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Introduction by
John Brockman

On February 10, 1999, The Guardian-Dillons Debate at the Westminster Central Hall in London featured Richard Dawkins and Steven Pinker in an event chaired by Tim Radford, Science Editor of *The Guardian*. Sold out weeks in advance, the evening attracted 2,300 attendees, with hundreds waiting outside. It was one of the toughest tickets in London in years.

The evening echoes an event held in Munich last November, "The Digital Planet", for which a thousand people turned out in a driving rainstorm to see and hear Dawkins and Pinker as well as Daniel C. Dennett and Jared Diamond introduced by Douglas Adams. More than a hundred journalists were in the audience. The lobby of the hotel looked more like the press center for a presidential election campaign.

Clearly, something is happening with this group of intellectuals.

While *The Guardian*-Dillons series is characterized as a "debate", Dawkins and Pinker, who are in general agreement across broad areas, presented what I would characterize as a "a high level seminar." As Dawkins pointed out: "The adversarial approach to truth isn't necessarily always the best one. On the contrary, when two people disagree strongly, a great deal of time may be wasted. It's been well said that when two opposite points of view are advocated with equal vigor, the truth does not necessarily lie mid-way between them. And in the same way, when two people agree about something, it's just possible that the reason they agree is that they're both right. There's also I suppose the hope that in a dialogue of this sort each speaker may manage to achieve a joint understanding with the other one, better than he would have done on his own."

-JB

RICHARD DAWKINS is an evolutionary biologist and the Charles Simonyi Professor For The Understanding Of Science at Oxford University; Fellow of New College; author of *The Selfish Gene* (1976), 2d ed. 1989), *The Extended Phenotype* (1982), *The Blind Watchmaker* (1986), *River out of Eden* (1995) (*ScienceMasters*

Series), *Climbing Mount Improbable* (1996), and *Unweaving the Rainbow* (1998).

(Click here for Dawkins on *Edge*)

STEVEN PINKER is professor in the Department of Brain and Cognitive Sciences at MIT; director of the McDonnell-Pew Center for Cognitive Neuroscience at MIT; author of *Language Learnability and Language Development* (1984), *Learnability and Cognition* (1989), *The Language Instinct* (1994), and *How the Mind Works* (1997).

(Click here for Pinker on *Edge*)

TIM RADFORD is Science Editor of *The Guardian*

Edge thanks *The Guardian* and Dillons for permission to run the Guardian-Dillons Debate at the Westminster Central Hall on February 10, 1999

Richard Dawkins & *Steven Pinker*

Is Science Killing The Soul?

Chaired by Tim Radford

TIM RADFORD: My name is Tim Radford; I'm the science editor of *The Guardian*. And I'm here to do a very strange thing, I'm here to introduce two people who obviously need no introduction whatsoever, otherwise you wouldn't be here. There are I gather 2,300 of you, and there are another three or four hundred weeping and gnashing their teeth outside. So you knew why you were coming. You thought you knew what you were going to hear. What you are going to hear is from two great story tellers of modern science. Science is a story, we're story-telling animals, we tell each other stories to explain why we're here, and since we don't know the outcome of our narrative, we conduct these things in the form of a story-so-far. This is what science does for us, but of course we've always done that. live later.

There are three great stories in science. One of them is where the universe came from. One of them is where life came from. And the third is where we came from. Now this last aspect breaks into several different aspects, really. One is: who is this

person called a human -- or indeed who is this person called a person? Where did he come from, or she? Why are we here? What are we doing, where are we going? And how did we get here, and why did one particular group of creatures on the plains of Africa suddenly pick up a stone and start playing with it, scratching things, or skinning things, doing things, going places, colonizing the globe. The second question is not about the entity called human, but the identity within that entity. What is this mind for? Why is it so big? Why could it encompass absolutely anything? Why does any mind seem to be able to encompass absolutely everything? It's all we've got, but we're not that conscious of it. We think we're occupying reality, but of course it's only our brain that tells us this. We have people here who can explain this much better than I can.

What's going on? Well, we have reached a curious situation in science in which it's possible for people to propose that science might be able to provide all the answers. Neither of the two guests tonight actually make these claims, but there are scientists who do claim such things. And one of the pieces of machinery that they use is sometimes known as Darwinism, or the theory of evolution, or just the action of natural selection upon random mutation. It doesn't really matter, because we're just going to call it tonight, Darwinism. At least I am. Professor Dawkins will actually have a better explanation if you ask him.

Is it important to us? Yes it is important. Natural selection is the environment. We started altering our environment back at the beginning of the 19th century. We have now comprehensively changed it, so we run the world for our benefit, and every now and then it gets a bit fragile at the edges, we have to start worrying about the ozone layer, or the carbon dioxide crisis -- but we have changed the environment. More alarmingly, we have begun to understand how we could change ourselves; we could take charge of our own genes. We aren't doing it yet. You hear talk about designer babies; there are no such things, but we have reached the stage where we have to ask ourselves whether we want some of our babies. We can now see what kind of baby we might be about to have, and people are suddenly thrust into the position of having to ask themselves, what is a gene, what does it do, and how will it all turn out? So these are very important questions, and they do actually concern us. These questions are not academic.

Nor are they new. There's a wonderful passage in the Book of Job, Chapter 38, I think, in which the poet who composed Job speaks as if God, and asks Job a series of questions which begin, Hath the rain a Father? Who hath begot the drops of dew? out of whose womb came the ice? and the hoary frost of Heaven, who hath engendered it? the waters are hid as with stone, and the face of the deep is frozen. Canst thou bind the sweet influence of Pleiades, or loose the bands of Orion?? Now that of course is great poetry, and one of the issues that we are discussing here is whether science is killing the soul in the sense of poetry. All I point out to you is that that is a series of questions about the hydrological cycle, you cannot say that it's just poetry, they are also real questions which demand real answers, which people are supplying, scientists among them.

We have with us tonight two extraordinarily gifted writers. One of them is Richard Dawkins, Charles Simonyi Professor of Public Understanding of Science at the University of Oxford, and he's the man who more than two decades ago introduced the notion of the selfish gene, upsetting a lot of people, creating a debate that hasn't

stopped yet. He followed this up with a series of dazzling books, of which the latest is called *Unweaving the Rainbow*, which is not just about Darwinism, but about science itself, and about our understanding of the planet we live on. The other is Steven Pinker, who is a professor of psychology at the Massachusetts Institute of Technology. And he leapt onto the best-seller list about three years ago with a wonderful book called *The Language Instinct*, which was just about this remarkable ability that 3-year-olds have to learn any grammar that happens to be lying around, with the implication that either babies are born knowing, in principle, all the languages that have ever been invented, or yet to be invented, -- or that there is a universal grammar and it's already composed in their own brains. If so, what a remarkable thing the brain is. I'll let them talk about that. The subject tonight is "Is Science Killing the Soul?" You will not find this a straight-forward head-to-head debate in which one man says yes and the other says no. It all depends, as Professor Joad used to say, on what you mean by soul. Richard Dawkins.

RICHARD DAWKINS: Thank you very much, Tim. But the word debate does appear up on the notice there. It may turn into more of a dialogue than a debate. I suspect that Steve Pinker and I are perhaps largely of the same mind here, so there's a risk that anybody who's come here expecting a confrontation will go away disappointed by too much agreement. I don't know if this will happen, but if it does, I don't think there's any need to apologize. The adversarial approach to truth isn't necessarily always the best one. On the contrary, when two people disagree strongly, a great deal of time may be wasted. It's been well said that when two opposite points of view are advocated with equal vigor, the truth does not necessarily lie mid-way between them. And in the same way, when two people agree about something, it's just possible that the reason they agree is that they're both right. There's also I suppose the hope that in a dialogue of this sort each speaker may manage to achieve a joint understanding with the other one, better than he would have done on his own.

