Charles Whitehead

# *Everything I Believe Might Be a Delusion. Whoa!*

## *Tucson 2004: Ten years on, and are we any nearer to a Science of Consciousness?*

> Articulate reasons are cogent for us only when our inarticulate feelings of reality have already been impressed in favour of the same conclusion. The unreasoned and immediate assurance is the deep thing in us, the reasoned argument is but a surface exhibition. Instinct leads, intelligence does but follow (William James, 1902/1985, p. 88).
>
> Let us then assume that crises are a necessary precondition for the emergence of novel theories and ask next how scientists respond to their existence. Part of the answer, as obvious as it is important, can be discovered by noting first what scientists never do when confronted by even severe and prolonged anomalies. Though they may begin to lose faith and then to consider alternatives, they do not renounce the paradigm that has led them into crisis. They do not, that is, treat anomalies as counter-instances, though in the vocabulary of the philosophy of science that is what they are (Thomas Kuhn, 1962/1970, p. 77).
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> Every established order tends to produce the naturalization of its own arbitrariness (Pierre Bourdieu, 1972/1977, p. 164).

Having agreed to review Tucson 2004, I am embarrassed to admit that I fell asleep eight times during the conference. This cannot have been entirely due to jet lag as I only fell asleep once in 1998, twice in 2000, and four times in 2002. It seems to be a geometric progression correlating with elapsed time.[1] As this was the tenth anniversary conference several speakers indulged in nostalgic reminiscences, but I thought that readers of *JCS* might prefer a less rose-tinted account which, among other things, might elucidate the dynamics of falling asleep at conferences.

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[1] It's called *anno domini*. I have the same problem — Ed.

## THE STORY SO FAR

I did not personally attend Tucson I and II, but gather that the first conference had a special excitement because there was that feeling in the air of embarking on a new and revolutionary adventure. The second was even more exciting with a 'circus atmosphere' (Chalmers, 2004), a much expanded programme, and around a thousand delegates. And that, apparently, was the high point. Keith Sutherland, reviewing Tucson III, wrote:

> It was generally felt that the conference lacked some of the excitement of Tucson II… What the committee wanted from Tucson III, however, was a little more emphasis on solid scientific progress, rather than people just restating their entrenched positions with the aid of a new metaphor or two.

Now, I only have to look at my bookshelf to see that conference abstracts have been getting thinner since 1998. That year there were almost 500 presentations; in 2000 less than 450, in 2002 around 400, and in 2004 there were 270. The conferences shrank from five whole days in 1998 to four in 2004. This is not necessarily a bad thing. Maybe the early conferences attracted a broad fringe of New Age riff-raff, and the loyal remaining core represents the Truly Elect. Alas, I cannot persuade myself that the decline in quantity has been offset by any rise in quality — still less any 'incremental progress' (David Chalmers' phrase this year). But who wants incremental progress? New paradigms are born from big-bang singularities (Kuhn, 1962).

Surely the reason for so much disagreement and debate is because 'the problem of consciousness' directly challenges the entire paradigmatic basis of western science. In 1998, speaker after speaker acknowledged that science, as it currently stands, simply cannot deal with consciousness (or, for that matter, provide a seamless account of reality). Rhea White, after blaming many social problems on scientific materialism, maintained that we need 'a better story to be told'. Frances Vaughan argued for a more contemplative approach to science, and G. Rosenberg called for the 're-enchantment of matter'. Of course there was the inevitable polarization of views reflecting the twin horns of the dilemma created during the Enlightenment and Counter-Enlightenment – on the one hand, materialism threatens to reduce us to deterministic automata with no possible role for consciousness or free will; on the other, idealism threatens to remove humanity from the realm of explanatory science altogether. So we had the brain-wiring/information-processing faction representing 'materialism', and the transpersonal psychologists, panpsychists, psychic investigators, and anomaly researchers representing 'idealism'. Interestingly, there was an apparent 'third horn' in the form of quantum mechanics. Turning our taken-for-granted world on its head, the 'implicate order' may well have the potential to reconcile materialism and idealism.

The materialists — rallying to Francis Crick's battle cry 'You are nothing but a bunch of neurones' (1994) — certainly provided the dominant paradigm even in 1998, accounting for more than 80% of all presentations, and 27 out of 35 plenary papers. Many delegates complained at the way alternative approaches

were under-represented (Sutherland, 1998). Cognocentrism became even more dominant in 2000, heralded by promotional posters featuring the fluorescent brains beloved by publishers and conference organizers if not by neuroscientists. There were a couple of plenaries on meditation and ayahuasca; but transpersonal psychology was relegated to concurrent sessions; anomalies and parapsychology reduced to a handful of posters; and the only plenary session on quantum phenomena offered few new suggestions other than the possibility that human indecision might be the result of quantum superposition (Hameroff, 2000). This is rather like recreating the universe every time you change your socks, and provoked highly sceptical comment from the auditorium.

But what is dominant behind the podium is not necessarily dominant in front of it. Questionnaire research among delegates at Tucson II suggested a marked shift from 'materialist' to 'transcendentalist' beliefs compared with a study ten years previously (Baruss & Moore, 1998). At Tucson III, when Frances Vaughan asked her audience how many of them had some form of 'spiritual practice' a large majority of the people I could see raised their hands. And in 2000, when Daniel Wegner polled delegates on whether they were 'robogeeks' (who believe everything is caused by the brain and free will is a delusion) or 'bad scientists' (who persist in believing in free will despite all the evidence against it), the bad scientists marginally won the poll.

The year 2000 also saw the rise of Grand Delusionism at Tucson. This was not a new trend (cf. Dennett, 1991), but it was not evident at Tucson III. Besides the 'grand illusion' of visual experience (O'Regan), there was the 'illusion' of perception (Wolf), the 'illusion' of volition and personal agency (Wegner & Wheatley), and the 'malignant illusion' of selfhood and consciousness — resulting from the fiendish machinations of our parasitic memeplexes (Blackmore). Maybe there is an unwritten law of theoretics which says 'If you can't explain it, deny it.'

To be fair to the cognitive and neuroscientists, it has to be admitted that they are the ones who come up with most of the new and thought-provoking insights, though they don't always draw the obvious social inferences. Change blindness (O'Regan) and inattentional blindness (Mack) are a couple of examples from 2000, though my favourite nugget of revelation was the curious fact that schizophrenics can tickle themselves (Frith). Apparently, in contrast to autistic people who have limited awareness of other minds, schizophrenics are drowning in otherness, and are 'other' even to themselves. In fact the social character of reflective consciousness should have been recognised in 1998, when Gallese reported the discovery of 'mirror neurones' and Milner and Goodale demonstrated that ego-centric perceptions are unconscious, whereas universalized (public and shareable) perceptions are conscious. All these findings are consistent with social mirror theory, which holds that mirrors in the mind depend on mirrors in society (Dilthey, 1883–1911; Baldwin, 1894; Cooley, 1902; Mead, 1934). They are not consistent with simulation theory (Harris, 1991), which assumes that awareness and the awareness of being aware are the same thing — a commonsense error shared by Dennett and many others at Tucson.

