

The mystery of consciousness

by Paul Broks

Nicholas Humphrey's latest book on the mystery of consciousness travelled with me to Crete, Latvia and America. And the intellectual journey it took me on has half-persuaded me that his evolutionary approach will one day provide an answer

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One day I'll be dead. The thought swirled by on a summer's evening in Crete. There was cold beer at my elbow and my sandalled feet were up against the trunk of a pine. A book lay open in my hands but I wasn't reading. I was noticing colours: the bark running blue-grey to rust, the red geranium. I was noticing insects and animals: the tiny green bug on my forearm, the microscopic orange thing that dropped on to the book, no bigger than a full stop, the ginger cat stretching in the shade. The air was filled with the din of cicadas and Mediterranean scents. I sipped my beer and savoured the moment.

The open book was Nicholas Humphrey's *Seeing Red: A Study in Consciousness*. I'd stopped reading by the second page, derailed by Joe King's email. Joe is 20 years old and severely disabled. He is writing to tell Humphrey of his concern that, when he dies, "this crippled body might be all I have." Yes, Joe, I'm afraid so. "Do u believe consciousness can survive the death of the brain?" he writes. No, Joe, it can't. Why kid ourselves? These were my answers, not Humphrey's. I turned them over as the sun sank. I could imagine Joe's disappointment. Humphrey would give us his reply in due course, but, for now, he was focusing on the young man's question because it revealed something important about the nature of consciousness, which is that consciousness matters to us. It matters more than anything. Of course it does. Yet the fact of its mattering so much goes mostly unremarked by scientists and philosophers of mind.

The purpose of *Seeing Red* was to frame an explanation of "just what the matter is." The book is based on lectures delivered at Harvard in the spring of 2004. At the start of the first lecture, Humphrey put up a screen of plain red light and informed the audience that he would be spending the next three hours discussing what was going on in their minds as they looked at the screen. Reading the book is supposed to be the next best thing to attending the lectures, an effect aided by the book's conversational delivery and diagrams of a spiky-haired cartoon chap looking at a red rectangle, head abuzz with thought bubbles.

The colour red has become something of a philosophical cliché, the redness of red being chosen more frequently than any other sensory item to represent "qualia"--the "what it's like" currency of subjective experience. Perhaps this is because red works to sharpen consciousness. The psychological and physiological effects of the colour are well understood. Humphrey

describes some of his own work in the field. He discovered that bathing monkeys in red light makes them anxious and fidgety, whereas blue has a calming effect. Red is heavy, strong, active and hot. Painters know its propensity to loom from the canvas. Cinematographers say it is troublesome. It quickens the pulse, raises the blood pressure. I associate red with enchantment. As a boy I watched my father developing photographs. I would stand and he would stoop in the makeshift darkroom under the stairs. I slid papers into the developing tray and was transfixed by the images appearing from nowhere. I had some notion of the physics and chemistry of the process, and the technology, but it felt like conjuring spirits. It was a fusion of magic and science, and a ritual that could be performed only in red light.

One day I'll be dead. It's an oddly exhilarating thought. Something unimaginable--nothingness--awaits us all. I have a hunch that getting an imaginative purchase on mental nothingness would help us also grasp the "somethingness" of sentience. What else was conscious in that summer's evening scene? The tree? No. The bugs? I doubt it. The cat? Who knows? I had an intuition that it felt like something to be the cat, that the animal had some awareness of the cacophony of the cicadas' mating calls, an awareness to which I would ascribe the sensory quality sound. As it stretched and rolled, I imagined it experienced a bodily sensation, which might be labelled pleasure. And I am pretty sure that if I had walked over and stamped on its tail, then it would have experienced pain. But it was just an intuition. An intuition, yes, but one I could surely back up with neurology.