Is science killing the soul? This is a cunning title, because it cunningly mixes two different meanings of soul. The first and oldest meaning of soul, which I'm going to call Soul One, takes off from one set of definitions. I'm going to quote several related definitions from the Oxford dictionary:

"The principle of life in man or animals -- animate existence."

"The principle of thought and action in man commonly regarded as an entity distinct from the body, the spiritual part of man in contrast to the purely physical."

"The spiritual part of man regarded as surviving after death, and as susceptible of happiness or misery in a future state."

"The disembodied spirit of a deceased person regarded as a separate entity and as invested with some amount of form and personality."

So Soul One refers to a particular theory of life. It's the theory that there is something non-material about life, some non-physical vital principle. It's the theory according to which a body has to be animated by some anima. Vitalized by a vital force. Energized by some mysterious energy. Spiritualized by some mysterious

spirit. Made conscious by some mysterious thing or substance called consciousness. You'll notice that all those definitions of Soul One are circular and non-productive. It's no accident. Julian Huxley once satirically likened vitalism to the theory that a railway engine works by "force-locomotif." I don't always agree with Julian Huxley, but here he hit the nail beautifully. In the sense of Soul One, science has either killed the soul or is in the process of doing so.

But there is a second sense of soul, Soul Two, which takes off from another one of the Oxford dictionary's definitions:

"Intellectual or spiritual power. High development of the mental faculties. Also, in somewhat weakened sense, deep feeling, sensitivity."

In this sense, our question tonight means, Is science killing soulfulness? Is it killing esthetic sensitivity, artistic sensibility, creativity? The answer to this question, Is science killing Soul Two?, is a resounding No. The very opposite is the case. But it is a question worth pursuing, because there have been many people, from genuinely great poets all the way down to Brian Appleyard and Fay Weldon, who've given a strong Yes answer to the question, Is science killing the soul? It's Soul Two that Keats and Lamb meant when they thought that Newton had destroyed all the poetry of the rainbow when he unwove it.

"Do not all charms fly
At the mere touch of cold philosophy?
There was an awful rainbow once in heaven;
We know her texture; she is given
In the dull catalogue of common things,
Philosophy will clip an Angel's wings,
Conquer all mysteries by rule and line,
Empty the haunted air, and gnomed mine‹
Unweave a rainbow . . ."

Well, I've written a book which is one long reply to that particular kind of anti-scientific attitude. In the sense of Soul Two, science doesn't kill the soul, it gives the soul constant and exhilarating re-birth.

Turning back to Soul One -- in the first chapter of Steve Pinker's book *How the Mind Works* he says, "I want to convince you that our minds are not animated by some godly vapor or single wonder-principle. The mind, like the Apollo spacecraft, is designed to solve many engineering problems, and thus is packed with high-tech systems, each contrived to overcome its own obstacles." In the same paragraph, he moves on to Soul Two when he says, " . . . I believe that the discovery by cognitive science and artificial intelligence of the technical challenges overcome by our mundane mental activity is one of the great revelations of science, an awakening of the imagination comparable to learning that the universe is made up of billions of galaxies or that a drop of pond water teems with microscopic life." Well, awakening of the imagination is a pretty good definition of Soul Two. And in that sense, far from killing the soul, science may prove to be its greatest awakener.

Carl Sagan wrote, shortly before he died,

"How is it that hardly any major religion has looked at science and concluded, 'This is better than we thought! The Universe is much bigger than our prophets said, grander, more subtle, more elegant'? Instead they say, 'No, no, no! My god is a little god, and I want him to stay that way.' A religion, old or new, that stressed the magnificence of the Universe as revealed by modern science might be able to draw forth reserves of reverence and awe hardly tapped by the conventional faiths."

Well it's common enough for people to agree that religions have got the facts all wrong, but "Nevertheless," they go on to say, "you have to admit that religions do provide something that people need. We crave a deeper meaning to life, a deeper, more imaginative understanding of the mystery of existence." Well, in the passage I've just quoted, Sagan seems to be criticizing religions not just for getting it wrong, which many people would accept, but for their deficiencies precisely in the sphere in which they are supposed to retain some residual virtue. Religions are *not* imaginative, not poetic, not soulful. On the contrary, they are parochial, small-minded, niggardly with the human imagination, precisely where science is generous.

Now, there are, of course many unsolved problems, and scientists are the first to admit this. There are aspects of human subjective consciousness that are deeply mysterious. Neither Steve Pinker nor I can explain human subjective consciousness -- what philosophers call qualia. In *How the Mind Works* Steve elegantly sets out the problem of subjective consciousness, and asks where it comes from and what's the explanation. Then he's honest enough to say, "Beats the heck out of me." That is an honest thing to say, and I echo it. We don't know. We don't understand it.

There's a cheap debating trick which implies that if, say, science can't explain something, this must mean that some other discipline can. If scientists suspect that all aspects of the mind have a scientific explanation but they can't actually say what that explanation is yet, then of course it's open to you to doubt whether the explanation ever will be forthcoming. That's a perfectly reasonable doubt. But it's *not* legitimately open to you to substitute a word like soul, or spirit, as if that constituted an explanation. It is not an explanation, it's an evasion. It's just a name for that which we don't understand. The scientist may agree to use the word soul for that which we don't understand, but the scientist adds, "But we're working on it, and one day we hope we shall explain it." The dishonest trick is to use a word like soul or spirit as if it constituted an explanation.

Consciousness is still mysterious. And scientists, I think, all admit it. But we ought to remember that it's not that long ago that life itself was thought to be equally mysterious. I'm going to quote from a book, *A Short History of Biology* by Charles Singer, a reputable historian of science, published in 1931, where he says, about the gene,

". . . despite interpretations to the contrary, the theory of the gene is not a 'mechanist' theory. The gene is no more comprehensible as a chemical or physical entity than is the cell or, for that matter, the organism itself. . . . If I ask for a living chromosome, that is, for the only effective kind of chromosome, no one can give it to me except in its living surroundings any more than he can give me a living arm or leg. The doctrine of the relativity of functions is as true for the gene as it is for any of the organs of the body. They exist and function only in relation to other organs. Thus the last of the biological theories leaves us where the first started, in

the presence of a power called life or psyche which is not only of its own kind but unique in each and all of its exhibitions."

That was 1931. In 1953, Watson and Crick drove a coach and horses through it, blew it out of the water. Genes are isolatable, they can be taken out of bodies, they can be sequenced, they can be put in bottles, they can be written out in a book and stored away in a library, and then at any time in the future they can be simply typed back into a machine and the original gene reconstituted. It could be put back into a living creature where it will work exactly the way it originally did. In the context of the gene, the understanding, the explanation is more or less total. And it was completely unexpected only a few decades ago.

My suspicion, my hunch, my hope, is that the same thing is going to be done for the conscious mind. Probably within the next century. Soul One will finally be killed, and good riddance. But in the process, Soul Two, far from being destroyed, will still be finding new worlds to conquer.

I'm going to end my prepared remarks by saying a little bit about Darwinism, because Darwinism is something which obviously Steve Pinker and I have in common in our approach to science. This, I think, may be the one place where possibly some slight disagreement may emerge. For me, Darwinism is not actually, surprisingly enough, the theory of the selfish gene. It's the theory of the selfish replicator. Darwinism is a much more general idea than the particular version of Darwinism which happens to explain life on this planet. Darwinism in this more general universal sense refers to the differential survival of any kind of self-replicating coded information which has some sort of power or influence over its probability of being replicated. DNA is the main kind of replicating entity that we know on this planet that has that property. When we look at living things on this planet, overwhelmingly the kind of explanation we should be seeking, if we ask what the functional significance is an explanation in terms of the good of the genes. Any adaptation is for the good of the genes which made that adaptation.