By 2002 the triumph of cognocentrism was virtually complete, at least at the plenary level. Of 40 plenary papers, 32 came from cognitive/neuroscientists and artificial intelligence investigators. There were only five plenary papers on phenomenology, and three on emergent phenomena and downward causation. I have nothing against the cognitive sciences, but the *cognoparadigm* is not only disembodied and individualistic, it is profoundly impoverished. Nowhere is this more evident than when cognitive scientists address emotion and the social brain (Adolphs; see also Adolphs, 1999). Adolphs thinks of the brain as a computing organ with social bits added on afterwards. He cites the social intelligence hypothesis of brain expansion but does not draw the obvious inference that, if the hypothesis is true, then everything expanded in human and other primate brains must subserve social functions. He refers to abstract art as 'non-social'; gives no thought to music, dance, and the massively expanded inferior parietal lobules; and even asks whether language might serve a social function.

To my surprise I did not fall asleep during the robotics presentations. When computer scientists start trying to develop social relationships between humans and machines by fitting the machines with rudimentary facial expressions (Kurzweil), I think it is time to sit up and take notice. If social mirror theory is correct, then social display is exactly what computers need if they are to develop reflective consciousness — though I think we are a long way off machines that can sing, dance, enjoy TV soaps, and have fun with pretend play.

One of the downward causation papers (Radin) and one of the neuroscience papers (Bierman) reported anomalies. These were interesting, not just because we need to look at the anomalies to find out what is wrong with the paradigm that created the 'problem of consciousness', but also because of the audience responses they provoked. Radin described ongoing PEAR research using random number generators at forty locations throughout the world. It has been consistently found that news events focusing widespread attention on one issue — such as the terrorist attacks of September 11 — produce momentary reversals of entropy (i.e. all forty REG machines generate anomalous non-random sequences). Bierman showed that non-conscious physiological anticipation of decisions (neuronal action potentials) not only precedes conscious decision-making, it begins even before any implicit learning can have occurred. The same retro-causal effect could be demonstrated in classic experiments by the Damasio group. In layman's terms, this means that neurones appear to be 'clairvoyant'. Audience comments tended to begin with 'Yes, but'. For example, 'Yes, but exceptional findings demand exceptional proofs!' Well, who gets to decide what 'exceptional' means? A proof is a yes or no entity — there can be exceptional probabilities but not exceptional proofs. And if we poll the world's cultures, then western culture — with its mechanistic, individualistic, and linear world-view — is the aberrant one. What humans everywhere fail to see is that their commonsense view of reality is only one among countless possibilities (Bourdieu, 1972). If there were any shift in our own world-view, much of what we call 'evidence' would decamp from the old paradigm to the new in a most disloyal manner.

A study of 'elite scientists' revealed that evidence has no effect on belief or disbelief in paranormal phenomena. No matter how thorough your controls or how many zeros you have in front of your *p* value, disbelievers still demand 'better proof'. So Thomas Kuhn (cited at the head of this review) didn't go far enough. Scientists do not simply fail to treat anomalies as counter-instances; they deny their very existence. Anomalies tend to get swept under the carpet until there are so many of them that the furniture starts to fall over.

## TUCSON 2004

So far the response at Tucson seems to be an ever more resolute retreat from the problems of toppling furniture. This year there were only 24 plenary papers in this cut-down conference, and few of them offered the least challenge to the unspoken assumptions which underpin the physicalist paradigm. No less than 20 plenary papers were cognocentric, neurocentric, and/or logocentric. The four possible exceptions were one creativity paper, one ethics paper, one animal metacognition paper, and one David Chalmers paper.

## The Materialists

The conference got off to a rattling start with Christof Koch who appeared to cram a three-hour paper into half an hour by talking six times faster than most of us can think. The audience listened in breathless silence (out of empathy, no doubt, with someone who could talk so long without inhaling once) as he summarized his and Francis Crick's 'neurobiological framework for consciousness', according to which 'meta-stable neuronal assemblies' in prefrontal cortex compete for dominance, the winner determining the current content of consciousness. Their position, as always, is that if you sort out the neurone-by-neurone minutiae of visual processing, the 'hard problem' of consciousness will somehow disappear. When one questioner asked how Koch would account for near-death experiences, he got the curt reply 'They must have neural correlates.'

Koch was followed by more neuronal minutiae from David Leopold and Stephen Macknik. No doubt this is all very good science, but what bothers me is its relevance to consciousness. I always thought the hard problem is supposed to be hard because all the solutions to the 'easy' problems leave the hard problem untouched (Chalmers, 1995). So why did the concurrent session entitled 'Foundational Issues in the Science of Consciousness' include nothing but brain-wiring papers?

### *Maps of materialism*

'Neural Correlates' was the only plenary session on Wednesday because the conference was preceded by one and a half days of workshops. I always attend workshops, partly because I actually go to conferences to learn things, but also because they often provide insights into what the conference is really about. I found two workshops particularly revealing.

The first, grandly entitled 'What Scientists Have Learned About Consciousness and the Brain: A Decade of Remarkable Evidence', was presented by Bernard Baars and Katharine McGovern. I happen to think that 'scientists' have learned very little about the brain and nothing at all about consciousness. However, the workshop provided a useful map of the consciousness debate from a cognitivist perspective, and was so popular that it had to be given twice. I attended the second showing and even that was pretty crowded.

McGovern began by dividing consciousness studies into three types — first-person (illustrated by meditation practices in cultures as aberrant as our own), second-person (illustrated by a mother and baby), and third-person (illustrated by someone's head with a segment carved out of it). This is a neat and tidy scheme but it is profoundly misleading. If self-awareness depends on other-awareness — in accordance with social mirror theory; as experimentally demonstrated by Gopnik and Meltzoff (1994) and as argued by Carruthers (below) — then introspection is actually a third-person approach. Further, since you cannot have a third-person world until you have a world with third persons in it, then the 'objective' world has to be radically first-person. Third-person objectivity presupposes third-person intersubjectivity (which begins with the mother–baby dyad classed by Baars and McGovern as 'second-person'). Similar points have been made in past issues of *JCS* but we humans tend to ignore everything we don't feel comfortable with, and carry on believing that there is an 'objective' world full of facts and a 'subjective' world full of experiences.

Baars then gave us a bit of background history, including a graph showing the rising publication rate from 1965 when there were fifty articles mentioning consciousness, to 2000 when there were fifty to sixty thousand such articles, followed by a decline. No explanation was given for the meteoric rise (and possible fall) of interest in consciousness, and I think this was handled more interestingly in Charles Tart's workshop (at least, the one in 1998). Tart observed that scientists are strict literalists who only believe what they can see, hear, touch, and measure (a trait which is also diagnostic of autism). Consequently, dreams only became 'real' as a result of EEG recording, and meditation as a result of physiological measurements. Maybe consciousness became 'real' as a result of functional brain imaging, which creates the illusion that we can 'see' thoughts.

