

The Science Studio With Daniel Dennett

ROGER BINGHAM: My guest today in the Science Studio is Dan Dennett, who is the professor of philosophy and co-director for the Center For Cognitive Studies at Tufts University, co-founder and co-director of the Curricula Software Studio at Tufts, and he helped design museum exhibits on computers for the Smithsonian, the Museum of Science in Boston, and the Computer Museum in Boston. But more importantly he's known as the author of many books, including most recently *Breaking the Spell: Religion as a Natural Phenomenon*.

So, Dan Dennett, let me just take you back to an interview, because this is Beyond Belief Two: Enlightenment 2.0. You were supposed to have been at the first meeting last year. There's an interview that you did some time ago with our old friend, Susan Blackmore, where she asked you "I assume you don't believe in God; do you think anything of the person survives physical death?"

You got very close to physical death about a year ago.

DANIEL DENNETT: I did, yeah.

BINGHAM: Would you like to recount that wonderful experience?

DENNETT: I had had a triple bypass in '99, but I was fine; I was in good shape. But then I had a so-called aortic dissection. My aorta, the main pipe from the heart up to the rest of the body, sort of blew out. It was held together by the scar tissue from the old operation; that's what saved my life, first. And so I had that all replaced - I now have a Dacron aorta and a carbon fiber aortic valve, and I'm fine, as you can see. I survived that just wonderfully. And no, I didn't have any religious experiences.

BINGHAM: Did your life flash before your eyes?

DENNETT: Not particularly, no. In the aftermath, I was tremendously grateful to be alive, and that's when I realized that when I say thank goodness, I don't mean that just as a euphemism for thank God; I mean thank goodness. There's a lot of human goodness that we've accumulated over the ages, and that was what kept me alive, and that's what I was grateful to.

BINGHAM: Tell me about your background, because what allowed you, do you think, to be in the situation where you didn't reach out for any other kind of supernatural support system? How did you grow up? Were you grown up in a religious household, or?

DENNETT: I grew up in I think a very common kind of household in New England; I call it sort of suburban Protestantism. Very liberal, you can believe whatever you want, but you learn the hymns, I sang in the choir, I

memorized psalms. I never took it too seriously, except briefly for a period in my teenage years, when I got very serious thinking about it, and then I just realized no, I was an atheist. But I love the King James Version, I loved the Christmas carols, I loved religious music, I liked a lot of religious art, and so forth.

BINGHAM: So, parents. Was there any science back then? How did you become a little philosopher?

DENNETT: No, if I'd had a scientific background in my parents, I think I would have been an engineer, because I'm sort of an engineer [unintelligible]. I love to figure out how things work, and put them back together and take them apart. But that was sort of off-limits, because it was very much of a humanities family.

My father was an historian; in fact, an expert on early Islam and an expert in Arabic language and Arabic culture. So I spent some of my youth in Beirut. He was also a spy; he was in the OSS. He died when I was very young. So he wasn't much of an influence on my life, because I was five when he died.

My mother was an English teacher, and a very good writer and a very good editor at Ginn and Company, an editor of textbooks. She was a real stickler for getting things clear. So I think I learned my writing, to some degree, from her.

BINGHAM: So you hardly knew your father at all, then.

DENNETT: No.

BINGHAM: Did he just vanish?

DENNETT: Well, I know him through a thousand anecdotes and tales that his dear friends have regaled me with over the years, and apparently, I'm his spitting image, very much like him, but I'll take their word for that.

BINGHAM: Have you spent much time in, did you ever go back to Beirut?

DENNETT: I spent some wonderful time in Beirut a long time ago, actually, at the height of Beirut's glory, about '64 - 1964, when it was the Paris of the Middle East, I spent a month or so there with my family. It was great. That's it. I haven't been back since.

BINGHAM: How does one become a philosopher, then, in your case?

DENNETT: When I was a freshman, we read Descartes' *Meditations* in intro to philosophy class, and I thought oh, man, this is really interesting. It's wrong; I think I'll figure out why it's wrong, and it shouldn't take me more than a couple of afternoons. I was hooked. Then that and Quine's book, *From a Logical Point of View*, which I read in despair in the math library late at night that freshman year, because I was taking a very difficult course in logic. And the next morning I'd read the whole book and I decided to transfer to Harvard to work with him.

BINGHAM: This is Willard Van Orman Quine.

DENNETT: Willard Van Orman Quine, yes, the great American philosopher of language and metaphysics and logic and epistemology, yeah.

BINGHAM: What did you take from Quine, in a brief description?

DENNETT: I showed up at Harvard in the fall of 1960 as an eager sophomore, and Quine was offering a course on the philosophy of language. The main text was a book of his, just out, called *Word and Object*. Needless to say I signed up for the course, and it was a fantastic course. Quine was not a great teacher, but the material was wonderful.

BINGHAM: Okay, so when I say what did you take from him, what did you extract from your interchange and discussions with Quine?

DENNETT: Quine was a naturalist, and for him philosophy was continuous with science. It was just the sort of most abstract and most meta part of the scientific enterprise. It was science criticism, science enabling, trying to put the world together with science, and I just completely bought into that. I thought that was exactly right. And he tackled problems of meaning and language, and he recognized very clearly, notoriously, his thesis of the indeterminacy of radical translation.

I think that's a fundamental point. I think he was right about it, I think he never got a very clear defense of it, but I've defended it ever since then. It's a concept which has to do with why it is that we can't pin down with absolute precision and accuracy the meaning of anything. This doesn't lead us to vapid relativism about meaning.

A simple analogy: if you're a cryptographer and you have a bit of cipher text, a bit of code, and you find a decoding of it that makes sense, you're morally certain that you've found the decoding. There's not going to be another one, but it's always logically possible. In fact, it's trivially logically possible. You can invent some cockamamie code where it means anything you like. The fact that you've found an efficient decoding is, you can stop; you found it.