STEVEN PINKER: I'm going to discuss an idea that elicits wildly opposite reactions. Some people find it a shocking claim with radical implications for morals and every value that we hold dear. Other people think that it's a claim that was established a hundred years ago, that the excitement is only in how we work out the details, and that it has few if any implications for our values and ethics. That is the idea that the mind is the physiological activity of the brain, in particular the information processing activity of the brain; that the brain, like other organs, is shaped by the genes; and that in turn, the genome was shaped by natural selection and other evolutionary processes. I am among those who think that this should no longer be a shocking claim, and that the excitement is in fleshing out the details, and showing exactly how our perception, decision-making, and emotions can be tied to the activity of the brain.

Three new sciences are now vividly rooting our mental processes in our biology. Cognitive neuroscience, the attempt to relate thought, perception and emotion to the functioning of the brain, has pretty much killed Soul One, in Richard's sense. It should now be clear to any scientifically literate person that we don't have any need for a ghost in the machine, as Gilbert Ryle memorably put it. Many kinds of evidence show that the mind is an entity in the physical world, part of a causal

chain of physical events. If you send an electric current through the brain, you cause the person to have a vivid experience. If a part of the brain dies because of a blood clot or a burst artery or a bullet wound, a part of the person is gone -- the person may lose an ability to see, think, or feel in a certain way, and the entire personality may change. The same thing happens gradually when the brain accumulates a protein called beta-amyloid in the tragic disease known as Alzheimer's. The person -- the soul, if you want -- gradually disappears as the brain decays from this physical process.

We know that every form of mental activity -- every emotion, every thought, every percept -- gives off electrical, magnetic, or metabolic signals that can be recorded with increasing precision by Positron Emission Tomography, functional Magnetic Resonance Imaging, Magnetoencephalography, and other techniques. We know that if you take a knife and section the corpus callosum (which joins the two cerebral hemispheres) you have the equivalent of two minds -- perhaps even two souls -- in the same skull. We know that if you look at the brain under a microscope it has a breathtaking degree of complexity -- on the order of a trillion synapses -- that's fully commensurate with the breathtaking complexity of human thought and experience. We know that when the brain dies, the person goes out of existence. I consider it to be a significant empirical discovery that one cannot communicate with the dead, and excellent evidence that Soul One, in Richard's sense, does not exist.

A second science, behavioral genetics, has shown that there is a fascinating degree of specificity in our genome. You've all heard of the remarkable studies of monozygotic twins reared apart, who are remarkably similar in intelligence, personality, and attitudes -- even in their opinion on the death penalty and their tastes in music and clothing. And just in the past year there have been discoveries of genetic markers, and in some case genes and even gene products, associated with mental traits such as intelligence, spatial cognition, control of speech, the desire to seek sensation, and the tendency to be overly anxious.

The third science that's connecting mind to biology is evolutionary psychology, which takes an approach to understanding the mind that has long been fruitful in understanding the organs of the body. We can't make sense of an organ like the eye without considering it to have a function, or a purpose - not in a mystical, teleological sense, but in the sense of an illusion of engineering. That illusion, we now know, is a consequence of Darwin's process of natural selection. Everyone agrees that the eye is a remarkable bit of natural "engineering," and that may now be explained as a product of natural selection rather than as the handiwork of a cosmic eye-designer or as a massive coincidence in tissue formation. But the eye by itself is useless -- unless it's connected to a brain. The eye does not carry out its function by dumping optical information into a yawning chasm. Rather, the eye is hooked up to parts of the brain -- anatomically speaking, the eye is an extension of the brain -- and those parts contain circuits for analyzing the incoming visual material, for recovering the shapes and colors and motions in the world that gave rise to the stimulation of the eye. The perception of a world of colored 3-D objects, in turn, feeds into a system of categorization, allowing us to make sense of our experience, to impute causes to events, and to remember things in terms of their significant categories. And in turn, those categories themselves would be useless unless they were organized in service of certain goals, goals set by our emotions.

Beginning with the eye, we have a chain of causation that leads to the study of faculties of mind, or modules, or subsystems, each of which can be seen as an adaptation akin to the adaptations in the organs of the body. Recent research has shown that aspects of the psyche that were previously considered mysterious, quirky, and idiosyncratic -- such as phobias, an eye for beauty, the tendency to fall in love, a passionate desire for revenge in defense of honor -- turn out to have a subtle evolutionary logic when they are analyzed in the way in which we have always analyzed the organs of the body.

I find these developments to be exhilarating; they are a fulfillment of the ancient imperative to know thyself. They also have important practical implications. Alzheimer's Disease, to cite just one example, will be one of the leading causes of human misery in the industrial world over the next several decades, as we live longer and stop dying of other things. Successful treatment of Alzheimer's will not come from prayer or wishful thinking or reasoning about soul one; it will come from treating memory and personality as biochemical phenomena.

Nonetheless, as I mentioned at the outset, not everyone shares this excitement. Sometimes the reaction of people who learn about these new sciences is uneasy ambivalence. The American author Tom Wolfe wrote an article called "Sorry, But Your Soul Just Died," a mixture of admiration and apprehension over the frontiers of cognitive neuroscience and evolutionary psychology. A reviewer of my book *How the Mind Works*, alluding to the rock and roll band, said that I was describing people as Meat Puppets, and several reviewers, to my puzzlement, asked whether, if I were right, life would be worth living. I am puzzled by these reactions, which are never backed up by argument, only by indignation and high dudgeon. But I'll do my best to recover the values and reasoning that lead to them, and to show why I think they are misguided.

One reason I find the reaction strange is that I can't imagine how anything coming out of the laboratory, computer, or theoretician's notebook could possibly subtract from what is the meaning of life, or Richard's sense of Soul two. Why keep on living if our minds are the physiological activity of the brain? Well, for starters there's natural beauty, and works of great art, and ethical ideals, and love, and bringing up children, and enjoying friends, and discovering how the world works -- I could go on. Why should the worth of any of those activities depend on the existence of a ghost in the machine?

Clearly there can be reasons that some people feel threatened by the idea that the mind is the activity of the brain, and here are my guesses about what they are. One is that since natural selection is not a process that is guaranteed to produce niceness, many typical human motives will not necessarily lead to ethically desirable outcomes. Much of the research in evolutionary psychology has shown that many ignoble motives have some basis in natural selection. An example is the desire, most obvious in men, to defend one's honor and reputation, by violence if necessary. Another is the characteristically male motive to seek a variety of sexual partners. It's easy to work out why those motives evolved, and there is by now an enormous body of evidence that they are widespread among humans. But people reject the explanation because of what they think is the subtext. If these motives are part of our nature, if they come from the natural world, well, everyone knows that natural things are good -- natural childbirth, natural yogurt, and so on -- so that

would imply that promiscuity and violence aren't so bad after all. And it implies that since they are "in the genes," they are unchangeable, and attempts to improve the human condition are futile.

I think both parts are wrong -- the first part is so obviously wrong that it has been given a name, the naturalist fallacy, the idea that what we find in nature is good. What we find in nature is not necessarily good; as Richard has put it, the universe is not good or bad, it's indifferent. Certainly violence and philandering and all of the other sins are immoral whether their cause is the genes, or the wiring of the brain, or social conditioning, or anything else. It behooves us to find the causes, but the causes don't change the moral coloring of those acts.

