if you like, and these strike the retina and we have a transduction of event, that is light is turned into nerve impulses which are physically very different sorts of things. They're not coloured, they're not electro magnetic radiation at all, they're pulses along axons. So now we have information in this neuronal code. There's a tremendous temptation to say, and then at some point that has to be translated again into some other medium and that's the medium of consciousness so it has to be another transformation or transduction across a boundary and that's when you become conscious of things in your visual world. And after all we know now that there's a lot of information that enters our eyes and that is in that sense visual and which even guides our behaviour but which we're not conscious of. And so the most natural way of thinking is of all of the information that's coming in visually being subjected to a sort of partition where some of it crosses a second boundary into consciousness and some of it doesn't.

Well inside that boundary that's what I call the Cartesian theatre, and I say this is simply a mistake, this cannot be right. There isn't any Cartesian theatre with a little homunculus sitting in there enjoying the show. It might have been true, but we know it isn't true.

Now there's two points here, one of them is conceptual point and one of them is an empirical point. The conceptual point is, if there were a Cartesian theatre with a little homunculus in there enjoying the show then we wouldn't yet have a theory of consciousness because we would have to explain how the homunculus managed to be conscious of all these things. That would set off what threatened to be infinite regress.

Now that doesn't say there isn't a homunculus, it simply says that at some point we have to discharge that homunculus and get all that work done by something which isn't itself conscious.

Now the empirical point is that when we look in the brain we find there isn't any homunculus in there. But we can readily imagine it, in fact the movie Men in Black has a wonderful scene which I love to show to my students, in which Will Smith opens the face of this apparent

corpse in the morgue and the face just opens like the bonnet of a car and inside there is a little Cartesian theatre with a little green man sitting there at the controls looking at the screens listening to the loud speakers and a sort of puppeteer in charge of this human size body. Now that's the Cartesian theatre. It doesn't in fact exist. All the work that was going to be done by that homunculus has to be distributed around to various agencies in the brain and they themselves aren't conscious, they themselves are not agents with the full compliment of human agency. Until you understand that a theory will be bankrupt as a theory of consciousness unless it performs this charging, this breaking down, deconstruction of the elements of consciousness and the parts that aren't conscious, until you understand that you

Keith Frankish

So there's no Cartesian theatre, no headquarters in the brain where sensory information is pulled for conscious awareness, and in your book *Consciousness Explained*, you talk instead of there being multiple drafts of sensory experience, different versions circulating at the same time, like different drafts of an essay. How then should we think about consciousness? What makes the difference between information that is conscious and information that isn't?

Daniel Dennett

In *Consciousness Explained* I wanted to destroy the idea of Cartesian material and the idea of the Cartesian theatre and what was I going to replace it with?

Well at the time I used the metaphor of the multiple drafts model which had its virtues but it was also not a very vivid or self explanatory alternative and for a number of years thereafter I was casting about for a better, just a more vivid more appealing alternative vision. And then one day it hit me when I reflected on Andy Warhol's famous remark about how in the future everybody is going to be famous for fifteen minutes, and I thought this is right, fame, fame in the brain. Some events that happen in the brain become famous and some don't and fame is not being witnessed in a special medium, it is a competitive and distributed phenomenon.

Being famous is not like being on television, some people are on television without being famous and some people are famous without being on television, and consciousness is more like fame than television. It's a phenomenon in which various contentful events in the nervous system, in effect compete for influence and those that win have influence, and they don't then get some extra glow, a further property, they just are influential. They lay down effects in memory they buy us what is next considered, they set in motion various chains of events, that's what consciousness is. The stream of consciousness is the succession of differentially influential or famous contents in a particular brain.

Keith Frankish

Perhaps we should bring in here another theme of *Consciousness Explained*. You suggest that a stream of consciousness of the kind we humans possess is the product of culture rather than biology. It depends on an artificial system the Joycian machine as you call it. Could you summarise this idea for us?