According to Baars, cognitive science has revealed six answers to the question: 'What does consciousness add?' or 'What is it good for?' But if consciousness is 'good for' something, then it must exert causal effects, and this violates the physicalist paradigm (closed system/conservation laws). But physicalists are quite happy to contradict themselves so long as no one points out what they are doing. We should also bear in mind that 'consciousness' here means reportable consciousness, perhaps implicating Gazzaniga's left-hemisphere narrator which constructs a coherent fiction out of the welter of experience. I think we can grant that Gazzaniga (1967) has demonstrated beyond reasonable doubt that the reflectively conscious mind is adept at confabulation — tidying up its experience of the world by filling in gaps and blotting out anomalies to conserve its own sense of integrity and autonomy. A lot of that goes on at Tucson.

We were told that 'conscious processes' are:

(1) Phenomenally serial [What isn't, other than at the quantum level?]
(2) Internally consistent [Supports Gazzaniga]
(3) Unitary [I love this one — however fragmented consciousness might be, how else would its disunited parts experience themselves? In fact there is good evidence that consciousness is *not* unitary: Whitehead, 2001]
(4) Limited in capacity [as opposed to non-reportable processes which act in parallel and have 'unlimited capacity' (sic)]
(5) Associated with globally distributed gamma activity measured by EEG
(6) Inter-area

All these points concern *reportability*, not sentience as such. And if we correct the question to read 'What reportability adds' or 'What reportability is good for' the answer can only be *intersubjectivity* — otherwise why report it?

The workshop also reviewed 'seven hypotheses of consciousness'. Actually there were eight but Baars does not count global workspace theory as a hypothesis. I will not bore the reader by dismantling all eight, but will simply mention that not a single one accommodates human sociality or intersubjectivity. This was reserved for a closing section on 'second-person approaches', treated as an appendix as though intersubjectivity were a peripheral issue and not the basis of all shared experience and hence everything else discussed in the workshop.

Probably the most memorable moment in the entire session was a dramatic demonstration of inattentional blindness. We were shown a short film in which people dressed in white passed a ball to each other, and people dressed in black did the same thing. We were asked to count how many times the people in white passed the ball. At the end of the film we were asked 'Did you see the gorilla?' No one did. On reviewing the film, a figure in a (black) gorilla costume walked on, stood looking around, waved at the camera, and walked off. Murmurs of 'cheating' greeted this unexpected revelation. The fact that this stands out from all the intellectual stuff just goes to show that a demonstration is worth a thousand words, and theatre is more compelling than any amount of reasoned argument.

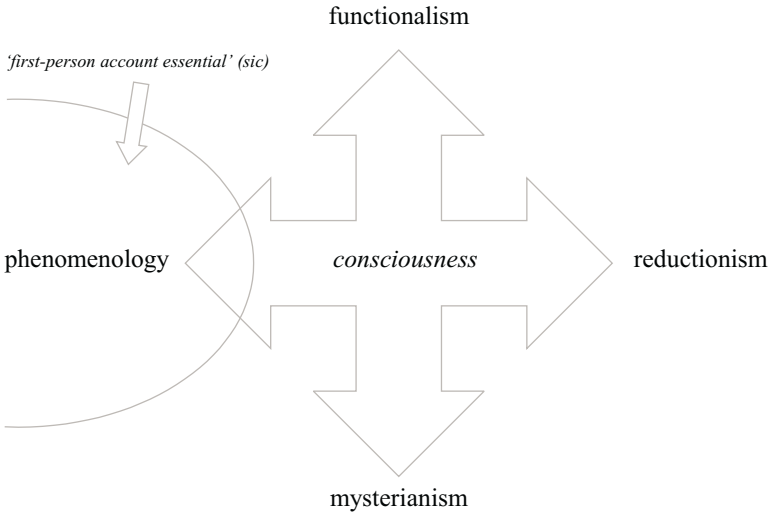
This was the central theme of the last workshop I attended — Susan Blackmore's 'Teaching Consciousness'. I heard one or two delegates comment that this was a strange topic for a workshop; but I would have thought that many of us are academics who teach, that most of us *lecture* in the traditional talking-heads manner, and that we have a lot to learn from Susan Blackmore.

As we entered the room she jabbed a finger at us and demanded to know 'Are you conscious *now*?' She believes, along with Dennett, that we are only conscious when we probe, like the light in the refrigerator: every time you open the door it's on. From that point on, everyone just *had* to take part. Blackmore uses role-play, theatre, and participatory games to get students to understand even the most esoteric ideas and research findings. For example, she asked two delegates to role-play Mary the Colour Scientist, emerging from her black-and-white room. One had to play the role according to Dennett, the other according to the knowledge argument. To my mind the dramatization clearly refuted Dennett —

amazement at the novelty of colour looked genuine, whereas the refusal to be impressed on intellectual grounds looked like sour grapes.

It is a pity that Blackmore, though she recognises the experiential power of theatre and make-believe, does not also recognise its importance for human self-consciousness and culture. This is a blind spot she shares with others, and it is at the heart of the 'memes' hypothesis. Being a social anthropologist, I get the urge to strangle people who keep using the word 'meme', which Blackmore does frequently. Most anthropologists believe that evolution by selfish replicators with chance copying errors is something peculiar to biology. But what is most frustrating about 'memetics' is the banality and naivety of its conclusions. Religious beliefs and practices, for example, are found to be 'parasitic memes' propagating themselves at the genetic expense of their human hosts. It has never occurred to Dawkins (originator of the term 'meme') that a belief such as 'goodwill to all humankind' might have survival value precisely because it overthrows the tyranny of selfish genes. Dawkins perpetuates the old anti-clerical propaganda of the Enlightenment, still thumbing its nose at the Church because it once held a monopoly on Truth.

The workshop finished with yet another map of consciousness studies – this one taken from Francisco Varela. We were asked to position various authors along two axes: one ranging between phenomenology and reductionism, the other between functionalism and mysterianism:

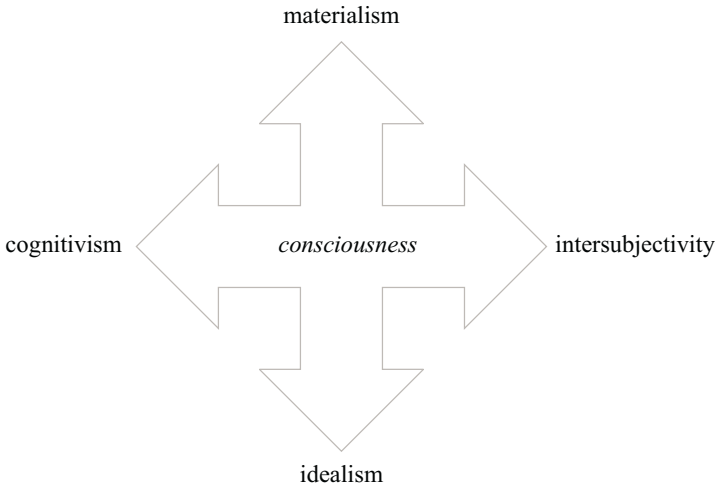



*Approaches to consciousness according to Francisco Varela (1996)*

I think this explains a good deal about what is wrong at Tucson. It is as though no one can think of anything outside this two dimensional format. Functionalism and reductionism are equally physicalist, mysterianism is a pejorative hiding a multitude of possible positions, and all four approaches are individualistic and unlikely to challenge the cultural assumptions that make consciousness problematic. Western individualism is implicit in the contradictory notion of a

'first-person account' (an account by definition is third person). Furthermore, where would you put quantum animism, anomalies research, parapsychology, etc, etc?