Also, the human mind, I argue, is a complex system of many interacting parts. Even if one motive impels people to do immoral acts, other parts of the mind that can subvert its designs. We can think of the long-term consequences, and we can imagine what society would be like if everyone acted on a particular motive. The part of the mind that has those thoughts can disengage the part of the mind that has less noble motives.

I think a second discomfort with the biological approach to the human mind is the worry that it somehow makes our ideals a sham or less real. Life would be a Potemkin Village, where there's only a facade of value and worth, but really biology is showing that there's nothing behind the facade. For example, if we love our children because the genes for loving children are in the bodies of those children and so the genes are benefiting themselves, doesn't that undermine the purity or the value of that love? If our ethical ideals, our sense of justice and fairness, were selected for because it did our ancestors good in the long run, would that imply that there's no such thing as altruism or justice, that deep down we're really selfish?

I think that this reaction is based on a misreading of Richard's metaphor of the selfish gene. It's not because of what Richard actually said in his book *The Selfish Gene*, which is crystal clear. But here's how it could be misread: the theory says that one can make powerful predictions about the process of natural selection by imagining that the gene has a selfish motive to make copies of itself. Of course no one ever thought that a gene has real motives in the sense that people have motives, but it this is a valuable way to gain insight about the subtleties of natural selection, especially when it comes to social interactions, and it leads to many correct predictions.

Here is the distortion. People think that genes are our deepest hidden self, our essence, so if our genes are selfish, that means that deep down *we're* selfish. It's an unholy hybrid of Freud's idea of unconscious motivation and the straightforward modern theory of the natural selection of replicators. Now, I think I'm safe to say that it was not intended by Richard, and it doesn't follow from the logic of the theory. The metaphorical motives of the genes are not somehow a more fundamental or honest version of the real motives of the entire person. Indeed, sometimes the most "selfish" thing a gene can do, in this metaphorical sense of selfish, is to build a brain that is not selfish -- not selfish at an unconscious level, not selfish at any level -- even if the genes are themselves metaphorically selfish.

When we love our children we aren't at any level of the brain calculating that it will increase our inclusive fitness. The love can be pure and in and of itself in terms of what's actually happening in the brain. The selfishness of genes explains why we have that pure emotion.

The idea that morality itself would be a fiction if our moral reasoning came out of some evolved moral sense is also a non sequitur. The fear comes from the fact that we know that many aspects of human experience are in some sense figments. The qualitative distinction between red, yellow, green, and blue, for example, is not out in the world; it's just the way our brain imposes arbitrary cuts in the continuous spectrum of the wavelength of light. Well, if the qualitative difference between red and green is a figment -- it's just the way we're built, it doesn't have any external reality -- could right and wrong also be a figment? Would the sense of worth that comes from pursuing justice and fairness be a sham, just a way of tickling our pleasure centers and making us feel good because of the flow of chemicals or the wiring diagram of the brain?

Not at all. This supposed devaluation of morality does not follow from the idea that we have an evolved moral sense. Many of our faculties evolved to mesh with real things in the world. We have a complicated system of depth perception and shape recognition that prevents us from bumping into trees and falling off cliffs. The fact that our ability to recognize an object comes from complicated circuitry of the brain does not mean that there aren't real objects out there. Indeed, the brain evolved in order to give us as accurate a representation as possible of what is objectively out in the world.

That may also be true, at least according to some philosophical arguments, for morality. Many philosophers believe that some abstract entities, such as numbers, have an existence independent of minds. That is, many philosophers and mathematicians believe that the number three is not just a figment in the way that the color red is, but that it has a real existence, which mathematicians discover and explore with their mathematical faculties; they don't invent it. Similarly, many moral philosophers argue that right and wrong have an existence, and that our moral sense evolved to mesh with them. Even if you don't believe that, there's an alternative that would make the moral sense just as real -- namely, that our universal moral sense is constituted so that it can't work unless we believe that right and wrong have an external reality. So if you want to stop short of saying that moral truths exist outside us, you can say that we can't reason other than by assuming that they do. In that case, when we get down to having a moral debate, we still appeal to external standards of right and wrong; we aren't reduced to comparing idiosyncratic emotional or subjective reactions.

The final disquiet, I think, that is elicited by the naturalist or biological approach to the mind, is that it robs us of responsibility. If we act only because of ricocheting molecules in the brain, shaped by the genes which in turn were shaped by natural selection -- if it's billiard balls all the way down and all the way back -- then how can we hold someone responsible for his actions, given that there is no "he" that caused them? I agree this is a fascinating puzzle, but I don't think it has anything particular to do with cognitive neuroscience or behavioral genetics or evolutionary psychology. It's a problem that is raised by *any* attempt to explain behavior, regardless of the nature of the explanation. You all remember the scene in "West

Side Story" in which the gang of juvenile delinquents explains to Sergeant Krupke, "We're depraved on account of we're deprived":

> "Dear kindly Sergeant Krupke, You gotta understand, It's just our bringing up-ke, That gets us out of hand. Our mothers all are junkies, Our fathers all are drunks. Golly Moses, naturally we're punks!"

Sondheim's lyrics send up the psychoanalytic and social-science exculpations of bad behavior that were popular in the 1950s, and the non-biological excuses continue. In the 1970s, Dan White was given a light sentence for murdering the mayor of San Francisco because his mind was addled from too much junk food, the infamous Twinkie Defense. In the 1990s, the lawyer for the Menendez brothers argued her way to an acquittal based on her client's diminished responsibility because of childhood sexual abuse. Any time someone explains behavior, biologically or otherwise, a thoughtless observer can imagine that the explanation absolves the actor of responsibility. According to an old saying, to understand is not to forgive. If a moral system locates responsibility in a ghost in the machine, we need to revise the moral system, because the ghost is being exorcised, but we still need the notion of individual responsibility. Any ethical theory that is challenged by some outcome from the laboratory is a defective, or at least an incomplete, ethical theory.

Yesterday I was on the radio with a professor of divinity who said it was crucial that we retain the idea of a unified self, a part of the brain where it all comes together -- the ethical system of two billion people depends on it, he said. I replied there's considerable evidence that the unified self is a fiction -- that the mind is a congeries of parts operating asynchronously, and that it's only an illusion that there's a president in the Oval Office of the brain who oversees the activity of everything. He said, "I hope that's not true, because if it is we'll have to change our ethical system." I think this is an unwise way of doing moral reasoning. He might be right; I suspect that he's wrong; but whether he's right or wrong, we don't want the morality of killing and raping and lying and stealing to depend on what comes out of the psychology lab down the hall. We need our ethical system to be more robust than that -- it's always wrong to kill people, and we need an ethical system for which that's axiomatic.

To conclude -- we look with wry amusement at the debates in cosmology of three or four hundred years ago, in which great moral significance was attached to the debate between the geocentric and heliocentric theories. It was considered not to be just an empirical question of science, but a problem of great moral weight whether the earth went around the sun or the sun went around the earth. Now we look back and see that this was all rather silly. Either one theory is true or the other one is true, and people had to find out which is which. Any notion that meaning, purpose, ethics, morals and so on hinge on that contingent fact of cosmology came from unsound reasoning. I suspect that the idea that meaning, purpose, and morals hinge on a Soul one, a ghost in the machine, will have the same fate. The ghost in the machine has been exorcised, and meaning and values are none the worse for it. Thank you very much.

RADFORD: If there is a sense of good which is independent of us, who put it

there? If a sense of god is a product of evolution, why do we all have such a consistent idea of a divine experience. When one reads the lives of the saints, one comes across the same phenomenon. We can't all have the same brains, or we don't all have the same brains -- why are all these things -- I know these questions are going to be asked, so I'll get them in now, if you don't mind. Richard? Or who wants to start with that one.