Consciousness is an aspect of brain function, and the cat's brain looks rather like a scaled-down version of mine. That doesn't apply to the insects. A cicada's tiny brain is nothing like a human's. I doubt they can "hear" the racket they make, even though it triggers impulses to act in certain ways. Consciousness must have emerged somewhere on the evolutionary ladder, somewhere between the cicada and the cat, perhaps. But that's a guess. Nor can I be sure of the origins of my own consciousness. I started out as a brainless clump of cells, a fertilised egg, cognitively more primitive than that orange microbeast traversing the page, let alone the cicadas. As an adult, I carry the same genetic material as the egg, but otherwise we have nothing in common. The egg wasn't conscious. Consciousness has happened on the journey from egghood to personhood. But how and why?

Such questions lead us to the great enigma, the so-called "hard problem" of consciousness: how does the objective, physical activity of the brain create the private, subjective qualities of experience? For some philosophers the question is unfathomably deeper than that; not so much how does the brain produce consciousness, but how can it? How can three pounds or so of jellified fats, proteins and sugars possibly be identified with the ineffable "raw feels" of awareness: the taste of beer, the sound of cicadas, the redness of red? This is the explanatory gap. It swallows our intuitions like a black hole. Colin McGinn, a philosopher, thinks it is plain obvious that the brain is "just the wrong kind of thing" to give birth to consciousness: "You might as well assert that numbers emerge from biscuits or ethics from rhubarb." The mystery of consciousness, he says, is beyond human comprehension. Stuart Sutherland, who was a psychologist, couldn't be bothered: "Consciousness is a fascinating but elusive phenomenon; it is impossible to specify what it is, what it does, or why it evolved. Nothing worth reading has been written about it." But Humphrey turns the tables. Consciousness seems mysterious because it has evolved to seem mysterious. Fascination and elusiveness are its primary functions. With an evolutionary perspective, due attention to neuropsychology and a little conceptual re-engineering, the explanatory gap can be closed.

I didn't finish the book in Crete, but took it with me to Latvia. I hardly ever go to academic meetings, but this one appealed. It was to be held at Zvartava Castle, a dilapidated neo-Gothic manor house out near the Estonian border and the entire symposium was devoted to a single, quirky question: I am thinking now: what is "I" at the moment of my thinking? Each of the principal speakers was given a three-hour slot to answer it. We were to talk without notes or teaching aids. Not so much as a plain red screen. Along with the invitation to participate came a set of ten rules, the last of which was: If the speaker is asked

a question, he must answer it however he can, dead or alive. I sat enthroned in an inner circle comprising the other speakers and the chairman, who ceremoniously banged a huge bamboo staff on the floor every now and then to show his authority. There were 30 or so in the outer circle, mostly professional philosophers and postgraduates. This was no academic pillow fight. It was an interrogation, an inquisition. They wanted to know what I really believed. These people were serious, they were bright, and, blimey, they were relentless. There was no respite. Twelve hours a day and into the night, into the vodka and the early hours, into the fitful sleep of an agitated, alcohol-soaked brain, wolves baying in the birch woods: I am thinking now: what is "I" at the moment of my thinking? And in the process, I realised two things: that I didn't exactly know what I believed and that I didn't much care.

On the third day, someone remarked on the "special quality" of my voice. The fact was my lungs were giving up. After the symposium I found myself back in Riga on my hotel bed, wide awake in the early hours, tormented by a death rattle of a cough and yearning for a bit of oblivion. How long had I been in Riga? A day? No, two. Why was my wife not with me? Shouldn't she be here by now? And why was my hair falling out? The first morning I counted 47 hairs on the pillow. There were twice as many the next day, but my wife had arrived by then and got me to the medical centre. Dr U didn't like the look of me. She didn't like the sound of me. "It's bad," she said. "Pneumonia, I think." "But why is my hair falling out?" "You are ill," she said. Seeing Red lay unread on the bedside table. I couldn't face it. You have to feel well to contemplate the big questions.