That's the practical reality. If I want to know what you believe or what something you say means and I can find a coherent account that meets all the everyday constraints, I can be pretty sure that's really what you mean and that's really what your belief is. But there's always a logical possibility that there's some completely other interpretation of you, and we should simply tolerate that and say yeah, we don't need any metaphysics to say no, no, there's a really real, real secret meaning, even if it's forever hidden from us.

No, the best interpretation you can get with all the constraints, that's as close as you'll ever get to objective meaning, and that's good enough.

BINGHAM: Did you have conversation or exchange with Richard Rorty on this?

DENNETT: Oh, yeah. Oh, yeah, Richard was a dear friend of mine, yeah.

BINGHAM: Because that would not be his position.

DENNETT: Well, I think it is. I mean, Dick was very fond of Quine's view on many topics, and I think on this one in particular, at least I never occasioned a real battle with Dick on that, and he liked my position on these matters, as far as I can tell.

BINGHAM: You were at Harvard?

DENNETT: Yeah.

BINGHAM: And then?

DENNETT: Then went to Oxford.

BINGHAM: And what was happening at Oxford at the time?

DENNETT: Well, that was the - like the Milan Cathedral, the late, florid excrescence of gothic. This was the late, florid excrescence of ordinary language philosophy. It was sort of rotting on the vine, but there were thousands - not thousands, there were hundreds of Canadians and Americans and Australians who were all coming to Oxford to learn ordinary language philosophy, and most of it was pretty preposterous, but there were some bright moments.

I worked with Gilbert Ryle, and he was a great mentor. So that worked out fine, but it meant that I was either appalled or amused at a lot of what was going on in Oxford among my fellow graduate students.

BINGHAM: For somebody who doesn't understand or who doesn't know the history, what do you mean by what was going on at Oxford at the time? In terms of what was being discussed, and why was it preposterous?

DENNETT: Philosophy, I think, goes through these pendulum swings of overconfidence and complete lack of confidence, and this was a period of very low confidence, and philosophers were pretty well convincing themselves that all they could do is analyze the meanings of ordinary words and that this was enough; it was little puzzles.

There wasn't any progress, there weren't any theories. All you could do is sort of knit one, purl two, and study the meanings of particular words like believe or understand or imagine or pain or attend. And it was micro-trivia, done very cleverly, but to no real end.

BINGHAM: So you moved beyond that to?

DENNETT: Irrepressible American optimist that I was, I thought we could have theories, and I thought we could make some progress. I got very interested in the mind and the brain and so wrote a book called *Content and Consciousness*. That was my thesis, actually, at Oxford, and it was bizarre at the time, because there was enough speculative neuromodeling ideas in it, sort of protoconnectionist ideas, that they figured the examiners should include a neuroscientist.

So JZ Young, the great London neuroanatomist and AJ Ayer were my examiners, and that was considered a very strange combination, as indeed it was.

BINGHAM: It is indeed a strange combination.

DENNETT: Yes, yeah.

BINGHAM: In Andrew Brown's piece about you in *The Guardian*, he mentions that when you got to Oxford, the impression was made on your landlord's son at Oxford was as a sculptor? That John Graham, now a doctor, remembers the Dennetts turning up after their honeymoon with a block of marble a foot high and a set of cast-iron chisels with which Dan carved a man reading a book.

DENNETT: It's true, yeah.

BINGHAM: How did sculpting get into your life?

DENNETT: Oh, I was going to be an artist at one point. When I was an undergraduate, it was either that or be a philosopher, and I think I made the right choice, but I still - well, I haven't done any serious sculpture for years. I've done very small pieces, but you know, those are more whittles than sculptures.

BINGHAM: The point you made about these changing fashions in philosophy and so on, Peter Atkins was saying yesterday that he thought philosophy was essentially a waste of time, to put it kindly, and that nothing much emerged from it. What's your take on that?

DENNETT: I think that that's often been true. It's true of a lot of philosophy now, but it's true of a lot of fields. Sturgeon's law is that 90% of everything is crap, and okay, so you look at the good stuff and don't waste your time or anybody else's on the bad stuff.

And I think there's plenty of good stuff in philosophy, and I think that right now, I'm particularly high on the work that's being done because I think we have a whole - actually now sort of two academic generations of philosophers who are knowledgeable about one science or another, or several. They have experience in the field, and in a way they are continuing the Quinean program that he was in effect too old to do.

But the idea of working side-by-side with the scientists and using the techniques and tools of the philosophers, such as they are, to break down some

of the conceptual models and some of the just confusions that can arise anywhere. They can arise in any science just as they can arise in the law or in medicine or in history. And it's really a question of figuring out what the right questions are to ask.

BINGHAM: We could talk, obviously, about your views on consciousness and so on and so forth, but let's actually go to the subject of this conference.

DENNETT: Good, let's do that.

BINGHAM: Where do you think we are at this point in discussing the subject matter of *Breaking the Spell, Religion as a Natural Phenomenon*. You've been on the road for a year, talking about these things. What's your sense of it? Do you have an optimism about this? Where do you think we should go?

DENNETT: Actually, I am optimistic about this, not just because that's my natural cast of mind anyway, but I see very heartening signs.

What I think has been happening in recent years, when we've seen this apparent upsurge of religious fervor, is more a matter of religious groups around the world confronting for the first time the democratization of information. Just the flood of information from cell phones and the Internet and television, and they've never had to deal with this. They could always isolate their children from this. They could always control what their children had contact with.

They can't do that anymore. Short of tying them up and holding them in the house and turning off the electricity and taking away the batteries, they just can't do it. And so they're rather desperately trying everything in sight to see what they can do to preserve what they think they should preserve.

That in itself is perfectly rational if you love something dearly - you take whatever steps you can think of to try to protect it from something you see as a threat. And I think what we have to do is appreciate that that's what's happening, and then think what is the gentlest, kindest, firmest, least disruptive way of easing the pain of the democratization of information across the world?

And rather than thinking about exterminating religion or anything like this, we should think about it, if you like, in both evolutionary and you might say in epidemiological terms. We should encourage the evolution of avirulent forms of these religions, turning them into less toxic varieties; encouraging the growth of the less toxic varieties of every religion, and letting the really dangerous forms go extinct.