PINKER: As for the first question, who put them there -- it may be like the question, "Who put the number three there?" It would be best to get a real moral philosopher to defend the theory of moral realism, but I'll do my best. Perhaps morality comes from the inherent logic of behavior that has consequences for other agents that have goals. If one of the goals is to increase total well-being, then certain consequences may follow in the same way that the Pythagorean theorem follows from the construction of a triangle. Moral truths may exist in the same sense that mathematical truths exist, as consequences of certain axioms. That's my best rendition of the premises of a theory of moral realism.

As for the second question, why do so many people and cultures end up with similar views of a deity or spiritual theme? -- these beliefs may come from two mental faculties that may not have evolved specifically for spiritual belief, but may have evolved for other things, and as a byproduct give us particular notions of gods and deities. One of them is what psychologists call a "theory of mind"; by "theory" they don't mean a scientist's theory but a folk theory. We all tacitly subscribe to the "theory" that other people have minds. We don't think of other people as mechanical wind-up dolls. Even though we can't know what someone else is thinking, we do our best to make guesses. We look at their eyes, we read between the lines, we look at their body postures, and we assume that they have minds, even though we can't see them directly. Well, it's a short step from imputing an unverifiable entity called the mind to another body, to imputing a mind that exists *independently* of a body. Beliefs in souls, spirits, devils, gods, and so on, may be the products of a theory of mind or intuitive psychology that has run amok, and is postulating entities divorced from their physical home.

The other part of the explanation comes from a conclusion that anthropologists have drawn about what you find in common in all the world's religions -- not just the major proselytizing religions, but the animistic beliefs of hunter-gatherer tribes. Ruth Benedict put it succinctly: the common denominator of religions is that a religion is a recipe for success. She didn't necessarily mean this to apply to the most sophisticated theologies, but in general, what people do in common when they think of deities is to pray to them for recovery from illness, for recovery from an illness of a child, for success in love, for success on the battlefield, for good weather, for the crops coming up, and so on. I don't want to say that sophisticated theology can be reduced to praying for good weather, but if you look at what's common across cultures that's what you find.

RADFORD: Richard?

DAWKINS: I think that there's been a historical trend from animism where every tree and every river and every mountain had a spirit, to polytheistic religions where you have Thor, and Wotan, and Apollo and Zeus and things, then a trend towards

monotheism (and finally zerotheism or atheism). Interestingly enough I was looking into the law of charity the other day, and found that one of the things that defines a charity for tax purposes is the furtherance of religion. But in British law it's got to be monotheistic religion. Now, there's a large Hindu population in this country. I imagine they might have something to say about that.

But I was actually wanting to steer the question in another direction. Having worked from polytheism to monotheism, I wanted to use that as an analogy in a quest to try to derive some joint enlightenment by talking to Steve about something -- actually, I want to learn something from Steve. So may I change the subject? You, Steve, talked about the illusion that the mind is a unity. Now, I imagine what lies behind your saying that it's an illusion is that actually there is in the mind a whole lot of entities which are actually pretty distinct. They may be even be pulling in different directions, but I imagine that there's been some Darwinian benefit in the move from poly-minds to mono-mind. There's a book by a South African biologist, Eugene Marais, *The Soul of the White Ant.* "White ants" are termites. Any social insect colony behaves in some ways like a single entity. It's as though it's got one purpose. Actually, of course, it's thousands of little worker termites, all doing their own little thing. And no one termite has any general concept of the whole picture, so when the termites build these huge great mounds, each individual termite is just following little tiny rules. If you see a bit of dirt of such and such a height, put another bit on top of it. There are rules which, when summed over all of the termites, lead as an emergent property to the growth of the mound as a whole. A final strand in this argument goes back to the genes. The fundamental message of the selfish gene is that genes are separate entities all pulling their own way in their own separate selfish way. But yet we have this gathering together of genes into individual organisms. And that reminds me of the illusion of one mind, when actually there are lots of little mindlets in there, and the illusion of the soul of the white ant in the termite mound, where you have lots of little entities all pulling together to create an illusion of one. Am I right to think that the feeling that I have that I'm a single entity, who makes decisions, and loves and hates and has political views and things, that this is a kind of illusion that has come about because Darwinian selection found it expedient to create that illusion of unitariness rather than let us be a kind of society of mind?

PINKER: It's a very interesting question. Yes, there is a sense in which the whole brain has interests in common in the way that say a whole body composed of genes with their own selfish motives has a single agenda. In the case of the genes the fact that their fates all depend on the survival of the body forces them to cooperate. In the case of the different parts of the brain, the fact that the brain ultimately controls a body that has to be in one place at one time may impose the need for some kind of circuit, presumably in the frontal lobes, that coordinates the different agendas of the different parts of the brain to ensure that the whole body goes in one direction. In *How the Mind Works* I alluded to a scene in the comedy movie *All of Me* in which Lily Tomlin's soul inhabits the left half of Steve Martin's body and he takes a few steps in one direction under his own control and then lurches in another direction with his pinkie extended while under the control of Lily Tomlin's spirit. That is what would happen if you had nothing but completely autonomous modules of the brain, each with its own goal. Since the body has to be in one place at one time, there might be a circuit that suppresses the conflicting motives. And in cases of neurological disease or brain damage, and even perhaps in psychiatric conditions,

we may be seeing a relaxation or an imbalance or a defect in some of the mechanisms that coordinate different parts of the brain. Perhaps in an obsessive-compulsive disorder, motives that we all have, such as checking to make sure that the stove is off and washing our hands, ordinarily might be repressed by some other part of the brain that says "yes, it's good to do that, but not too much; there are other things to do as well." Obsessive-compulsive disorder may come from an imbalance among these different mechanisms.

QUESTION: I just wanted to bring up the very obvious point of biological reductionism which I think is raised by some of the speakers here -- in that while I agree about there being no ghosts in the machine I'm a little bit worried about what it's getting replaced with is seemingly a rather simplistic way of looking at the world as being the outpourings of the human genome project. And in that, I'm worried that I don't hear for example that human behaviors like aggression and so forth are the product of very social processes, shared processes, between groups, between people who are unfamiliar with one another, who have misperceptions of one another and so forth -- the kinds of processes that social psychologists talk a great deal about. What we're being offered instead is a sort of reductio ad absurdum biological form of reductionism. Are we just going from one form of ghost to another. It's not a ghost, but a rather simple way of looking at the world.

PINKER: I don't think any complex behavior can be explained directly in terms of the genes, which is why I emaphasized evolutionary psychology and cognitive neuroscience. Behavior is produced by the trillion-synapse human brain, which assesses situations, absorbs values from the people that we grow up with, assesses the long-term consequences of actions, tries to impress other people, and many other things. All of the phenomena that we call culture are real and utterly indispensable, but they have to be connected to the emotional and learning mechanisms that our brain makes available. I think any behavior has to be explained at many levels; our inborn emotions and learning mechanisms are one important level, perhaps the most important level, but not the only level.

RADFORD: Can you break the notion of culture down into a reductionist argument?

DAWKINS: Reductionism is one of those words that makes me want to reach for my revolver. It means nothing. Or rather it means a whole lot of different things, but the only thing anybody knows about it is that it's bad, you're supposed to disapprove of it.

QUESTION: What we need is for science, cognitive science in particular, to evolve further, so we begin to grasp the mystery that is subjective experience. Dr. Pinker said that the mind is the activity of the brain, and went on to describe ways in which cognitive neuroscience etc explained that. But in a way -- I can't help thinking of the analogy of the television set. It would be naive to suppose that the program that you watch is actually produced within the television set, and yet somebody from another planet who didn't know about television might assume that the program was generated within the television set.