The major axis should be between materialism (almost everything on the above chart) and idealism (everything no longer believed in by Blackmore and excluded from plenaries at Tucson 2004). There should also be an axis between cognitivism (individualistic) and social approaches, with almost everything at Tucson at the cognitivist end; and anthropology; self-awareness research; and social, transpersonal, and developmental psychology at the other:




*Dimensions not recognized by Varela*

## *More intriguing materialism*

The first half-day of the conference ended with a reception in the Radisson Starlight Ballroom (a name redolent with materialism of another kind), and the next day gave us three more materialistic plenaries. Jack Pettigrew opened the session on the 'Physical Basis of Consciousness' with a paper on perceptual rivalry, giving the concept a breadth of significance which I didn't know it had before. He spoke of a 'master clock' in the brain which controls a number of quasi-regular alternations in consciousness, including circadian rhythms such as the sleep cycle; ultradian rhythms such as REM and daydream cycles; and alternations that occur in seconds as in binocular rivalry or hours as in the nasal cycle. Visual demonstrations included a pattern of 'swimming dots' which periodically disappear. In the manic phase of bipolar disorder the dots disappear all the time, whereas in the depressive phase they do not disappear at all. Another pattern of moving dots creates the illusion of a rotating sphere: in mania the sphere revolves in a forwards direction, and in depression in a backwards direction. Affective states, apparently, exert a consistent top-down influence on visual processing.

But the most intriguing part of his talk concerned research on Himalayan 'high meditators' with twenty or more years of meditational practice. Such meditators have learned to develop 'very subtle mind' and are associated with the 'incorruptible body phenomenon' (the body resists decay following death). They also show dramatically elongated phases in a number of perceptual rivalries. For example, the disappearance of Motion Induced Blindness has been shown, across thousands of subjects, to have a normal mode of one to two seconds, but in high meditators the mode is an astonishing 743 seconds. Pettigrew speculated that the effects of meditation on perceptual rivalry might be linked to the large gravitational anomalies created by mountainous masses as demonstrated in the Himalayas. He pointed out that we have neurones which are sensitive to gravitational variations as small as $10^{-9}$ G. Such sensitivity is sufficient to detect, for example, the movements of Jupiter. Pettigrew suggests that gravity may provide a new arena for the interaction of the physics and biology of consciousness.

Stuart Hameroff, chairing the session, asked Pettigrew whether he thought consciousness could create the apparently sequential nature of time. There is no obvious reason why a deterministic universe should require time to be sequential, he said. Pettigrew's answer was 'Yes', and he recommended those interested to read Francisco Varela on time.

The second speaker, standing in for a cancelled presentation, was David Chalmers, examining 'The Matrix as Metaphysics'. He began by asking how many delegates had seen *The Matrix* (there was a forest of raised hands) and how many had not (five or six brave souls). So, for the five or six readers who probably have not seen the movie, I should explain that it expands on a well-known philosophical thought experiment known as the 'brain in a vat'. Neo, the main protagonist, thinks that he has a real body and lives in a real world with real people, trees, buildings, etc. But in fact his brain is floating in a tank and interacting with a virtual world created by computers. Chalmers quoted from the DVD sleeve:

> *Perception*: Our day-in, day-out world is real.
>
> *Reality*: That world is a hoax, an elaborate deception spun by all-powerful machines that control us. Whoa!

'Everything I believe might be a delusion!' he remarked, apparently without ironic intent. He then proceeded to deconstruct alternative ways of understanding reality, and arrived at the postmodern conclusion that a virtual world is just as valid as any other.[2] But I kept wondering what would happen if some suicide bomber blew up the brain in the vat.

Stuart Hameroff then returned to his question of consciousness and time, which was not strictly relevant in this context, though he claimed it was, because dreams are a kind of reality rather like the brain-in-a-vat scenario. He illustrated his unscheduled presentation with a prepared slide showing an iceberg. The one-fifth above sea level represented the classical world of conscious experience

[2] The whole argument is on his website or at http://whatisthematrix.warnerbros.com

created by quantum state reduction; the submerged four-fifths represented the 'quantum subconscious' which is timeless. The Penrose/Hameroff model of 'orchestrated objective reduction' has been 'harshly criticized' (Hameroff & Tuszynski, 2004), but quantum phenomena at least serve the useful function of defying our flat-earth physicalist assumptions.

The second plenary featured Ned Block and Alva Noë weighing up the relative merits of physicalism and functionalism in the light of neural plasticity. Block argued that sensations may be physicalist (e.g. tactile cortex always produces tactile sensations) and perceptions functionalist (e.g. if vision is rewired to auditory cortex, the resulting perceptions are still experienced as visual). Noë favoured functionalism, suggesting that the reason why synaesthesia does not defer to function is because, like phantom limbs, synaesthetic sensations are not integrated into any perceptual scheme, and so do not fade over time.

Anyone who was looking forward to some relief from all that brain-wiring stuff must have been disappointed by the following session on hallucinogens. Alexander Shulgin, in his abstract, notes that:

> The ultimate understanding of the mystery, and the appreciation of the magic of these materials, can only come from exploring their action on the mind, not the brain. This makes a move away from the physical environment of cells and nerves and tissue to a person's spiritual and emotional realms of thought, imagination, and creativity …

But Shulgin cancelled which meant that we were left with Vollenweider and Ray on 'brain mechanisms' and 'chemical architecture'.

## Alternatives to Materialism

Following the first plenary I went to the concurrent session on 'Non-local and Paranormal Effects' — partly because it was the *only* session in the conference this year overtly offering any alternative to materialism, and partly because I wanted to hear Gary Schwartz. I was not disappointed. His paper on the survival of consciousness and the brain as 'antenna-receiver for mind' included what was (for me) the most memorable argument of the entire conference.

He cited a number of distinguished scientists with non-materialistic views, including Max Planck, who believed that matter is derived from consciousness. The brain as antenna receiver hypothesis was also entertained by William James, Wilder Penfield, John Eccles, and others. The evidence he presented for the survival hypothesis included single-blind and double-blind studies, using multi-sitter and multi-medium methods. Conventional counter-explanations such as fraud, cold reading, wishful thinking, or experimenter bias, were ruled out by the experimental designs and findings. Alternative explanations such as telepathy and 'super-psi' were similarly ruled out, for example by using 'proxy sitters'. Mediumistic communications were rated for accuracy on a scale from –3 to +3, where –3 indicates a total miss, and +3 indicates a definite hit. Counting only the +3 scores as hits, the average accuracy across all mediums and sittings was 83%, as against 36% in control conditions involving random guessing.