How do you do that? You do that by gently setting up competition between facts and myths, and you do that by education, and you don't worry about the old folks. I think people are very rightly concerned that oh, poor Granny and Grandpa, you don't want to disillusion them. You don't want to say to them, you know, you've wasted your life on this. That's cruel, that's hard. Let them

finish out their days with their illusions, as long as they're not in charge of armies, or something like that.

Let's just try to turn off the spigot and get their grandchildren and their children's children and their children just to open their eyes to the wealth of factual information, not just about science but about religions, including their own religion. I think that the toxic forms of religion only survive when there's enforced ignorance in the home. And if we can simply say you have no right to keep your children ignorant of these facts; these are just facts. These are not - this isn't propaganda. These are truths. These are just as much truths as chemistry is truth and arithmetic is true.

If we get those truths to children first in this country and then around the world, then they can teach their children whatever else they want, and they're going to find it's going to be hard for them to teach their traditional doctrines. And so what will they do? They will revise; they will adjust. They will have to accommodate to convince their own children of these doctrines, and that's a healthy direction.

I think - this is an empirical claim; I might be wrong - I think any religion that can thrive under conditions of open information deserves to thrive, and it'll be just fine. And the rest should go extinct.

BINGHAM: Okay, now could you unpack this phrase you used, belief in belief? What do you mean by that?

DENNETT: Yeah. I guess it's my favorite chapter in the book is about belief in belief. I began to notice that arguing against the existence of God is sort of pointless in most circumstances, because it's not so much that people believe in God as they believe in belief in God. And in fact, more people believe in belief in God than believe in God.

How do I know that? Well, with very few exceptions, people who actually believe in God also believe in belief in God. That is they think it's a good thing, they're all for it, they're proud of the fact that they believe in God, they think it's good. Once in a while, you will encounter somebody who actually deeply, bitterly regrets the fact that they can't shake their belief in God. They wish they could, but they're just - it's a weakness. That's a rare individual.

So all those people believe in belief in God, and then the people who don't believe in God, they believe, many of them, just believe in belief in God. So there's more, all told. And the more I thought about it and the more I explored this, I discovered how true that is.

For instance, I would say, with few exceptions, the most hysterical and vitriolic criticisms of my book have been from people who themselves declare themselves not religious. They don't need religion, but they are the self-appointed defenders of religion, and they believe in belief in God, and they view me as mounting an attack on this, and in a way, that I am. I'm saying the

belief in belief in God is really what is standing in the way. It's what's doing all the work today.

And it's not the only case of belief in belief. That is to say, scientists believe appropriately and passionately in the integrity of science. They want people to believe in science, and any time there's a fraud in science, they're torn. Do we not only stop the fraud but expose the miscreant to a huge blast of publicity? Or do we quietly and discreetly excise this culprit from our midst?

Well, there's some powerful reasons for not wanting to parade our villains, because it might undermine the public trust in the integrity of science. On the other hand, it might improve the public trust in the integrity of science. Those strategic issues are issues about belief in belief. It's just that in religion, they're doing all the work.

BINGHAM: So what do we now know, in your view, about how beliefs are formed? The neuroscience of beliefs?

DENNETT: I don't think we can tell a very good story yet about, to put it really crudely, the ratio of reason and emotion and reflex that contribute to the beliefs we have. We know, though, we don't need neuroscience to tell us that we are equipped with superb fact-finding gear - eyes and ears. It's actually pretty hard to deceive us on most mundane topics. We're very good at catching out illusions and deceptions. We do have some weaknesses.

BINGHAM: Do you think that's true?

DENNETT: We do have some weaknesses, and we have some systematic weaknesses, and it wouldn't be so bad if there were not forces honed by an evolutionary process that are out to exploit those weaknesses, in the same way that predator-prey relationships are a case of mutual co-evolution, with one side trying to deceive the other, and the other side getting better and better at detecting that deception.

So in the realm of religions, what we've seen over thousands of years is a co-evolution between our capacity to detect the truth and ideas that are magnificently designed to sneak in behind our defenses, to exploit our emotional nature, and to in effect bamboozle us and get into our heads and then get propagated along to other people. So we really do get an insight into what's going on if we think about these ideas as symbionts that invade brains when they can. And the ones that really stick, the ones that are infectious, as we say, that are unforgettable - to say that an idea is unforgettable is to say not that it, as it were, is made out of steel or something, it's that it contrives for its own replication within the brain.

You rehearse it and rehearse it and rehearse it and it's in there and it can become a little obsession, and you've got it in there, you're not going to get rid of it, and you want to pass it on to your neighbors. And some ideas are just much better designed to do that than others.

Advertisers consciously try to design ideas, slogans, sound bites, that will be, as the Germans say, an earworm that will get into our head like an advertising jingle and just not leave. The ideas that do this that we find populating religions around the world were not in the main consciously designed by individual idea designers; they didn't have to be. They evolved the same way words evolved - by a process of cultural natural selection.

After all, there have been probably hundreds of thousands of religions. Religions get started every day, still. Most of those are extinct, same as with species. The religions that we see that have survived, transforming themselves all the way for several millennia, these are the winners of a huge cultural evolution tournament. These are the finely honed, beautifully tuned brain inhabitants that we now have, for better or for worse.

That doesn't say they're bad. After all, science is another such set of ideas, and we work at coming up with interesting mnemonics and wonderful graphic ways of making clear the second law of thermodynamics and other things that are important. So we do actively work on trying to make these unforgettable ideas.

BINGHAM: One of the criticisms obviously is that people have trouble accepting that science is a privileged form of knowledge; that the truths of science are the best. How do you deal with that kind of thing?

DENNETT: First of all, I find it a little hard to take seriously. These are people who don't fear taking airplane flights and are very angry if it turns out that something they've been ingesting has a dangerous property in it that science has pointed out, and somehow they've nevertheless been purveyed this by some evil, science-ignoring company. People don't ignore science. It's not for nothing that two of the most successful religions that have been concocted in the last few centuries are Christian Science and Scientology.