Daniel Dennett

James Joyce in his novel *Ulysses* gives us some wonderful examples of stream of consciousness and this is a lovely metaphorical rendition of what it's like to be conscious, in which things happen, flow in a sort of serial order, we're only conscious of one thing at a time roughly speaking and there's things that are going on around us that we only gradually become conscious of and one thing reminds us of another thing and so forth.

So it's this stream of consciousness that Joyce famously illustrated that inspires me to call the architecture in the brain that is responsible for it the Joycian machine. Now the question is what kind of an architecture, what kind of a connectivity what kind of computational architecture in the brain gives rise to this stream of consciousness and where did it come from and here I maintain, very surprisingly to most people, that that architecture is not just a normal part of mammalian development, it is an architecture that is unique to the human brain and moreover it's unique to the human enculturated brain, that is you have to grow into it, in the

same way you have to learn a language. There is a good innate head start for a language, but you have to be exposed to language in order to become a language user and you have to be exposed to human culture, I claim, in order to become conscious in the sense that James Joyce makes famous, in the sense of having a stream of consciousness of the sort that we all celebrate.

So my claim is that human consciousness does not depend on an organ of the brain but of a particular anatomically salient part of the brain which would be like a Cartesian theatre, as if there was one place in the brain, this is your consciousness organ.

Now the way we become conscious is by having our brains entrained, adjusted by social interactions early in our lives to the point where this creates a whole system of micro habits of thought, ways of stimulating ourselves, ways of reflecting on things and that this puts together an elaborate layer of habit on top of the basic machinery and this is very much like software. It's as if culture installs in us a different kind of operating system, not the operating system we were born with but a more specialised operating system that we don't share with other creatures and that's the system that enables us to have a stream of consciousness.

Keith Frankish

So in your view the conscious mind as we know it is to a large extent a product of human culture. Does it follow then that animals are not conscious?

Daniel Dennett

It does follow that animals are not conscious the way we are and that the difference is large. Animals are of course awake they can feel pain and they can experience pleasure but they can't I think, and it's an implication of my view, they can't dwell on things the way we can. They can't shift their attention the way we can, they can't reflect on things the way we can. That sort of recursive, reflective mulling over and letting one thing remind you of something else and so forth and being able to control that to some degree. That's what animals I think can't do, not chimpanzees, not dolphins not dogs and their consciousness is so disunified, so fragmented, so impoverished compared to ours, that to call them conscious is almost certainly to mis imagine their circumstances.

Keith Frankish

Are you saying that it's not like anything to be an animal?

Daniel Dennett

I like to ask people, what is it like to be a brace of oxen a pair of oxen. And they say well it's not like anything of course, I mean it's like something to be one ox, it's like something to be the other ox on the left and the one on the right but it's not like anything to be a brace of oxen because they aren't unified in the right way. Well but you'd be amazed to the extent of which many animals are like a brace of oxen. How much disunity is possible in a mammalian nervous system. It's this further unification which is the fruits of the Joycian machine that gets installed on us. What is it like to be an ant colony, well it's not like anything to be an ant colony even if it's like something to be an individual ant, so people think. Well, stop and think. A brain is composed of billions of neurons, each one of those is a lot stupider than an ant. They happen to be enclosed in a skull and they inter communications are rich but of the same sort that is possible between one ant and another. Now if we open up somebody's head and we found inside, not neurons but millions of little ants, maybe we would say, oh gosh, maybe it's not like anything to be this person. Well an ant colony can exhibit a lot of the same unified behaviour a lot of the same protracted projects common caused that an organism inside a skin can exhibit.

Now if you think it's pretty obvious that an ant colony is not something that is itself conscious so that you say, well this any colony is thinking about something, about the weather right now. If you're quite sure that an ant colony isn't conscious then you should be at least willing to entertain the hypothesis that a bird is just as unconscious as an ant colony is. Now I'm deliberately setting the bar high, forcing the burden of proof onto those who say, it's just obvious that say other mammals at least are conscious the way we are. I say no it's not obvious, prove it. And the more we learn about specific organisms, that's why you have to do

the science, the more we find out that a lot of things that are obvious to philosophers in the armchair are just false.