But the highlight of Schwartz's talk, for me, was the comparison he drew between neuroscience and telecommunications research. He pointed out that the belief that consciousness arises from physical processes in the brain is based on three kinds of investigation:

(1) Correlational studies (e.g. EEG correlates of visual perception)
(2) Stimulation studies (e.g. electrical or magnetic)
(3) Ablation studies (e.g. effects of brain lesions)

But analogous methods are applied during television repair with parallel results, yet no one comes to the conclusion that pictures on the screen are created inside the TV. The neuroscientific evidence, like the television evidence, is equally compatible with a hypothesis of antenna receiver.

Schwartz was followed by Katherine Creath on 'Measuring effects of intention on plant leaves using biophoton imaging'. Biophotons are emitted by living cells, and more so when tissues are injured or unhealthy. Creath's research showed that when 'energy healers' from three different disciplines treated cut or injured leaves with the intention to heal, biophoton emissions decreased in contrast to untreated leaves, indicating a healthier condition. Treating the leaves with the intention to 'glow more' had the opposite effect.

Nelson Abreu then talked about remote viewing and new ways of increasing the rigour of experiments, and Rainer Schneider described further work on the non-local effects of willing — otherwise known as DMILS (direct mental interaction with living systems). Schneider described research in which 'agents' attempted to activate or calm human 'receivers' at a distance according to a random schedule of influencing epochs. Various autonomic measurements were used as indicators, and both experimenters and receivers were blind to the influencing schedule. To test the hypothesis that DMILS effects correlate with conscious intention, specific stress-inducing instructions (e.g. 'never fail at attempting to influence your partner') and personality type of agents (tendency to activate 'high inferential functions' under stressful or non-stressful conditions) were varied. The central finding was that DMILS effects correlate with activation of 'low level' (non-conscious) intuitive processes but are obliterated by 'high level' willing and other conscious processes. This is in line with other findings, for example, Bierman's demonstration that 'clairvoyant' anticipation of events occurs at the level of non-conscious physiological processes. You would expect psi phenomena to be suppressed during biological evolution, because non-local effects conflict with the necessarily competitive nature of selfish genes and selfish bodies.

Non-local and paranormal phenomena are not the only research areas that offer some challenge to the physicalist paradigm. There were papers on transpersonal psychology (Freeman), intersubjectivity in autism (Barresi), psychoactive substances (Winkelman), and free will (Horgan and Baumeister) with at least potentially un-physical implications. But most unexpected were two plenary sessions — 'Ethics and the Brain' and 'Metacognition in Animals' — which were stuck right at the end of the conference, like 'second-person'

approaches in the Baars/McGovern workshop, as though no one saw their central importance.

In the 'Ethics' session, Martha Farrah noted that 'neuroscientific knowledge' has profound implications for the way we think of ourselves as moral or spiritual beings, as beings with a capacity for self-change, and as members of society. But what no-one noted is the two-way causality linking the materialistic/individualistic ethic of capitalism with the materialistic/individualistic assumptions of western science. Scientists regularly imagine that their own 'objectivity' exists in a moral vacuum. But a materialistic culture demands a materialistic science for its own self-legitimation, and this inevitably affects funding policies and job opportunities. The Galileos of this world — those who challenge the prevailing paradigm — no longer face imprisonment, but they do face excommunication.

Peter Carruthers, in the 'Animal Metacognition' session, argued that the social 'mind-reading' model of self-other awareness is much more compelling than the cognocentric 'self-monitoring' model. For example, he pointed out that humans are very good at confabulating but very bad at monitoring their own erroneous thought-processes. What he did not point out is that the mind-reading model supports social mirror theory (mirrors in the mind depend on mirrors in society), which turns the 'hard problem' on its head, because it makes the 'easy problems' of reflectivity and cognition dependent on a prior and apparently non-adaptive sentience.

Any consideration of how consciousness could evolve raises problems for materialism. The concurrent session on that theme began with my own paper — 'Evolution of the Human Brain' — which used physical data to undermine physicalist models. The currently dominant hypothesis of primate brain expansion — the social or 'Machiavellian' intelligence hypothesis — avoids the worst excesses of western individualism, but is still cognocentric, attributing human encephalization to 'intelligence' and language. A better alternative, I suggested, is social mirror theory. The differential pattern of cortical expansions in humans is not consistent with the social intelligence hypothesis, but is consistent with a 'play and display' hypothesis of brain expansion, as predicted by social mirror theory. Furthermore, there were two periods of brain expansion during human evolution, followed by a phase of brain contraction, as predicted by the hypothesis. Cranial cast and archaeological data suggest that song-and-dance display drove the first period of expansion, pretend play the second, and economico-moral culture brought about the final phase of brain contraction.

Ericsson-Zenith rejected physicalism on philosophical grounds. Since there is no way to explain the 'physical construction of consciousness' in non-sentient creatures, the 'primitive of experience' has to be a first-order phenomenon like matter and energy. He conceives of the primitive of experience as 'continuous and unfragmented across our physiology'. Evolved complexity acts against this *a priori* integration to create structured experiences of sensation and mentation. The view which is implicit in this argument — that all structure throughout the universe fragments a primordial continuum of sentience — has been presented before at Tucson, notably as the 'theory of enformed systems' (Watson,

Schwartz & Russek, 1998) which holds that systemics, the most fundamental scientific discipline, *is* the science of consciousness.

## More Materialism

A new feature of the conference this year was a series of 'Keynote Addresses' by Zoltan Torey, Steven Pinker, and Daniel Dennett. You might expect a keynote address to serve the same function as a keynote journal paper — a distinguished exponent reviews an area of study, and then other authors bring new research and comment to bear on aspects of the review. But these three speakers chose rather personal themes and appeared very late in the programme — Torey after all but three ordinary plenaries, Pinker after all but two, and Dennett last of all.

Torey gave an interesting and moving account of his own life, beginning with his sudden loss of sight as a young man. He dealt with this dramatic loss by generating a dreamlike visual world anchored in and validated by his other senses. His reflections on this inner world led him to a three-layered 'animal' model of consciousness: sensory awareness; inner language which elaborates on sensory experience; and the resulting awareness of being aware. He expressly stated that reflectivity is something generated from within and not 'imposed from outside'. So this is a non-social, cognocentric, and logocentric view. However, his audience obviously enjoyed his talk and opinions I heard afterwards were enthusiastic.

Pinker chose to address the question 'Is consciousness an evolutionary adaptation?' He considered three possible senses of the word 'consciousness': self-knowledge, segregated information access, and subjective experience, concluding that the first two are plausible adaptations, but the third

> is almost certainly not an adaptation, not because it is a by-product or spandrel (like, say, music or religion) but because it has no causal consequences and hence cannot have been selected for such consequences.