Everybody understands the authority of science, and in fact post-modernist critics, who like to talk about science as one conversation among many, how do they support their claim? By looking at the frailties of science that have been pointed out by science. Always. Science is the source of science criticism. It is the self-critical enterprise. That's completely unlike religion.

BINGHAM: So who do you think have been the most important formative influences on your thinking?

DENNETT: Darwin, of course. Quine and Ryle and Hume and Alan Turing. Those are my heroes.

BINGHAM: Who would you have liked to have had a conversation with? Anybody in history if you had a chance?

DENNETT: I think David Hume would have been great company, and Alan Turing. If I could bring Alan Turing back to today in a time machine and set him loose with the world that in effect he's created, I would just love to see

him. I think it would take him about two minutes to understand everything that's happened.

BINGHAM: What would you say to him, do you think?

DENNETT: I don't think I'd have to say anything to him. I think I'd just show him my laptop and see how long it took him to imagine the waves of brilliant engineering that fell right out of things that he'd figured out, you know, back in the forties.

BINGHAM: I remember when we were doing a television series together many, many years ago, actually, went with Paul Churchland, there was a Turing test going on, do you remember that?

DENNETT: Oh, that's right, yes. I think I was even presiding over it.

BINGHAM: Yes, exactly. Does that still make any sense?

DENNETT: Well, it didn't make sense then except as sort of an interesting dress rehearsal for something that someday might make sense. When Turing put forward the Turing test, he didn't mean it to be a platform for serious scientific research. He meant it as a conversation-stopper, as a thought experiment that should convince people that, come on, folks, any computer that could pass this test fair and square, of course it would be intelligent.

But of course, philosophers being what they are, they refused to accept this I think entirely sane line of reasoning on Turing's side.

BINGHAM: The idea being that when one sits behind a screen and you get input from the other side, you couldn't see what was on the other side.

DENNETT: After all, how do I know you're intelligent? You passed the Turing test. It's what we're doing right now; we're having a conversation. And this idea goes back to Descartes. There's this lovely passage, often quoted from the *Discourse on Method* where Descartes says, back in the 17th century, how could you tell that something was an automaton and not a human being?

And he said well, have a conversation with it. If it can carry on intelligently on no matter what subject, then it can't be a machine. What he was wrong about - it's a great test. He just couldn't take seriously a mechanism as complex as what we've got between our ears. I mean, I like to imagine Descartes - he doesn't say why a machine couldn't do it. He does, a little bit.

He says oh, it could do two or three or seven - it could do a few things. You push it here and it says one thing, you push it there, it says another thing. Well, that's sort of the limits of clockwork in his day. He never imagined a clock with a hundred million springs and 50 billion pulleys and wires and cog wheels. He would have thought, well, that's just silly. He had no way of taking a machine that size, seriously.

We now know that brains are machines of that size. They have, in effect, trillions of moving parts. So who knows what you can do with a machine with a trillion moving parts?

BINGHAM: I do remember, though, that my experience of the Turing test was that of the three, I actually interpreted the input from two of the humans as being from a computer, so I-

DENNETT: This is actually a lovely illustration of sort of what's wrong with philosophers' thought experiments sometimes, and that is philosophers' thought experiments are always done, the sun's always shining and it never rains and the electricity always works, and very few surprises in thought experiments. When you actually do a real experiment, you discover all sorts of boundary conditions you'd never thought of, and you begin to realize they're important.

And what happened in that Turing test was really quite amusing. That was the third annual Loebner Prize test, and the first two years we had discovered that the judges were bizarrely passive. They didn't probe in any aggressive way the contestants, which Turing supposed would actually happen. So in the third year, as you will no doubt remember, I was actually the author of this little bit of briefing.

I said, think of yourself as a counter-spy, and your job is to catch the imposter. You're supposed to use ordinary conversational gambits, but your task is not to let any computers through this screening process, and you should be ashamed if you let any through. So this was simply to gear people up to be more diligent.

And so what happened was, if you looked at the contestants, the human - I think there were three human beings behind the screen and seven computer programs - there was a huge difference. The computer programs just weren't any good at all. And then there were these three human beings, and the gulf between them and the computers was so great that a number of you judges reasoned as follows - Turing hadn't counted on this.

We wouldn't be having this competition if there wasn't at least one program which was really pretty good. So, I'll just take the least impressive human being, and I'll declare that a computer so that I protect myself against being the dupe here. And so a bunch of the judges did that. And that's how some human beings got declared to be computers.

BINGHAM: That's pretty much what happened, as I recall, yeah. Do you still find this useful, this whole notion of the Cartesian theater? You still talk about it, still people ask about it.

DENNETT: Well yeah, I still find it useful to warn people about the mistake of the Cartesian theater. It's really a very seductive idea. The light comes in our eyes, the sound waves come in our ears, we touch things, all these nerve signals start heading up, heading up, heading up and there's processing,

processing, processing. But of course that's all in the medium of spike trains and neurons.

And then what happens? Well, they get analyzed and analyzed and analyzed, and then what happens? Well, and then consciousness happens. Where? Well, somewhere right in the middle there has got to be a sort of summit to this mountain where the input finally arrives at the place where the input's supposed to go. That's the Cartesian theater. That's a mistake.

The idea that there is a privileged place in the brain where everything comes together for consciousness is a tremendously appealing idea, but it can be resisted, and it should. Now when people ask me about this, they said wait a minute, is this an empirical point or is this a conceptual point? Well, it's both.

First there's the empirical point, and that is when we look inside, we find there isn't any such place. But we might have looked inside and found that there was such a place. Easy enough to imagine. In fact, there's a famous film clip which is a beautiful example of this, and that's in "Men in Black". It's in the morgue when they slide out the corpse and Will Smith touches the little point on the guy's ear and his face opens up, and there's a little guy sitting in the control room, and he's looking at the screens and pushing the buttons. That's the Cartesian theater. It's perfectly coherent. We might have found that if we looked inside, but, you know, we didn't. So that's the empirical point. That's not what we found.