In his 1992 book *A History of the Mind*, Humphrey argued that consciousness is grounded in bodily sensation rather than thought, and proposed a speculative evolutionary account of the emergence of sentience. Seeing Red is a refinement and extension of those ideas. Put simply, we don't so much have sensations as do them. Sensation is "on the production side of the mind rather than the reception side." When the spiky-haired cartoon character is looking at the red screen, he is doing red. He is redding. The evolutionary history of sensory enactments like redding (or hotting and so on) can be traced to the bodily reactions of primitive organisms responding to different environmental stimuli, noxious and nutritive. Imagine an "amoeba-like" creature floating in the ancient seas. Like all other organisms, it has a structural boundary, which is the frontier between "self" and "other." The animal's survival depends on crossborder exchanges of material, energy and information, and, as it moves around, some events at the border are going to be "good" for it and some "bad." It must have the ability to respond appropriately--as Humphrey puts it, "reacting to this stimulus with an ouch! To that with a whoopee!" At first the responses are localised to the site of stimulation, but evolution endows more specialised sensory zones, this for chemicals, that for light--and a central control system, a proto-brain, which allows for co-ordinated responses to specific stimuli: "Thus, when, say, salt arrives at its skin, the animal detects it and makes a characteristic wriggle of activity--it wriggles 'saltily.' When red light falls on it, it makes a different kind of wriggle--it wriggles 'redly.'" These are the prototypes of human sensation. With the march of evolutionary history, life gets more complex for the animal and it becomes advantageous for it to have an inner representation of events happening at the surface of its body. One way of accomplishing this is to plug into those systems already in place for identifying and reacting to stimulation. The animal's representation of "what's going on?" (and what it "feels" about it) is achieved by monitoring what it is doing about it. "Thus... to sense the presence of salt at a certain location the animal monitors its own command signals for wriggling saltily... to sense the presence of red light, it monitors its signals for wriggling redly." Such self-monitoring by the subject is the prototype of "feeling sensation."

Evolution then takes the animal to another level at which it comes to care about the world just beyond its body, so that, for example, it becomes sensitive to the chemical and air pressure signals of the proximity of predator or prey. This requires quite another style of information processing. "When the question is 'What is happening to me?' the answer that is wanted is qualitative, present-tense, transient, and subjective. When the question is 'What is happening out there in the world?' the answer that is wanted is quantitative, analytical, permanent, and objective." The old sensory channels continue to provide a body-centred picture of what the stimulation is doing to the animal, but a second system is set up "to provide a more neutral,

abstract, body-independent representation of the outside world." This is the prototype of perception. At this stage the animal is still responding to stimulation with overt bodily activity, but eventually it achieves a degree of independence and is no longer bound by rigid stimulus-response rules. It still needs to know what's going on in the world, so the old sensory systems stay in service, and it still learns about what is happening to it by monitoring the command signals for its own responses. But now it can issue virtual commands which don't result in overt action. In other words, it no longer wriggles. Rather than going all the way out to the surface of the body, the commands are short-circuited, reaching only to a point on the incoming sensory pathway. Over evolutionary time the target of the command retreats further from the periphery until "the whole process becomes closed off from the outside world in an internal loop within the brain." Sensory activity has become "privatised."

I wasn't really well enough to contemplate these big questions, but they wouldn't leave me alone. With rain lashing the window, I lay awake at 4am trying to make sense of a dream. I was at the cinema watching a scene set in a theatre: a play within a film within a dream. I don't know what the play was about, but one of the props was a full-length mirror, which reflected the faces of a section of the audience. In another scene, people were passing a hand mirror around. I realised that I was alone in the cinema and developed the sensation that if the woman now holding the mirror turned it towards me, I would see myself in the reflection. She duly turned the mirror, but what I saw was the camera that was filming the scene. That's it! I thought. That's it! But now I was lying awake wondering what "it" might be.