Pinker seems to have changed his mind here. In *How the Mind Works* (1997, p. 145) he says that experience does have consequences: 'We do not just experience a toothache; we complain about it and head to the dentist'. But when he confronts the problem of figuring out *how*, he is stuck with the physicalist paradigm. I am always surprised by people who stand up at consciousness conferences and tell their audience that consciousness cannot have 'physical' effects, failing to note that the conference itself is a consequence of consciousness. The idea of a 'physical' universe which forms a perfect closed system embracing everything 'real' but paradoxically excluding consciousness, leads to the equally paradoxical idea that consciousness must 'arise' from 'physical' processes but cannot exert any influence in the other direction. Things can influence non-things, but non-things can do nothing to things.

The revealing point here is the one Pinker makes in parentheses about music and religion. In architecture, a spandrel is the concoidal triangle formed between two adjacent Gothic arches. The spandrel as such serves no structural function: it is simply the inevitable by-product of the juxtaposed arches. So, in biology, a

spandrel is the non-adaptive but inevitable by-product of something else which *is* adaptive. Now I fail to see how music and religion could be inevitable if they are not adaptive, or what kind of adaptation they could be spandrels of, or even how religion, any more than language, could have evolved at all (since both depend on the prior emergence of ritual pantomime and the inversion of selfish-gene strategies: see Durkheim, 1912; Knight, 1991; Whitehead, 2001; 2002).

Anyone who wants to understand Pinker's reasoning more fully should read the last chapter of *How the Mind Works*. There he states that all the human arts 'are not adaptive in the biologist's sense of the word', concluding that they are eye-candy or auditory cheesecake 'pushing pleasure buttons without the inconvenience of wringing bona fide fitness increments from the harsh world' (pp. 524 & 534).

On music he tells us that it 'communicates nothing but formless emotion' (p. 529). Numerous musicians have told us that music does not communicate anything, emotional or otherwise (Storr, 1993). We learn the musical forms of our own culture from nursery rhymes — and what is the emotional content of Jack and Jill or Baa Baa Black Sheep? Music is more like massage: the pleasure is in the performance. Song-and-dance, the biological basis of music, serves several functions including grooming (servicing coalitions and alliances), entrainment (making sure everyone is singing from the same hymn sheet), and the creation of emergent order (welding two or more selfish individuals into one great big selfish individual). Strictly communicative functions are mainly competitive and agonic.

He goes on to say that music is 'quite different from language' being 'a technology, not an adaptation' (p. 529). This is the wrong way round. There is no way that an implicit level of display could be less primitive than a conventionalized cryptic code. How is it that I can 'understand' a Chinese melody but cannot understand Chinese speech? How is it that three month old babies show the first signs of song-and-dance display, but do not utter their first words until twelve months?

On the subject of the literary arts, Pinker tells us that 'there is no mystery to the question "Why do people enjoy fiction?". It is identical to the question "Why do people enjoy life?"' So here is a scientist telling us that there is no need to explain pretend play, role-play, poetry, drama, and theatre, even though mimesis is extremely rare in non-human animals, and nowhere so complex as in humans.

The arts can only be understood in the context of play, but the only mention of childhood play in Pinker's entire book is in the context of play-fighting (p. 546), something that we share with apes. The most salient feature of contemporary human behaviour, that which most profoundly distinguishes us from all the non-human apes, is the quality, quantity, and variety of our play and display. These behaviours are not sensory candy-floss. They are the basis of human self-awareness, other-awareness, and reflectively usable cognition. They are the prerequisites for ritual, religion, language, and economico-moral culture. They are our ultimate utilitarian adaptations.

The third keynote address was Daniel Dennett's 'Qualia Questioned: Once More With Feeling'. He began by calling for 'imagination management',

something which I assume he assumes we all lack and need to learn from him. 'It's very easy,' he cautioned us, 'to get misled by your own imagination'. Happily for Dennett, he cannot see the irony of his own words, and whatever problems he may face in life, self-doubt will be the least of them.

Take money for example (Dennett continued). Certain people, if they ask the price of something whilst travelling abroad and are told 'Twenty five zloty' or 'Sixteen yen', will ask: 'Yes, but what is it in *real* money?' He coined the term 'vim' in reference to this non-dispositional, non-functional, *intrinsic* value possessed by familiar as opposed to unfamiliar currencies. The moral is that if we believe in qualia (which the vast majority of us do, according to an audience poll conducted by Dennett) then we are like those morons who believe in vim.

Later he borrowed a list of questions from Pinker's talk, all of which concern 'sentience' as something above and beyond measurement. Pinker's inference was that there are no causal consequences and so no adaptive function. Dennett goes further: there are no measurable consequences and so these are not meaningful questions. If there is 'something left over' after you have given a complete objective account, Dennett's conclusion is: 'I just don't see what it could be.'

All in all, he gave us three arguments for not believing in qualia:

(1) People who believe in qualia are morons
(2) Sentience has no measurable consequences (not even books denying its reality)
(3) Dennett cannot imagine anything over and above a 'complete objective account'

Now, I always thought that philosophers are supposed to be the housekeepers of science. But at Tucson we find them coming out with the same bad logic as the scientists, because they are trapped in the same hermetically sealed envelope of unquestioned assumptions. This is not a problem where empirical methods can expose the errors, but where the physicalist paradigm confronts its own nemesis, empirical results get swept under the carpet. Physicalists think that what we have to explain is how consciousness 'arises' from 'physical' processes (Chalmers, 1995). The least problematic word here is *consciousness* — even Descartes managed to get that one right. But many westerners are so passionately attached to this 'arise' and this 'physical' that they would rather deny the experiential bedrock of all knowledge — pleasure, pain, and resistance to muscular effort. Dennett himself, in a rare moment of self-doubt, once asked 'But why does pain have to *hurt* so much?'

The anthropologist Maurice Leenhardt learned that the natives of New Caledonia had no doubt that they had 'spirit'. What they were less sure about was whether or not they had bodies. Such confusion about the body, of course, is itself the result of cultural obfuscation. But in reacting against an animistic world-view not entirely unlike that of New Caledonia, Western culture has created collective deceptions of its own (Whitehead, 2002; under review).

### Looking Back, Looking Forward: The Tenth Anniversary Session

The final plenary was a panel discussion with Bernard Baars, Susan Blackmore, Stuart Hameroff and David Chalmers. Chalmers relegated himself to the role of chairman, but opened the proceedings with a brief historic overview and some general comments. He mentioned that some people have asked him whether or not it is time to drop the 'Toward' from the conference title, but thought this would be premature and somewhat hubristic. But what if this 'Toward' is equally hubristic?

Baars spoke about 'What's changed in the last ten years and what hasn't', repeating the gist of his and McGovern's workshop plus a somewhat bigger plug for Global Workspace Theory, which he acknowledged was 'still not accepted' by everyone (Blackmore having given a paper criticizing the theory). He thought that one of the most essential sources in the study of consciousness was research into volition, such as that presented by Daniel Wegner.