The conceptual point is if we had found that, then of course we would have to look in the little green man's head, and at some point we've got to realize it's not Cartesian theaters all the way down. So at some point, you have to take all the work that you're imagining the little guy in there to do, and you've got to distribute it around in space and time in the brain and recognize that that's what consciousness is. It's that work getting done, and once it's done it doesn't have to be done again in this little, privileged theater.

And so consciousness is smeared spatially and temporally. Because it's smeared spatially, it has to be smeared temporally, otherwise we'd have some kind of magic, which we don't need. And there's a notional sense of simultaneity, which is more important than the actual timing of events in the brain.

BINGHAM: Do you think it's a prerequisite of getting across any of these ideas about religion that there be more general acceptance and understanding of how minds work or how brains work that it's the neuroscience teaching?

DENNETT: Yeah, I think so. Some years ago, there was a lovely philosopher of science and journalist in Italy named Giulio Giorello, and he did an interview with me. And I don't know if he wrote it or not, but the headline in *Corriere della Sera* when it was published was *Sì, abbiamo un'anima. Ma è fatta di tanti piccoli robot* – "Yes, we have a soul, but it's made of lots of tiny robots."

And I thought, exactly. That's the view. Yes, we have a soul, but in what sense? In the sense that our brains, unlike the brains even of dogs and cats and chimpanzees and dolphins, our brains have functional structures that give our brains powers that no other brains have - powers of look-ahead, primarily. We can understand our position in the world, we can see the future, we can understand where we came from. We know what we're here. No buffalo knows it's a buffalo, but we jolly well know that we're members of Homo sapiens, and it's the knowledge that we have and the can-do, our capacity to think ahead and to reflect and to evaluate and to evaluate our evaluations, and evaluate the grounds for our evaluations.

It's this expandable capacity to represent reasons that we have that gives us a soul. But what's it made of? It's made of neurons. It's made of lots of tiny robots. And we can actually explain the structure and operation of that kind of soul, whereas an eternal, immortal, immaterial soul is just a metaphysical rug under which you sweep your embarrassment for not having any explanation.

BINGHAM: So when you use the phrase eyeglasses for the soul, are you talking about an fMRI?

DENNETT: I used the phrase eyeglasses for the soul yesterday as a metaphor for what I take what one of my heroes, Hume, meant when he said, morality starts with the natural sentiments. This is love and compassion and hatred of pain and care for your immediate family first. We have certain built-in, hardwired, provided in your genes dispositions and powers and propensities, and that's got to be the foundation on which morality is built.

But then, Hume says, we have the artificial virtues, which are the creations of a social process, and that we convince each other are important and we instill in the young, and this is moral education. And the result is that infirmities, weaknesses, susceptibilities to illusion that we discover in our reflectiveness in the minds that we're given by our genes we can correct to some degree, we can harness and adjust.

So in the same way that if we discover we're myopic we can wear glasses. We're not genetically doomed to myopia; we can simply correct that condition. And we're not genetically doomed by our disgust reactions, our instincts for love, our instincts for hate and fear. We've got them, we should understand them, and then we should figure out what kind of technology in the broadest sense, including ideas, theories, precepts, not just hardware, what kind of technology can we devise that we can introduce into our brains to achieve the kind of souls that we want?

Well now is this just relativism? No, because we, and who else? All of us, all the people, can, in principle, form a community to discuss these things. In the same way the scientific community does. It's not science, it's politics, but it has its own rules of procedure in the same way science does. We say to everybody around the world, come join us, be part of the conversation.

You have to leave certain things behind. You can bring in your holy books, your holy scriptures, but you can't use them as trump cards. There may be great wisdom in your holy texts, but just saying that this is what your text says cuts no particular ice. You've got to convince the rest of us that what your text says is something that we should believe, not just because you believe it.

In other words, if somebody says well, look, this is non-negotiable. I'm a Hindu, and Hindus believe this and that's it, we have to say to that person no, no, you don't get to play that card. If you really can't discuss this point, then you've declared yourself disabled in this conversation. Part of what makes you capable of participating in this discussion is that you can put everything, everything on the table and take on the responsibility for defending this as a moral claim.

People want to play the faith card, and you say no, you can play the faith card somewhere else, but not in this conversation. If you think that some practice in your culture is not just good for you but good for everybody, try to explain it to us. Maybe you'll convince us. Meanwhile, we're trying to do the same to them. And is there any guarantee that this will achieve a convergence?

No, but there's a pretty good reason to believe that a lot of this is already convergent. There's a huge amount of shared moral conviction that we can start with. That's our platform, that's our leverage. And if we're as open-minded with their creeds and worries and fears, if we're open-minded with them, and if we can encourage them to be open-minded with us, then we can work out a shared ethic.

Not hammered out in every last detail, but this is like Sam Harris's lovely analogy with food. Lots of different kinds of food. We can appreciate I don't want that food, but I understand why you like it and it's okay, because it's not poisonous. At least it's not poisonous for you folks, so you can have it.

And this process, it's not a scientific process, it's a political process. But just like a scientific process, there's good process and bad process. If the process is transparent, if it doesn't involve bullying, if everything is up for discussion, if people treat each other with respect, if it's everywhere answerable to the scientifically determined facts, this is how you derive ought from is. And you say well, it's not absolute, absolute ought.

No, of course not. But in the limit, it's the consensus of what the people alive today think we ought to do. And if we look at the history of religions, we see that religions have adjusted, adjusted, adjusted, adjusted over the centuries. The ethical precepts of religions, they are very different from what they were 2,000 years ago. Religions have adjusted before, and they'll adjust again.

In fact religions have changed more in the last hundred years than they changed in the last thousand years, and maybe they'll change in the next ten

years as much as they changed in the last hundred years. I'm actually very optimistic about that.

BINGHAM: So if you accept as a basic premise that enlarging the constituency of reason was a good goal, how would you define now, operationally, reason?