According to Humphrey, all perception is unconscious. Sensation and perception are separable, he argues, and it is the sensory systems, not the perceptual, that underlie conscious awareness. He points to the neuropsychological evidence. As a Cambridge PhD student in the late 1960s, working under the supervision of Larry Weiskrantz, he made some astute observations of a monkey whose primary visual cortex had been surgically removed. The monkey, called "Helen," should have been completely blinded. But Humphrey developed a hunch that she could somehow "see." He found time to sit by her cage and play with her, and it soon became clear that she was watching him. Over the next seven years he became her friend and tutor, taking her for daily walks in the woods and fields, encouraging her and coaxing her, "trying in every way to help her realise what she might be capable of. And slowly but surely her sight got better." Watching her run around the room, negotiating obstacles and picking up crumbs off the floor, you would assume she had normal vision. But this could not be the case, and with another leap of intuition, Humphrey sensed that "she still did not really believe that she could see." He noticed that sometimes, when she was afraid or upset, for example, her "sight" would fail her and she would stumble around as if in the dark. Helen, of course, couldn't say what she saw, or thought, or believed. But within a few years, "blindsight" (as it came to be called) had been identified in a human being. Weiskrantz, encouraged by Humphrey's observations, was conducting experimental studies of a patient, "DB," who had undergone surgery to remove a tumorous malformation of blood vessels in his right occipital lobe. The operation required extensive removal of the primary visual cortex, resulting in a large scotoma (blind spot) in the left visual field. Predictably, DB was oblivious to stimuli presented in his blind field. Yet although he reported no visual sensation, he could, when prompted to "guess," accurately report the position and shape of the objects presented. Put a blindsight patient in Humphrey's lecture theatre with the screen suitably positioned in his blind field and ask him what he can see. He will claim to see nothing, yet be able to judge that it is "red." He perceives redness but does not experience it. In Humphrey's terms, he is not "redding."

This brings us to the heart of the matter, indeed the heart of mattering--the matteringness of consciousness. "Consciousness matters"--and we should, if we follow Humphrey, be close to grasping "just what the matter is." In blindsight, the person "sees" but has no sensation of seeing. The "raw feels" of the shape and colour of the seen object are missing. His brain is informed of objects in his visual field but "he" is disengaged from them. They are of no matter to him. "What sensation does is to track the subject's personal interaction with the external world--creating the sense each person has of being present and engaged, lending a here-ness, a now-ness, a me-ness, to the experience of the present moment." Those raw feels are mattering-in-action and they bring into being the "us" to which things matter. As Gottlob Frege put it: "An experience is

impossible without an experient. The inner world presupposes the person whose inner world it is."

I still have my hair, and when I recovered I took my feeble lungs, and Seeing Red, to Philadelphia. I was going to meet a man who, more than any other I know, lives absorbed in the present moment. My film director friend Ian Knox and I drove from New York and, close on midnight, arrived at the home of Pat Martino, the subject of the film we were making. As a young jazz guitar virtuoso starting out alongside John Coltrane, Pat was one of the finest musicians of his generation. Insect-thin and fastidiously dressed in black with cropped white hair, he is cadaverously handsome and unsettlingly serene. We sent out for Chinese food and got talking. With a catalogue of successful albums to his name, and on the brink of a major new recording deal, Pat became seriously ill. He was diagnosed with manic depressive disorder, but then the seizures started. The brain scans revealed a large arteriovenous malformation in his left temporal lobe. The surgery that saved his life wiped his memory. He had no idea who he was and didn't recognise his parents. The amnesia ripped selfhood from his brain. Nothing mattered; life was meaningless; he was nobody. They tried to coax him back to being the "somebody" he once was. His father would play Pat's old records at full volume--an intolerable torment. Pat could stand it no longer and left. He drifted, for a time living in Japan and then Amsterdam. He was recalled to Philadelphia on the death of his mother. His father died soon afterwards, and it was too much. Pat's life fell apart, and he ended up once more on a psychiatric ward. But it was there that an astute psychiatrist gave him a primitive computer to play with. It contained a music program, and Pat began to play, like a child with a toy. There was nothing to achieve, nowhere to go, forward or backward, nothing to do except play. It was an epiphany. It was like being born again, he says, but "living entirely in the moment." The music mattered; life was meaningful; he was somebody. And with music as the golden thread, he began to weave a new version of himself. He took up the guitar again, studying technique, via tuition videos, from a great teacher--his former self. Pat's memory is now substantially recovered, but he still has a residual, Zen-like focus on the "now." He claims to have a heightened sense of aliveness, of selfhood, of the sheer privilege of being alive. *In the Moment* is what we're calling the film.