Blackmore took the opportunity to defend her and Daniel Dennett's position against accusations that they are ducking the issue of consciousness. 'We are not saying that consciousness isn't real,' she explained. 'We are saying it is real but it's not what we think it is.' This sounds suspiciously like, 'Consciousness is real but it isn't conscious.' She too invoked Wegner's research to buttress her own position, and summarized three ways to 'deconstruct the illusion'. The intellectual approach — looking at the brain and thinking, 'Somehow or other that's what's doing it,' did not impress her much. She valued the meditational approach and her own technique of 'disciplined self-questioning'. The more you look for the conscious self, she said, the more it disappears. During question time she waxed a little mystical, citing the Buddhist concept of 'no-self' to clarify her position.

So many presentations invoked the work of Wegner, Libet, and other doubters of free will, that I think this must be a central concern. Wegner has shown pretty convincingly that our sense of conscious will can be deceived by experimental manipulations. Chris Frith (2000) suggested that our sense of agency arises from comparison of the predicted consequences of an intended action and the actual consequences. The illusion of 'alien control' in schizophrenia may indicate deficient feedback from efferent processes.

My main problem with Wegner's paper this year was its title — 'Conscious Will: The Body's Way of Knowing What the Mind Is Doing'. I must have thought about it a hundred times and still cannot make sense of it. In what sense does the body 'know' about the mind? Does it have a mind of its own? Why does it *need* to know about the mind? Wegner's own explanation is no less confusing: he suggests that conscious will helps us to 'keep track of what our minds seem to be causing our bodies to do'. This is circular — but for the experience of will our minds would not 'seem' to be causing anything. And what would be the point of tracking something which only *seems* to be happening but actually isn't? I got even more lost when Wegner went on to say that experiences of conscious will may be authorship emotions that mark some actions as apparently our own, and

others as the doings of other agents and events. Whilst this may be essential to the development of a self concept, it only requires proprioception, which does not in itself produce a sense of conscious agency — for example, in simple reflexes and the illusion of alien control. Perhaps what Wegner really wants to say is that conscious will is the body's way of knowing what the body is doing, but he knows that is nonsensical. For if consciousness cannot affect the body, it cannot be the body's way of doing anything.

Of course any of our perceptions can be fooled — as in optical illusions, for example. This does not rule out the possibility that they are reliable the rest of the time. So I wonder why it is that cognitive scientists keep thinking they have disproved free will. Take Libet's now famous experiment. This is not a study of conscious will at all, because it takes no account of the difference between strategic and tactical decisions. All the volunteers in this experiment took the *strategic* decision of volunteering. The tactical decisions required by the experimental protocol were supposed to be unpredictable and unpremeditated. Finding that they actually were unpremeditated is entirely circular. I see no reason why low-level decisions should not be delegated to unconscious processes, as in the 'flow' experiences of athletes.

Wegner did ask the challenging question — Why is free will important to us anyway? Why does Libet cling to his idea of 'free won't' even though he thinks he has disproved free will? If Wegner thinks free will is a delusion, why does he have to invent a pseudo-mechanistic function for it?

The illusions of agency created by Wegner's experiments, like optical illusions, are presumably the result of confabulation — filling in the gaps with extrapolated data, which most of the time approximate reality well enough to be useful. Gazzaniga has shown that we will invent any fiction which helps to preserve our own sense of integrity and autonomy. The experience of will may be multi-layered, with a social level implicating self-value.

A more challenging question is — What does 'free will' actually *mean*? If I prefer porridge to cornflakes, am I 'free' to choose cornflakes? Why would I want to be so free, other than to prove a point, which implies a prior debate not of my making? If a tyrant commands you to do what you want to do anyway, in what sense are you not 'free'? Our notion of free will may simply reflect a western ideology of 'freedom and democracy'. Without this notion of 'freedom', the sense of agency would hardly be such an emotional issue (Calvinists seem quite happy with Predestination).

The problem for consciousness science, of course, is to understand if and how consciousness can have 'physical' consequences. It may be the case that the interaction between awareness and the experienced world takes place only at levels of 'first-order' awareness. Many valued, transcendent, and paranormal experiences seem to be unreflecting: Rhea White talked about 'flow' in 1998, and this year we heard Roy Baumeister on musical creativity (of unconscious origin but apparently requiring conscious editing) and Rainer Schneider on DMILS effects (obliterated by conscious will).

Stuart Hameroff took a different approach from that of Baars and Blackmore. Asking, 'Where are we now?' he dismantled some of the leading views at Tucson. The dominant neural-correlates paradigm, typified by Chris Koch, he characterized as: 'Let's declare victory and get out of here.' Steven Pinker's tactics he found equally obfuscatory: marginalizing the problem by cornering the market in everything else. As Koch maintains that the hard problem will melt away like vitalism, Dennett compares consciousness to the redundant concept of *élan vital*. In defiance of them all, Hameroff announced that vitalism is coming back in quantum form. He too ended on a mystical note, citing the Kabbalistic notion that reality is 99% a world of light (quantum subconscious), and 1% the world of aggravation in which we all live.

The session ended with the chairman's closing remark: 'That brings us to the end of another successful conference on consciousness.' Well, what else could he say?

## What Else Needs To Be Done?

The whole ethos of Tucson conferences appeared 'stuck' in 2000, and increasingly stuck since then. I believe this is because they are not doing their job, which is to face up to the fact that materialistic approaches are self-contradictory and powerless to deal with consciousness. Backing off from the problem has led to a growing tunnel-blindness — major areas of relevant science are increasingly neglected or ignored.

Take cosmology, for example. I have not checked through every abstract, but there has been no conspicuous mention of the anthropic cosmological principle. Even Stephen Hawking lapses into something like epistemological despair when he mentions it, and I would have thought that the extraordinary fact of a biocentric universe would be considered relevant at least by panpsychists and theologians. There have been few references to John Wheeler, and I think none to his hypothesis that the universe is created by its resident observers.

Even psychology is under-represented. I do not recall any plenary paper on social or developmental psychology, and can only attribute this to an assumption that 'information processing' is something that takes place in a vacuum. Intersubjectivity seems to be a peripheral issue, and the emphasis on integrating 'first-person' and 'third-person' approaches reveals a major blind spot in this area.

Stranger still, self-awareness research and consciousness research appear to behave like oil and water. When I presented a paper on self-awareness at Tucson 2000, I found myself in a concurrent session on 'metacognition' — a cumbersome term which can only help to perpetuate mechanistic and individualistic cognocentrism. Some reparation was made this year — in the plenary on 'animal metacognition' — albeit not wholly effectively. Anyone who has not read *Self-awareness in Animals and Humans* (Parker, Mitchell & Boccia, 1994) should do so immediately.

I also wonder what happened to the Exceptional Human Experience Network. Rhea White and Susan Brown gave a very informative workshop in 1998, which did challenge the physicalist paradigm. I do appreciate the contributions of

Charles Tart and all who represent the contemplative traditions, but what about the spontaneous phenomena explored in pioneering works such as *The Varieties of Religious Experience* (James, 1917) and *The Spiritual Nature of Man* (Hardy, 1975)?