DENNETT: Why would that be a useful exercise, to operationally define reason? I think it's analogous to a problem that arises more narrowly within logic. There's debates among logicians about what counts as, as it were, the best logic, the right logic. Are we going to have classical logic, are we going to have one non-classical logic, another one going to be intuitionists, are we going to have some other? And you ask yourself, is this a well-joined issue?

And I think in some sense yeah, it is. But notice that the ideal that they are arguing about, they can't articulate yet. It's the ideal of if you like perfect rationality, and there's the pros and cons that they variously have, but they have a shared but not definable ideal of what a logic should do. And I think reason is just cognitive excellence, and what that comes to, we're still finding out. And in the same way, we can find out what moral excellence is.

BINGHAM: Let's take two very short, quick questions at the end. Who's the smartest person you know, and who's the wisest, and what's the difference?

DENNETT: Oh, my. Well, one of the smartest people that I've ever known died just recently, and that's John Maynard Smith. And he also strikes me as one of the wisest. He was both breathtakingly clever and incisive, but also a very sweet and gentle man who was wonderful at explaining things and never bullied anybody. So that's the first name that comes to mind. I'm just going to stick with that.

BINGHAM: Okay, that's a good one. If you had a chance of doing anything other than what you're doing now, what would you have been?

DENNETT: I think I've already answered that. I think I probably would have been an engineer. Probably not a very good one.

BINGHAM: Well you're still sort of working, and you've almost sort of answered this one as well, but what are you optimistic about with the progress question?

DENNETT: I am optimistic about the future of reason. I think that - and my email bears this out - there's a tremendous discomfort with the irrationality that we see in the world today, and although some people have I think hugely overreacted to religion and the sort of threat of religion in the same way our government has overreacted to the threat of terrorism.

And it's not that big a problem, and if we just calmly, firmly proceed with better education and more transparency and more openness, I think we're going to be amazed at the results.

AUSTIN DACEY: To help respond to Roger's question about what is reason, by way of answering a related question, what is a reason, or what is it to give a reason, and I wanted to suggest that there's a great answer to that in that cornucopia of ideas that you call a book, *Freedom Evolves*, your great book on the free will problem, where you have a kind of evolutionary account of reasons according to which a reason is something that you give to someone else so as to take responsibility for your actions.

It's what marks the difference between something that just happened and something that you did. So if we're riding in the subway together and I shove you by accident or I shove you because you're standing on my foot, it's my giving you the reason, you were standing on my foot, that marks a difference between the accident and the action.

And this seems to be something that is part of our evolved, universal psychology, and might be something that could form part of a shared moral vocabulary in this discussion that you sketched.

DENNETT: In fact, let me just expand a little bit more on that. Thanks very much for the compliment, and for drawing up that point. I think a big mistake we're apt to make about reasons is that we confuse represented reasons with reasons. I think there've been reasons for as long as there's been life. There's reasons why the primordial cells are designed the way they are, and there's reasons why they do the things they do - for instance, following gradients through the primordial soup.

Now they don't appreciate the reasons; the reasons aren't represented anywhere. We, in retrospect, however, can see what the reasons were. That was the birth of reasons. And the biosphere is just chock-a-block with reasons. We're the first reason representers. For instance, one of my favorite examples is the baby cuckoo chick, when it hatches, the first thing it does is it tries to push the other eggs, the eggs of its hosts out of the nest so it can monopolize the resources.

Now that's the reason it's doing it. It doesn't know the reason, the little bird brain; it's innocent as can be. It doesn't know the reason, but that is the reason, and it's what I call a free-floating rationale.

BINGHAM: The classic example of the wasp.

DENNETT: But when chimpanzees do things for reasons, those are reasons just the way it's reasons for cuckoo chicks. But the chimpanzees don't represent their reasons to themselves the way do either. They are more advanced than the cuckoo, and they can sort of represent their reasons, but they can't share their reasons. They can't reason together. It's the fact that we can have a conversation, that we can represent reasons and then criticize our reasons, that's something that we have that no other species has, and that is, in fact, I think, the source of our morality.

BINGHAM: So you think that if I said in sign language to Kanzi come, let us reason together, it wouldn't have much going?

DENNETT: I think that's like talking to God. You can always say that to Kanzi, but Kanzi's not going to answer you.

BINGHAM: Rama? You had a question.

V.S. RAMACHANDRAN: I just had a comment about your belief in belief, which I think is a very interesting point, and I'm reminded of this from a completely different area of research - that is, placebos. And what's interesting about placebos, everybody here, I'm sure, knows what a placebo is. You have a real pill and you have a pink pill and you don't do anything at all, and the pink pill works better than not doing anything at all.

Now the amazing thing is there was a study not long ago showing placebos work even if you tell the person it is a placebo. There is a pink pill which doesn't do anything. And I think something like a prayer might be like that. I know people who are perfectly rational who will say, "I know prayers are placebos, but it works anyway, so I'm going to pray." So this may be the origins of many religious beliefs in that gray zone where people believe in belief, but they don't actually believe.

DENNETT: Yeah. I have a bit about placebos in *Breaking the Spell*, and I think that in fact it's very interesting to look at placebos and at shamanic rituals and recognize that here is a case, too, where the shamans, the witch doctors, 10,000 years ago when there was no real medicine, if you had a problem, the only health insurance you had was a witch doctor. And the witch doctor could actually help you about some things, because they'd sort of discovered the placebo effect, and they had all sorts of very elegant ways of ritualizing this to enhance the effect.

They also had some stuff that really worked. They had herbs and so forth that really had potent properties. That's why the drug companies are scavenging the world's shamanic rituals to try to find out what they've got there that works.

But now the idea is that those rituals that were beautifully honed by cultural evolution over thousands of years didn't work on everybody. Some people are just more or less immune to rituals. Those people had no health insurance. That would be a very strong truncation selection pressure, so that in those human lineages where there was a strong shamanic tradition, we would predict that people would have brains that made them more susceptible to the rituals that enhanced placebo effects than not, in the same way that you get a co-evolution between the cultural practice of dairy herding and lactose tolerance in adulthood, so you would have a co-evolution between the culturally evolved practices of shamans and the genetic response to that, a heightened susceptibility to ritual. That's a hypothesis that can be empirically explored, and I think it may turn out to be close to the truth.