DAWKINS: Steve can give a serious answer; I'm going to say something about

television sets. My friend Douglas Adams has a wonderful story about television sets. He imagines somebody who believes that there's a little man inside the television set who's juggling the pictures and making it all happen. Well, he's taken on one side, and it's explained to him all about cathode ray tubes and scans and radio waves, and the whole principle about television sets is explained to him, and he nods and he says, yes, yes, I think I've got that, right, I understand that, hmm, very interesting. But I expect there are just a *few* little men in there, aren't there?

PINKER: I want to distinguish what is truly mysterious about consciousness from what is merely an unsolved scientific problem in the process of being solved. Obviously consciousness is not a total mystery, because when you go in for surgery a man puts a mask over your face and gas comes in and he can on demand make you unconscious and bring you back to consciousness. More generally, we are learning more and more every day about the neural basis of consciousness -- what goes on in the brain when you have a conscious experience -- down to itty bitty details: why one thing looks redder or tastes saltier than another, and countless other details of perception, memory, and emotion. The part that remains a mystery is why the purely subjective aspect of experience should exist at all. Some philosophers, such as Dan Dennett, argue that that isn't a scientific problem and may not even be a coherent question -- since, by definition, pure subjective experience has no observable consequences, we're wasting our time talking about it. I think that goes too far, but it is possible that the existence of subjective first-person experience is not explainable by science. When cognitive neuroscience completes the story of how the brain works and predicts every last itch, every last nuance of color and sound in terms of the activity of the brain, one can still wonder why it *feels* like something to see and touch and taste. My own hunch is that this unsatisfied curiosity may itself be an artifact of how our brains work. It may be a question like "What occurred before the Big Bang?," or "What's outside our finite universe," or "What does a 4-dimensional object look like?" The puzzlement may come from a mismatch between our ways of thinking and knowing and the nature of reality as revealed by our best science. Our brains are organs that think and know in particular ways, and if they cannot come to grips with the discoveries of our best science (such as the discovery that brain activity causes subjective experience), that may just be our problem, a limitation of our own common-sense intuition in fully appreciating the lessons of our science. The science itself may be fully complete.

DAWKINS: It stills feels like a hell of a problem to me.

QUESTION: I want to ask about the problem of free will. It seems to me an implication of what you're both arguing that free will may be an illusion. Have I misunderstood?

PINKER: Again, it depends on what the meaning of "free will" is. I don't mean to sound like President Clinton -- but there's "free will" in the sense of the Soul one, the ghost in the machine, an utterly capricious and unpredictable process, an absence of even statistical predictability, where you just can't tell what someone is going to do. In that sense, as soon as you understand something about human behavior, and as soon as you can predict something about behavior, free will has evaporated. I think that sense of free will doesn't exist. On the other hand, there may be a sense of free will that we need as a construct, or an idealization in our system of moral reasoning, to get the answers to come out right. We may want to

distinguish between people who are literally in a fugue state and hallucinating, and people who are compos mentis and who can be held responsible for their actions in the mundane sense that punishment may deter them and others. It may be that free will is the most convenient way of summarizing that difference, in which case it would continue to exist, but in a scientific translation, that is, a brain state within certain normal conditions.

QUESTION: Professor Dawkins, at the start of your talk, you said that the traditional religions were not only false but also failed to provide a deeper meaning than science and in that sense were not more soulful. I agree with that, to the extent that they attempt to provide an explanation, but another thing that the religions do is give comfort to people if they lose people in car accidents or to cancer and so on, and as far as I've experienced it, the scientific view cannot give people this kind of comfort. So in that sense the religions, even if they're false, are more soulful. And I wonder how you would respond to that.

DAWKINS: I think there is a lot in that. I of course was talking about that aspect of religion where the psalmist says the heavens declare the glory of God. Science can do a lot better than that. The questioner is asking about another thing that religion can do, which is consoling people in bereavement and similar situations. On that I would say three things. First, I mainly agree with you. Science is not on the whole going to console you if you lose a loved one. The second thing I would say is that the fact that religion may console you doesn't of course make it true. It's a moot point whether one wishes to be consoled by a falsehood. The third thing I would say is that although science may not be able to console you in the particular case of a bereavement from a car accident, it's not at all clear that science can't console you in other respects. So, for example, when we contemplate our own mortality, when we recognize that we're not here forever and that we're going to go into nothingness when we die, I find great consolation in the feeling that as long as I'm here I'm going to occupy my mind as fully as possible in understanding why I was ever born in the first place. And that seems to me to be consoling in another sense, perhaps a rather grander sense. It is of course somewhat depressing sometimes to feel that one can't go on understanding the universe; it would be nice to be able to be here in 500 years to see what people have discovered by then. But we do have the privilege of living in the 20th and very soon in the 21st century, when not only is more known than in any past century, but *hugely* more than in any past century. We are amazingly privileged to be living now, to be living in a time when the origin of the cosmos is getting close to being understood, the size of the universe is understood, the nature of life in a very large number of particulars is understood. This is a great privilege; to me it's an enormous consolation, and it's still a consolation even though it's for each one of us individually finite and going to come to an end. So I'm enormously grateful to be alive, and let me take up what Steve was talking about, the question of how you can bear to get up in the mornings. To me it makes it all the more worthwhile to get up in the mornings -- we haven't got that much time, let's get up in the morning and really use our brief time to understand why we're here and what it's all about. That to me is real consolation.

QUESTION: Both of you seem to agree that science has killed off Soul One; I agree with you. Just to play devil's advocate a little bit: it obviously hasn't killed off the *belief* in Soul One and it's possible that it will never do so -- in the sense that a world in which no one believed in Soul One would not be what you called an ESS,

an evolutionarily stable state. In other words, just as a world in which everybody was nice to each other is not an evolutionarily stable state, because cheats prosper -- it may be that a world in which nobody believed in Soul One would be a fantastically fertile breeding ground for cults who did believe in Soul One. If that's the case then you'll never get rid of it.

RADFORD: Who wants to deal with the New Age question?

DAWKINS: Yes. G. K. Chesterton said when people stop believing, they don't believe in nothing, they believe in anything. I presume that's what the questioner has in mind. I am interested in cults. The so-called organized religions are of course just old cults. They started off as cults and they've acquired a respectability that's simply due to the long time that they've been with us. I'm interested in them. I don't know why the questioner thinks it's not an ESS. It's not to me obvious that a world in which nobody believed in Soul One is necessarily ripe for invasion by cults, except insofar as I think one of the main reasons why people do believe the things that they believe is somewhat analogous to viral infection. And the reason for this has a good Darwinian basis. When we are children it is very important that we should learn as quickly as possible certain extremely important things. The language of our society, the social rules of our society, various rules for how to stay alive in a hostile world. So it's very easy for a Darwinian to believe that children will be preprogrammed with a rule that says, Believe what your parents tell you, or believe what your society's elders tell you. And of course a rule like that is not going to be discriminating. It's going to work both for the sensible things -- rules for how not to die of snake bite or falling off of cliffs or how to learn the language of the society. But the self-same rule is also going to be a natural sponge, or a natural soaker-up of New Age nonsense, and nonsense of any other kind. So, a biologically sensible rule -- Believe what you're told when you're young, and when you grow up pass on the same stuff to your own children -- that is a recipe for the long-term survival for the beliefs themselves. Or the rule might be, Believe so-and-so, and spend as much time as possible persuading other people to believe it as well; that's a recipe for epidemics of infectious beliefs. So I think that in that sense I agree with the questioner.