What is it like to be a rabbit? Well you may think that it's obvious that rabbits have an inner life that's something like ours. Well it turns out that if you put a patch over a rabbit's left eye and train it in a particular circumstance to be say afraid of something, and then you move the patch to the right eye, so that the very same signal, the very same circumstances that it has been trained to be afraid of, now is coming in the other eye, you have a naive rabbit, because in the rabbit brain the connections that are standard in our brains just aren't there, there isn't that unification.

What is it like to be which rabbit, the rabbit on the left or the rabbit on the right. The disunity in a rabbit's brain is stunning when you think about it, and you just haven't tested many species to see just how disunified they can be. The answer is they can be quite disunified.

Keith Frankish

So far we have said nothing about Qualia. For some people qualia are the very essence of consciousness. Now I know you think that the notion of qualia is not a useful one at all. Why do you take that view?

Daniel Dennett

Yes qualia of course is a technical term that philosophers use, it's a term with no precise meaning, but the general idea of qualia seems to be that these are the features that are enjoyed by the conscious self and if we're getting rid of the conscious self in the Cartesian theatre we have to get rid of the ploys, the objects that the Cartesian self was supposed to concern itself with. Now I've recently thought of another example which brings out I think very clearly what I'm saying the problem is. My fellow Americans are often teased for being very naive about money, we come to Europe and we're told what something costs in pound sterling or in Euros, and we say what's that in real money, meaning dollars. And it's as if we have a sense that pounds sterling, euros, they have exchange value of course, we can turn them into dollars, but dollars have real value, intrinsic value. The intrinsic value of the dollar this naive American might say, there's a property that defies analysis by economists but my golly we can feel it. Can't you feel the real value of the dollar, we call this intrinsic property that dollars have and pound sterling don't, by this Americans life call that the vim, of the dollar, every dollar has it's vim. Well now vim cannot be explained by economics, because vim is an intrinsic property not a relational, functionalistic property. Now it's no problem for economists that they can't explain the vim of a dollar because dollars don't have vim. It just seems to some people that dollars have vim.

What economists have to explain, or psychologists is why people think that dollars have vim and it's exactly the same of qualia. What has to be explained is why people think that there are these extra intrinsic properties and once we've explained why people think there are these properties we've explained everything that needs explaining. The properties themselves, if they did exist, would indeed be a challenge to functionalistic materialistic science, but there's no reason to believe in the properties in the first place.

Keith Frankish

Some would say that in denying the existence of qualia, you are denying the existence of consciousness itself, how do you respond to that is consciousness just an illusion then?

Daniel Dennett

The philosopher Lee Siegel is a Philosopher of Religion at the University of Hawaii, he's also an expert stage magician and an expert of Indian street magic. And in his wonderful book *Net of Magic* he has a passage where he says I'm writing a book about magic and my friends say, real magic, by which they mean pharmaturgical acts, super natural events and so forth. He said no not real magic, stage magic, stage craft, sleight of hand, conquering tricks. And then he goes on to say in other words what they mean by real magic is the kind of magic that isn't real, the kind of magic you can actually do isn't real magic. Well a lot of people feel exactly the same way about consciousness. If you explain consciousness as a bunch of tricks in the

brain then really what you're saying is there's not real consciousness. Well if by definition you think that consciousness is something in effect magical, something that defies science, then I guess I'm saying there isn't any real consciousness there's just if you like stage consciousness which is just a bag of tricks. But of course that's how we explain life, that's how we explain colour, that's how we explain everything problematic by showing that it can be understood in terms of things which are not themselves alive, or not themselves conscious. So the same point could be made with regard to life.

Are you saying that nothing is really alive, it seems that you're explaining how living things are just made up out of lots of tiny cells and each cell is made up of little proteins and so forth, and a protein isn't alive so you're saying really nothing's alive it's just a lot of dead matter. Well that's a mistaken way of perceiving the situation, that's what it is to explain what life is, and that's what it is to explain what consciousness is.