BINGHAM: Actually, I was just looking at this. There's a little card that Jerry Orstrom gave me yesterday, this is on the other side of *A Brief History of Gravity*. This is a 5,000-year history of alternative medicine. 3,000 B.C. – eat this root. 100 A.D. – that is a heathen root, don't eat it; say this prayer. 1300 A.D. – that prayer's superstition, don't say it; drink this snake oil. That was 1800 A.D., sorry. 1900 A.D. – that snake oil is phony, don't drink it; take this pill. 2006 A.D. – that pill is artificial, don't take it; eat this root.

Phillip? Just a couple more questions, then we will go to lunch.

PHILIP LOW: I very much enjoyed this conversation. There's just one thing you said which caused me some pause; your comment about the buffalos. I mean, which particular brain structure or oscillations do buffalos lack and are found in humans, which enable us to say that we are *Homo sapiens* and buffalos not to know that they are buffalos? You've said that birds have very innocent brains. Well, I've spent a few years looking at those brains, and even in those innocent brains you find structures which are actually dedicated to the bird's own song, not unspecific. So why would you say such a thing?

DENNETT: Oh, let me clarify. Buffalos, like any sexually reproducing species, know their own kind. Not perfectly; that's why orchids can get pollinated by insects that think they're mating with their own kind. So there's recognition, of course, of course. And so there has to be something in the brain of every species that permits it to do something like template matching. Whether it's done olfactorily or by visual cues or whatever, of course that's true. So buffalos, in one sense, know what buffalos are. They're the things that they will mate with, to a first approximation. But that's all they know. We know rather more. We know, for instance, that we are vertebrates, and that we are mammals, and that we know how we are positioned with respect to the other species in the biosphere, and no other species knows that.

BINGHAM: Okay.

TERRY SEJNOWSKI: Yeah, first a comment on that last point, and then a question. I think that as we learn more about the brain, we're going to be amazed at our narrow-mindedness about what other animals think about. I really think that as a species, we're incredibly narrow in terms of what we attribute to other fellow creatures on this Earth. Dolphins, gray parrots. Okay, so that's just a comment, and it's a belief, and I think that we'll be very, very surprised as we learn more about these other brains.

But here's a question for you. There's been a small revolution occurring in areas of psychology and neuroscience, suggesting that large parts of the brain, which are important for doing all the heavy lifting, all the processing, all the visual reception and making decisions are unconscious and unavailable to consciousness. What role for the unconscious is there in your plan for basing everything on pure reason?

DENNETT: Yeah, good. First let me comment on your hunch about animal minds. Of course that's just a hunch, as you say; you may be right. I have thought that it was more important to dampen the enthusiasm for what I've called the Beatrix Potter syndrome, which is to think that every animal is just sort of a human being in a fur coat, and that they pretty much think the way we do, and there's a tremendous seduction to imagining the inner lives of animals as very much like ours, just plus the fur and the echolocation.

TERRY SEJNOWSKI: That's anthropomorphism, and that's wrong.

DENNETT: That's anthropomorphism - not realizing how alien those minds are. And so I have wanted to stress the differences, not just in how alien they are, how unlike our minds a lot of those minds are, in addition to the ways, of course, that they're like ours, but also to stress what I think is just obvious, and that is we're the species with civilization and science and the mind tools, the thinking tools, that this has made available just skyrockets any normal human being into a whole new world that no animal has access to.

Richard Gregory says that a thinking tool, it doesn't just take intelligence to use a pencil or tools in general, but they enhance your intelligence. They make it possible for you to do things with your brain that other animals can't do. My friend Bo Dahlbom has a nice line that I quote somewhere; he says, "You can't do much carpentry with your bare hands, and you can't do much thinking with a bare brain."

And no human being thinks with a bare brain. We fill our heads with techniques and facts and prosthetic devices and so forth. And if it weren't for that, we wouldn't be the moral species. That's what gives us noblesse oblige. We've got the power, that's why we've got the obligations. That's why no other animal is morally obligated the way we can be morally obligated.

Let's see, you had another point there, as well.

TERRY SEJNOWSKI: Your unconscious mind.

DENNETT: Oh, yeah. That's a very interesting issue. We are learning that the pathways between the outside world and that part of our internal forum that we can talk about - I'm being very careful not to put the Cartesian theater back in there - are not as, as it were, sacrosanct and as clean and as crisp. The processing that goes on doesn't have quite the integrity that we could imagine it to have. But we learn that. Now it's time to make the prosthetic devices that respond to that discovery.

We need eyeglasses for the soul there, too, and as we learn that we are suckers for the gambler's fallacy - a nice example, I can't remember the name of this particular fallacy, you show one picture of a starving child and you'll get more money than if you show two pictures of starving children.

What we've got here is an arms race in the evolutionary sense, where as we discover these chinks in our armor, these weaknesses, these flaws, these fallings-short of optimality, we do two things: some people think of clever ways of exploiting them, and other people think of clever ways of blocking that exploitation. It's a moving target, and it's always going to be one.

BINGHAM: Pat, do you want to talk about the rest of the moral menagerie?

PATRICIA CHURCHLAND: Yeah, yeah, a little bit. Of course anthropomorphism can get silly; we know all about that. But one of the things that I think is very interesting about animal behavior studies is the discovery of the complexity that non-verbal animals are entirely capable of enjoying representationally.

So for example, corvids turn out to be able to solve extremely complex problems in one go, and they don't talk to themselves and they don't have reasons and so forth - or at least they don't have verbal reasons. And it turns out that jays have a rather complex theory of mind, in the sense that they know who all the individuals are and can identify them, they know who in the hierarchy can see where they are caching nuts and so forth.

And so it turns out that what you call the mere hunch of Terry's is actually not so much a mere hunch but an hypothesis for which there is accumulating evidence. And this is against the backdrop of something else, which I think is really important and quite staggering, and that is the discovery by molecular biology that humans have only about 28,000 genes and we share all but about 300 with mice.