QUESTION: I followed what Richard Dawkins has said over the years and I admire him for his defense of science, but in the end, I think -- as Engel would say it, in a reaction against theology etc., we can come to an explanation it's very one-sided; and I think with Steven Pinker, I'm surprised that he's surprised that people don't accept his theories, because after all we're dealing with consciousness, which is social and historically developed over millions of years of human society, and you can't say in the end that that resides in people's genes. If we take the example if you say about morality -- surely morality is something that's been developed over the years. Why is it that in America we get individuals that go out shooting people -- surely that's a symptom of American society.

RADFORD: You've just raised a huge question, which could keep us happy all night, I'll try to get our two guests to answer it. Why do things go wrong? The question is a serious one. If evolution is for the best, if a religious sense provides us with the stability to go through life, why do things go wrong? There's a whole Robert Bresson film devoted to this one, it's called *The Devil Probably*; there's a Kurt Vonnegut statement as well. Who wants to take this one on?

DAWKINS: That's not what I gathered the question was. Nobody's ever said evolution is for the best, except insofar as it's for the best of the genes, and that's another matter. I don't think there was a question there at all; I think that was a statement, which we should be grateful for.

PINKER: I think that evolution and genetics and neuroscience are essential parts of an explanation of human behavior, but that doesn't mean that people are sealed in a barrel, oblivious to the standards of behavior set by other people, and unable to make decisions based on them. Quite the contrary -- one of the things our brains are designed to do is learn the contingencies of the social world we find ourselves in. Obviously there is variation among cultures, which is made possible by the fact that people innovate and people learn other people's innovations. Also, the optimal way to behave in a given situation depends on how other people behave and react to one's own behavior, and those contingencies vary from place to place and have to be learned. There are large differences, orders of magnitude, in rates of violent encounters across different countries, although the psychology of the violent encounters is strikingly similar. The rates differ because of differences in the cultures and social values, those values aren't like a gas that seeps out of the earth and that people merely breathe in. They emerge from a bunch of minds interacting in a group, exchanging ideas, assessing one another, making decisions. So culture itself, even though it's part of any explanation of behavior, itself has to be tied to the psychological and ultimately neurological mechanisms that allow cultures to arise to begin with.

THE REALITY CLUB

Jaron Lanier on Daniel C. Dennett's The Evolution of Culture

From Jaron Lanier
Submitted: 4.1.99

There are a number of frustrations confronting a skeptic who attempts to make sense of the claims made by adherents of the "meme" idea. First and foremost among these is that the notion is so variable as to provide no fixed target. In my conversations with Richard Dawkins, including one that was transcribed and published (click here), I have had the distinct impression that his ambitions for the term are modest. He wonders if *some* cultural processes could be understood as being like selfish genes. This caution is also found among certain other theorists, who focus on unconscious or semi-conscious phenomena like dance steps as candidate memes. Some meme-adherents (click here) demand a rather strict application of the metaphor to genes, while others, including Dennett, are ready to explore alternate biological models, such as viruses. Then there are meme totalists who believe their one metaphor consumes the whole of culture. Most perplexing is

the fact that individual meme proponents display a tendency to waver between these preferences according to who is in the audience. I have more than once had the experience of watching a meme totalist turn into a guarded meme speculator when confronted by a skeptic, only to expand again once the skeptic left the room.

Are memes a rhetorical technique, a metaphor, a theory, or some other device? Depending on who you talk to, they can be so wispy as to be almost nothing. As applied by Dennett in his lecture, they make no predictions and cannot be falsified. They are no more than a perspective. Just as a musician might try to listen to the silences, instead of the notes, to gain a new experience of familiar music, Dennett asks us to consider culture from the point of view of tropes instead of people.

I adore this exercise for it's esthetic value. As a young composer I used to use my imagination to take on the identities of musical ideas. Imagine being equal temperament. You would first come to consciousness in China and feel yourself pounded out into the air from giant bells. You would feel the dark beating of your imperfect harmonies like tingles in your toes. Then, with the death of an Emperor, you would fall into a deep sleep, only to awaken centuries later pulsing out of the fingertips and into the ears of a frenetic, sober, workaholic named Bach. You would then feel your body opened up in new ways by a prying cosmic chiropractor- this is how the successive generations of harmonic innovators would feel to you. You would eventually flow out of the Beatles' space age chrome guitar pickups and through the distorting diminutive speakers of pastel plastic Japanese radios.

Since neither Dennett nor anyone else identified with the meme movement is unambiguous about what they are claiming, I'll answer Dennett's lecture in a similarly schizophrenic fashion. First, I'll assume memes are poetry, then I'll assume they are theory.

If memes are poetry, then they are the poetry of a flight from Meaning. What is communicated in Dennett's account of the origin of music is primarily that it means nothing. Imagine for a moment that instead of music, Dennett had chosen to provide a "just so" story to explain the origin and development of mathematics.

Dennett could have started in the same way, with an early hominid or some other ancestor beating a stick for the hell of it, only in this case he or she would have done so for a certain number of times. The "integers" meme was thus born. Dennett could have created a scenario in which that beating is copied and elaborated and gains its own momentum. This could develop in the course of millennia into an elaborate culture of counting, including strange kinds of numbers, like the imaginaries. It would also explain the often noted concurrence of musical and mathematical talent.

But something would be missing, which is that mathematical ideas can actually be true or false. In the same way, I am not ready to throw out the possibility that musical meaning is not entirely culturally relative. As Dennett points out, "music" is a universal phenomenon. It is probably the only human activity that is both universal and apparently elective. Yet the variety of musical behavior is so extreme as to make one wonder how it is possible for humans to perceive that universality.

By what stretch of the imagination is Inuit throat singing (which is accomplished by two people kissing and using each-others' throats as resonators) in the same category as John Cage sitting quietly in front of a piano, or Stanford students staying up all night perfecting a new signal processing algorithm?

As much as Dennett wants to get rid of ontology, he is its slave. He relies on meaning in order to communicate his attack on meaning. How can he even talk about music? Music is not the only pattern of behavior that has become extremely elaborate. Everyday greetings and small talk are extremely complex, and yet are not experienced as profound.

What is this profundity, this meaning in music? Well, that's the hard question. Music is particularly odd because it sits at the intersection of so many aspects of human experience and capability. It is a little like math, a little like dance, a little like sex, a little like speech, a little like drama. It is all these things and yet it is somehow instantly recognizable as something distinct.

I can report subjectively that in extended work with other musical cultures, there is an eerie sense of common musical understanding that is somehow possible. In learning to play musical instruments from distant cultures I have had the distinct impression of entering a heretofore inaccessible world of experience- as if learning to move and breath with these artifacts conveyed qualities that words and even sounds could not. And yet it is of course impossible to be certain of how much commonality I have ever truly achieved, or indeed if there was as much distance as I initially perceived. I can't know how much of the musical meaning I experience is illusory, except to say that I believe it to be absurd to think that it is entirely an illusion. To assert illusion is ultimately to assert both meaning and consciousness; an unconsciously had, meaningless illusion is an absurd proposition. Such a thing could not be detected.

The question of meaning is one that Dennett is simply deaf to. It is a subjective pleasure, like consciousness. It is part of that world of things that cannot be empirically falsified, but undeniably constitute an individual's subjective reality. A person's rapture at the hearing of Bach's music can theoretically be characterized neurologically, and could then be emulated by a computer. That the experience itself exists is known only to each individual experiencer.