Keith Frankish

Earlier I interviewed David Chalmers and I wondered if I might ask you a question which I asked him. Your views and Chalmers could hardly be more different, he would say I guess that you are just ignoring the hard problem, and you would say I think that that problem is an illusion. That consciousness as Chalmers conceives it simply does not exist. How does such a deep disagreement come about? Could it be resolved by argument or does it come down to a clash of intuitions or methodology perhaps.

Daniel Dennett

Now I wondered that myself many times, I've known David Chalmers since he was a graduate student and I have been confronting him on this issue now for quite a few years, and we've been over the arguments and he acknowledges that there aren't any arguments that could show him that his hunch about this is wrong. And I finally came to realise that he's right, there aren't any arguments, we're beyond argument now, he's got an intuition that I don't share, it's the zombic hunch and it's impervious to argument so I'm not going to waste my time arguing anymore. I think it's time for therapy. So I just propose that maybe he'll out grow this idea and others with him, but if they don't out grow it then the science of consciousness is going to go on without them.

The main point is that we shouldn't pause and try to engineer a revolution in physics or a revolution in science, because some people have an intuition they can't shake, that we should simply wait and see if that intuition will fade of its own or perhaps leave them somehow to dream up an argument which might actually support their intuition but otherwise it's a sort of disability that they have and we should acknowledge it and try to explain why they have that disability and then just work around it.

Keith Frankish

Could I ask you about the future then, how do you see consciousness studies developing. If we were doing this interview in 2020 rather than 2004, what do you think we'd be talking about?

Daniel Dennett

Well I know what I hope will be the case but I doubt if my optimistic dreams will come true. What I hope will be the case is that in 2020 we'll look back on the situation in 2000 and 2004/5 and marvel at how really powerful and obstinate the zombic hunch was for so many people. And we'll look back and see how as more and more and more phenomenology was explained, predicted, manipulated the base of operations got smaller and smaller and smaller for those who held the zombic hunch, still they cling to it. We are now at a point where we can generate new phenomenology that's never been witnessed before. Colour illusions, motion illusions, all sorts of wonderful and bizarre and striking effects that we can generate because we understand well enough how the brain accomplishes these things.

People working in vision have developed some wonderful illusions, for instance motion capture is one of my favourites in experiments done by Rama Chandren and others, we see a yellow blob on a grey background and a bunch of black dots moving together move across

this yellow blob. And as they move they seem to drag the blob with them, this is called motion capture. It all depends on whether the yellow and the grey, which forms the background, are isoluminant, that is if they have the same luminance values, which is distinct from the chromatic values of the colour. And you can test this by simply changing the luminance of either the grey or the yellow and the effect completely goes away instantly, it's a very powerful effect just about everybody sees it. Now this was a phenomenon that had never been seen before, it was generated because the people who did the experiments knew how colour and motion and location were represented in the visual cortex and they were able to see that this interaction should occur.

Well that was already ten years ago. Hardly a day goes by but other stunning new kinds of illusions are generated by this research, so the idea that we couldn't know what it's like for somebody else to see what they see or smell what they smell or hear what they hear, is beginning to ring a little hollow. We now know for instance that a very large percentage of our genome is involved in olfactory receptors in your nose, and it's now known that there's a lot of human variation, that really no two people have the same collection of nasal receptor cells and how they feed into the olfactory system is being understood. It's now getting to the point where we can predict on the basis of knowing some body's genome whether they'll like the smell of broccoli whether they will be able to distinguish between two different wines and so forth. And in the face of this growing capacity to predict, in detail how people are going to be affected by various remarkable stimuli, how in the face of this, how people can go on saying well, you'll never explain the feelings that we have, our subjected feeling, to be it's just a marvel that people are still so confident that there's an impregnable fortress there, or an irreducible residue of mystery. But maybe it will evaporate much more quickly than that and we'll look back in 2020 and marvel that it was still so strong in 2004.

Keith Frankish

Well Professor Dennett thank you for your time today and for your detailed and illuminating answers to my questions.

Daniel Dennett

Well they were very good questions and I enjoyed answering them, thanks a lot.