Related to that is the discovery that our brains structurally are very, very similar, and the lesson about evolution that evolutionary psychologists need to know is that evolution has been extraordinarily conservative in the way it builds nervous systems and that your nervous system and that of a mouse and that even invertebrates is extremely similar.

And this really does, I think, provoke the thought that, of course language makes a difference in the case of humans, but it may be that it's a very small difference in terms of the actual brain. I mean Marty Sereno has this wonderful hypothesis that it's that sheer number of neurons is what makes the difference.

And finally, of course, to get back to animal studies, it turns out that if you look carefully and you look closely, that animals also have something which you might call a representation of what's a fair division and what's not a fair division. Perhaps they don't share exactly what you mean by a system of justice or human rights or what have you, but relative to their way of making a living and their particular niche, they have a kind of moral organization that serves them extremely well.

And to say, I think, that we alone are the moral organisms is a kind of inverse Beatrix Potter problem, and that is that you're failing to recognize the complexity of social organization in non-human animals.

DENNETT: Okay. First of all, I know that literature pretty well; I taught a course with Robert Cook, who's one of the experts on bird intelligence, on animal intelligence. And I wrote an article in *Behavioral and Brain Sciences* some years ago about this very issue, intentional systems and cognitive ethology. And what I said there is that we get this dynamic, this pendulum swing between the romantics and the killjoys, and it's still going on 20 years later.

We have people saying oh, look how fantastically wonderful animals are. Those are the romantics. And then somebody does an experiment and says oh my god, look how stupid they are. That's still going on. And yeah, the corvids are great, but if you want to do experiments to show that things that oh my god, you mean corvids can do this but they can't do that? I would never have imagined they couldn't do that.

Everywhere you look, you find these weird truncations of their competence. I mean, that's what Seyfarth and Cheney showed with the vervet monkeys. They're brilliant in these some areas, and dense as a post right next door.

CHURCHLAND: Just like humans.

DENNETT: Yeah - no, no.

[Laughter]

DENNETT: No, no; not like humans. The truncations are alien; they're very weird. It's very hard for us. We've said today, I don't know how Frances Collins can be a good scientist and how he can hold these other views. That's a sort of a bizarre division of a mind. But I think that first of all, yes, we have to proceed without any blanket claims about what kind of sort of proto-morality animals have, and just how much they represent their social surroundings, and it's very interesting work, and it's hard to study, and there's the positive side and there's the negative side.

You've stressed the positive, and today I will stress the negative, and there's a lot more that has to be learned there. But as far as the point about the conservativeness of the genes and the similarity of the brains, I guess I don't think there's a big point there, for this reason. I've got a laptop right over there, and that architecture is basically the same as on the first computer that Turing ever built. And it can do a kazillion things that that computer that he built couldn't do - software.

Software. And that's the whole point of the hardware-software distinction. There's so many things we can do with our brains that chimpanzees can't do with their brains because they can't download the software.

Now it might be, to pursue your point about conservativeness - and I've worried about this. It could be that you can make one or two or three tiny changes in a chimpanzee genome and whoop, they got a human brain, just like that, that could learn a language, that could go to school, and so forth. That is a distinct possibility. But until that happens, we now know from what, half a century of very clever and diligent efforts to teach chimpanzees language, not going to happen unless we make those changes in the brain.

BINGHAM: We're sort of running out of time here. Do you have just one question there?

AUDIENCE MEMBER: Yeah. So you talked about facts and myth; religion versus science, but I think there's another front where there's a distrust from science. I would say it's scientific as well, but it's facts versus facts, and the second set of facts are facts about science. So to take two examples, looking at the history of science, people would probably say they're concerned about, say, ableism in science, or the situation with ecology.

Specifically, for example, if we think of mainstream science or let's say even big science as driving technology, what's happening in the rainforest I think could be very well argued to be connected to science in some way. Ableism, for example, you've mentioned Turing. Turing, in a sense, died because the science of the day, or at least the mainstream science, thought that there was a problem with homosexuality and tried to fix him, and it was tragic - tragic consequences.

So my question is how do we spot that today in science, first of all. How do we deal with the problem of skepticism, which I think is probably a real problem, and secondly, what do you think are the big mistakes that we're making today? Because if it happened in the past, clearly it's probably happening now. What are the things we really should watch out for?

DENNETT: Well of course the way science deals with its own flaws is to be self-critical and to catch them and to try to fix them. But this doesn't come for free, it takes time and energy and, quite bluntly, money to do that, too. And one of the problems we have is that science is getting very, very expensive, and the money has a very distorting effect, as we all know.

But even there, I think we can get a sort of compensatory development of the very scientific practice. My favorite prediction along those lines is that many of the most important and exciting discoveries in psychology in the next 20 years are going to come out of not universities but liberal arts colleges. Here's why.

They have psych departments, they can't afford fMRI machines. Their faculty are going to do all the clever experiments that you don't need fancy scanning to do, and they're undergraduates and they are going to write the articles that are going to discover lots of effects that it would be too expensive and difficult

for the researchers at the major universities to go, because if there isn't a scanning component in their research, they can't get a grant to do it. And this is going to be done grantlessly, by and large, and that's a self-correcting mechanism. I think things like that will happen.

AUDIENCE MEMBER: But at the same time, the DSM, for example, is proliferating, right? So again, if we're looking at the errors, if we have to look at what is symmetrical today, yes, we're gaining knowledge about cognition, but we're also promoting all these infirmities, as you mentioned, that I think probably analogously seemed very similar to what was done back then.

DENNETT: I'm sure there's many uncorrected and unheralded problems and sort of pathologies in science, and I don't have any blanket cure for that but just more diligence and more reflectiveness.

BINGHAM: What's the biggest mistake you ever made, and what did you learn from it?

DENNETT: Oh, the biggest mistake I ever made I would never say out loud, I guess. That would be my biggest mistake, right there.

BINGHAM: Dan Dennett, thank you very much.