I have speculated elsewhere (click here) that Dennett might represent a class of person who does not have internal experience. I meant this originally as a joke, and I still strongly suspect that he and other "cybernetic totalists" are merely enjoying being smart alecs by tweaking those of us ready to acknowledge that we have subjective awareness. But the logical possibility exists that there are some people without internal experience, and that would certainly explain our diverging philosophies.

Instead of trying to make the question of meaning disappear in the mists of a single metaphor, science can better proceed by gradually helping to illuminate components of meaning that can be subjected to empirical investigation. A genetic component for such a universal phenomenon as music would not be surprising, and indeed it has been proposed. For an example click here. It might at first seem

surprising to see Dennett, of all people, not even mention the work that has been done suggesting genetic components to musical behavior, but it shouldn't be. The alliance between information centric theorists and biological determinists is probably a temporary marriage of convenience. Soon enough, I expect, meme theories will cause simplistic cybernetisists to jump over to the cultural relativity side of the fence en masse.

There is an irony here. Dennett seems to be arguing that under a Darwinian lens, culture would look like a "spandrel", which was a metaphor constructed by Stephan J Gould and rather violently repudiated by Dennett.

Now, what of memes as theory rather than poetry? I have addressed this already elsewhere in the Edge dialogs (click here - see bottom of the page). So I will only summarize here.

Objection #1) There are no predictions that can be tested, no potential for falsification. Memes are, as Dennett points out, open enough in their possibilities to account for the wild variations imaginable in potential cultures. But there is no basis for preferring memes over other potential equally open theories. Are memes more testable than the vague obfuscations of recent "postmodern" philosophers? Or do they merely adopt a cybernetic style that certain people find more comforting?

Objection #2) Ideas and other cultural elements are Lamarckian. That is one reason why people didn't understand Darwin at first. God was supposed to have thought the world into existence. Even people who were ready to question God had trouble getting over the idea of ideas. Indeed, I have seen students adopt incorrect understandings of genes because of the publicity for memes. They thought that genes must work like ideas, and be able to influence each other on contact. Lysenko would have loved memes.

Objection #3) Ideas often have objective value. Mathematical ideas can be proved. Scientific theories can be falsified. Technologies can function, or fail. Political ideas have harder to assess but real moral and ethical implications. A candidate for a virulent meme, such as the music for a Diet Pepsi commercial, might truly be a lesser achievement than, say, a late Beethoven string quartet- yet that judgement cannot exist in the framework of memes alone. Furthermore, in all of the above cases people have created cultural institutions that have formally, rationally improved human achievement in the course of history. Culture is a watchmaker with vision, at least some of the time.

Objection #4) Culture doesn't generally suffer from constraints of the sort found in biological processes. For instance, bad ideas typically don't really die, alas, while the dominant mechanism of evolutionary selection is pre-reproductive death (the other primary mechanism being mate selection). Your genetic traits were largely selected for because your would-be ancestors with alternate traits were killed by your actual ancestors or other organisms, particularly microorganisms- or starved to death. In that sense, the ideas that perished in the library at Alexandria were more like memes than any ideas in currency today. Furthermore, culture doesn't generally have impassable species boundaries. Although cultures become isolated on occasion, in a vast number of cases ideas flow into one another and selection

pressure, if it existed, could not be focused on a unit of potential change, as it is in biological systems.

Objection #5) Ideas and other cultural phenomena do not necessarily have an inheritable substrate that functions as a specification layer. Biological organisms are reducible to an evolutionary interpretation to the degree that traits are described by genes. (As in: An undernourished animal will be smaller than a well nourished genetic twin, so not all observed traits are genetic.) In order for a meme theory to say anything it would have to be able to identify some structure that could serve as the basis for reductionism. It is possible that some human behaviors are not reducible. (In my experience, for example, you cannot learn to play Indian classical music without becoming immersed in Hindu culture, including a style of movement, of interpersonal and intergenerational contact, and a great many other things that do not have names.)

Jaron Lanier

EDGE IN THE NEWS

MIND MELD

Literary agent John Brockman gives intellectuals an Edge

By Tom Samiljan
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Now that AOL's mass-market muscle has taken over the online world, it's easy to forget that the Net has long been a forum for intellectuals to exchange ideas. The problem is that many of these ideas are debated on exclusive, invitation-only mailing lists. But on Edge, the brainchild of New York literary agent John Brockman, the musings of some of the world's most prominent academics, artists and scientists‹on topics as varied as genetics and affirmative action‹are available to anyone. Getting on the list can be tough (you have to know Brockman), but mere mortals can access edited archives of his high-minded monthly e-mail newsletter at Edge's website.

Brockman launched the Edge list in 1996 as an online incarnation of the Reality Club, a group of intellectuals who began meeting in 1981 in real-world salons. "I started the Reality Club because it's almost impossible to sit down in New York and think deeply," says Brockman. "This is a market town‹it's hard to get a group together to focus on serious works." Now Brockman gathers minds from around the world for online discussions and writings about such topics as relativity theory and Plato. In Edge's 52 monthly editions thus far, surfers can find, for example,

transcripts of lectures given by Darwinian theorist Richard Dawkins and interviews with MIT computer scientist Marvin Minsky and musician Brian Eno.

Probably the most stimulating and attention-grabbing content has resulted from the site's periodical posing of portentous philosophical questions. In a recent edition from January, Brockman asked his mailing-list members to identify the most important invention of the past 2,000 years. Among the responses were the eraser ("because it allows us to go back and fix our mistakes," according to *Ecstasy Club* author Douglas Rushkoff), the clock ("It converted time from a personal experience into a reality independent of perception," writes Disney Imagineer Danny Hillis) and Copernican Theory ("It took a lot of intellectual courage and taught us more than just what it said," writes the Monkees' Michael Nesmith). Such answers, along with 600-odd postings on the same topic from visitors to Edge's discussion area (run separately by New York-based e-zine Feed at www.feedmag.com), prove that shopping and fucking are hardly the only reasons people go online.

Brockman started Edge in response to the notion of the "third culture," an idea described by C.P. Snow in his 1959 book *The Two Cultures.* Snow identified two types of intellectual cultures: literary and scientific. In the future, Snow posited, members of these groups would come together and form a third culture to disseminate intellectual concepts to the public. According to Brockman, however, the third culture that has emerged is more the result of scientists' becoming increasingly literate. "The literary world, which hijacked the word *intellectual,* has been brain-dead for 30 years. Now it's the scientists who are asking the big questions," says Brockman, citing the success of Brian Greene's *The Elegant Universe,* a book about string theory that hit No. 1 on Amazon.com's best-seller chart this past February.

Although it covers weighty scientific issues and has a recipient list that reads like a who's who of the digerati (including Bill Gates and *Version 2.0's* Esther Dyson), Edge is remarkably low-tech and text-based. The irony of this is not lost on Brockman. "[Even though I'm] someone who has been pushing the envelope for digital communication, I keep coming back to books," he says. "The power of the printed word is amazing."

Why the elite mailing lists? Brockman chalks it up to lack of manpower. "I try to do everything myself," he says. "If I started to read a bunch of [unsolicited] e-mails, then I wouldn't have time to do Edge." And since the site's content is available for free, the greater public doesn't really miss out. According to Feed founder Steven Johnson, in some cases, the clearly focused discourse of closed lists can be preferable to the sometimes incoherent and rambling nature of open forums.

Whether or not Edge visitors decide to chat intelligently about issues on Feed won't change the distinctive content of Brockman's salon. Visitors are guaranteed a look into the minds and theories of people who make a living lecturing around the world and writing books. And for the intellectually curious who don't have the time or money to attend thought-provoking symposia and conferences, Edge is easy on the wallet. At least Brockman thinks so. "I think I've created the best graduate school in the world," he says.

Visit Edge at www.edge.org.