Selfhood and consciousness are entwined "in-the-moment," and Humphrey has explained the role of sensation in both. But has he nailed what Daniel Dennett has sceptically termed "factor X," that mysterious flame of phenomenal experience, those sparkling qualia that light up the "explanatory gap"? He knows he hasn't, quite. But he gives it a go all the same. If the X factor has to do with anything, he says, it has to do with time. Phenomenal consciousness is about the temporal "depth" of the present moment. The subjective "now" is, paradoxically, extended in time: it is "temporally thick." We experience it not as an infinitely thin sliver of time but as a moment in which times present, past and future overlap. We travel through life as in a "time ship," which "has a prow and stern and room inside for us to move around." The problem is that the notion of the "extended present" is fundamentally incoherent to the commonsense mind. Our experience ("the thick moment"--an amalgam of past, present and future) is at odds with our understanding of the linearity of time. We can't get our heads around those ineffable qualities of consciousness because, as the philosopher Natika Newton points out, the very nature of the X factor makes it, "analytically, ostensibly and comparatively indefinable." According to Humphrey (and here I find him hard to follow) it is precisely this that gives consciousness its mysterious, out-of-this-world qualities, and creates the irresistible intuition of mind-body duality. Nature has performed a stupendous conjuring trick: the illusion of the soul. It is an illusion that at once creates and valorises us as conscious entities. It is thereby an adaptive illusion. Consciousness matters, says Humphrey, "because its function is to matter. It has been designed to create in human beings a Self whose life is worth pursuing." Even beyond death.

When it comes to reconciling brain function and consciousness, it may not so much be an explanatory gap that we have to contend with as, in Thomas Metzinger's phrase, an intelligibility gap. Metzinger makes the point that we could have a satisfactory theory of consciousness but if the theory is not intuitively plausible we will not "experience the truth" of it. As Humphrey himself asks, if the X factor fell into our lap, would we even realise it? *Seeing Red* is a brilliantly inventive account of the evolution of consciousness, the best yet, which is ultimately doomed, as all scientific theories of consciousness

may be doomed, by the indefinability of the beast under scrutiny. But that is part of the theory. There is also an escape route, a way out of the hall of mirrors. Humphrey recognises the value of art, in particular that artistic methods and media may prove more valuable than ordinary language "as analytical tools for exploring the nature of phenomenal experience." We can, for example, learn from the work of Claude Monet, who was obsessive in his quest to capture the qualities of "present-tense experience." Getting one's head around the problem of consciousness, "experiencing the truth" of a scientific and philosophical theory, may be as much the concern of art as science. Scientific advances alone may never be enough to satisfy our intuitions. And that's what's so hard about the hard problem of consciousness. We may one day solve the problem in scientific terms but still not fit the solution into the frame of human imagination. Do I care? Less than I used to. I'm more comfortable with ambiguity these days.

I have some doubts about Humphrey's theory. I am not (yet) convinced of the separability of sensation and perception. I'm not sure I'd ever trust a blindsight patient to pilot a plane. Nor do I think the theory has much to say (yet) about why consciousness should emerge at any particular stage of the evolution and operation of nervous systems. Solve that problem and we'd have a diagnostic test capable of indicating that this or that animal, or this or that human foetus/neonate/infant, is conscious--or this or that machine. But I do believe the theory is following the right lines, and I am persuaded that something like this approach will lead ultimately to a scientific resolution of the problem. Whether or not we notice when it does remains to be seen.

And the reply to Joe King? The reply to Joe King is worth the cost of the book.

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