The most fateful and revealing omissions, however, are mainstream anthropological disciplines such as social, biological, and palaeo-anthropology. The only anthropologists I see presenting with any regularity at Tucson are Michael Winkelman, Stanley Krippner and Barbara Crow. These three are cultural anthropologists, representing an important but distinctive American tradition with a primarily cognitive approach. Social anthropology is more rooted in the idea of society as an emergent *sui generis* system (Simmel, 1899) dependent on collective representations (Durkheim, 1912), collective deceptions (Marx & Engels, 1846), and social theatre (Turner, 1982). Social anthropology inherits one of the oldest traditions of theorizing about human self-consciousness, beginning with Hegel ('We become conscious through acting on the world': 1807), Marx and Engels ('We become conscious through labour': 1846), and Dilthey ('We become conscious through the meaningful objectifications of others': 1883–1911).

There are many reasons why social anthropology has a crucial role to play in consciousness science, but I have only space to mention two:

(1) Universals of human mentation and behaviour can only be established by cross-cultural research.
(2) Cross-cultural data reveal that it is the *job* of human culture to obfuscate our view of ourselves and the world we live in.

Science is, at least potentially, a metacultural project. The great power and value of science lies in its ability to emancipate us from the negative aspects of our own cultural heritage, including the collective deceptions that created the 'problem of consciousness' in the first place. As that problem has a deceptive origin, then consciousness science is not really a science at all, since its ultimate goal must be to render itself obsolete, or claim all other sciences as its own.

## References

Adolphs, R. (1999), 'Social cognition and the human brain', *Trends in Cognitive Sciences*, **3** (12), pp. 469–79.
Baldwin, J.M. (1894), *Social and Ethical Interpretations of Social Life* (London: Macmillan 1902).
Baruss, I. & Moore, R.J. (1998), 'Beliefs about consciousness and reality of participants at Tucson II', *Journal of Consciousness Studies*, **5** (4), pp. 483–96.
Bourdieu, P. (1972), *Outline of a Theory of Practice*, trans. R. Nice (Cambridge: Cambridge University Press 1977).
Chalmers, D.J. (1995), 'Facing up to the problem of consciousness', *Journal of Consciousness Studies*, **2** (3), pp. 200–19.
Chalmers, D.J. (2004), Chairman's remarks in 'Tenth anniversary session: looking back, looking forward', *Toward a Science of Consciousness: Tucson 2004*.
Cooley, C.H. (1902), *Human Nature and the Social Order* (New York: Scribner).
Crick, F. (1994), *The Astonishing Hypothesis: The Scientific Search for the Soul* (London: Simon & Schuster).
Dennett, D.C. (1991), *Consciousness Explained* (London: Allen Lane/Penguin).
Dilthey, W. (1883–1911), *Selected Writings*, ed. H.P. Rickman (Cambridge: Cambridge University Press 1976).

Durkheim, E. (1912), *The Elementary Forms of the Religious Life* (London: Allen & Unwin 1964).
Frith, C. (2000), 'The control of action and the experience of agency', *Toward a Science of Consciousness: Tucson 2000* [PL9: What is the Relationship Between Consciousness and Volition? Abstract 130].
Gazzaniga, M.S. (1967), 'The split brain in man', *Scientific American*, **217**, pp. 24–9.
Gopnik, A. & Meltzoff, A.N. (1994), 'Minds, bodies and persons: young children's understanding of the self and others as reflected in imitation and theory of mind research', in *Self-awareness in Animals and Humans*, ed.S.T. Parker, R.W. Mitchell & M.L. Boccia (Cambridge: Cambridge University Press).
Hameroff, S.R. (2000), 'Quantum computation in the brain? Decoherence and biological feasibility', *Toward a Science of Consciousness: Tucson 2000* [PL12: Is Quantum Computation Relevant to Consciousness? Abstract 303].
Hameroff, S. & Tuszynski, J. (2004), 'Spintronics: Nature's solution to the problem of decoherence in the brain?', *Toward a Science of Consciousness: Tucson 2004* [C6: Subcellular and Quantum Brain Processes: 103].
Hardy, Sir A. (1979), *The Spiritual Nature of Man* (Oxford: Clarendon).
Harris, P. (1991), 'The work of the imagination', in *Natural Theories of Mind: Evolution, Development and Simulation of Everyday Mindreading*, ed. A. Whiten (Oxford: Blackwell).
Hawking, S. (1988), *A Brief History of Time* (New York: Bantam).
Hegel, G.W.F. (1807), *Phenomenology of Spirit*, trans. A. Miller (Oxford: Oxford University Press 1977).
James, W. (1902), *The Varieties of Religious Experience: A Study in Human Nature* (London: Penguin Classics 1985).
Knight, C. (1991), *Blood Relations: Menstruation and the Origins of Culture* (New Haven & London: Yale University Press).
Knight, C. (1998) 'Ritual/speech coevolution: a solution to the problem of deception', in *Approaches to the Evolution of Language: Social and Cognitive Bases*, eds. J.R. Hurford, M. Studdert-Kennedy & C. Knight (Cambridge: Cambridge University Press).
Kuhn, T.S. (1962), *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press 1970).
Leenhardt, M. (1949), *Do Kamo: Person and Myth in the Melanesian World* (Chicago: University of Chicago Press 1979).
Marx, K. & Engels, F. (1846), *The German Ideology* (London: Lawrence & Wishart 1974).
Mead, G.H. (1934), *Mind, Self and Society*, ed. C.W. Morris (Chicago: University of Chicago Press 1974).
Pinker, S. (1997), *How the Mind Works* (London: Penguin).
Simmel, G. (1968), *The Conflict in Modern Culture and Other Essays*, ed. F.P. Etzfern (New York).
Storr, A. (1993), *Music and the Mind* (London: Harper Collins).
Sutherland, K. (1998), 'Tucson III: A personal view', *Journal of Consciousness Studies*, **5** (4), pp. 497–503
Turner, V. (1982), *From Ritual to Theatre: The Human Seriousness of Play* (New York: PAJ Publications).
Varela, F.J. (1996), 'Neurophenomenology: A methodological remedy for the hard problem', *Journal of Consciousness Studies*, **3** (4), pp 330–49.
Watson, D.E., Schwartz, G.E. & Russek, L.G. (1998), 'A comprehensive theory of consciousness I: Enformy and enformed systems', *Toward a Science of Consciousness: Tucson 2004* [Po2d: Physical and Biological Science: Abstract 308].
Whitehead, C. (2001), 'Social mirrors and shared experiential worlds', *Journal of Consciousness Studies*, **8** (4), pp. 3–36.
Whitehead, C. (2002), 'Cultural and political origins of the "hard problem"', *Toward a Science of Consciousness: Tucson 2002* [P3: Philosophy: Abstract 68].
Whitehead, C. (2004), 'Evolution of the human brain', *Toward a Science of Consciousness: Tucson 2004* [C20: Evolution of Consciousness: Abstract 212].
Whitehead, C. (under review), 'Political origins of the "hard problem"'.
Whitehead, C. & Turner, R. (2000), 'Is role-play a default state for human consciousness?' *Toward a Science of Consciousness: Tucson 2000* [C10: Metacognition: Abstract 281].