

**Interview with Daniel Dennett conducted by Jim Spadaccini at The Future of Science Conference in Venice, Italy
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Q: What is it about Darwin's idea that is so dangerous?

DANIEL DENNETT: I think Darwin's idea upsets a very ancient apple cart. For thousands, maybe hundreds of thousands, maybe millions of years, our ancestors have thought that it takes a big, fancy, intelligent thing to make a less intelligent thing. You get... you never get the pot making the potter, you never get the horseshoe making the blacksmith. It's always smart artificers making lesser things. And so the idea of a... of an intelligent creator that made all the wonderful things that we see in the world is... just seems to stand to reason. And Darwin comes along and says, 'Well, no, there's a completely different theory, which says all of this wonderfulness, all of this design can bubble up from unintelligent things, from a process which itself has no intelligence, but which in a mechanical way generates all of this diversity and all of this excellence of design.'

And at first, that idea is just... is just shocking, it's just very hard to believe. We now can see that not only does it have a good chance of being true, there's a tremendous wealth of evidence showing that it is true. But that's such a radical inversion of our reasoning that many people say, 'Well, that's okay for some things, but I want to cling to the old ways of thinking in my own territory,' say, for art or music, or for the human mind, or for conscience, for ethics. And so we get these collision zones, where some people are thinking in the new post-Darwinian way, and other people are thinking in the old-fashioned top-down way, and there's collisions, and that's dangerous.

Q: You've described the design of natural selection as "brilliant" but "mindless." Can you explain?

DENNETT: The late Frances Crick used to joke he had what he called Orgel's Second Rule. Orgel's... named after his colleague, Leslie Orgel. Orgel's Second Rule is that natural selection is cleverer than you are. Again and again we see in natural systems, in organs, in individual cells, in the wing of the bird, in the way that a polar bear makes its den, we see wonderful design, design well worth copying, a stupendous use of resources. This is... this is design that enraptures engineers who know good design when they see it. So there's a lot of exquisitely well designed materials in the living world, but the process that made it is not itself intelligent or directed. It is a sifting process. It's a mechanical

sifting and differentially replicating... it's like a tournament, which automatically has a winner, and the winner not... doesn't just advance to the next round, but makes lots of copies of itself to advance to the next round. And it's this incessant competition, copying, copying, copying, which automatically finds the design improvements and discards the rest. So it's profligate, it's wasteful, it's... wanders aimlessly around in this space of possibilities, but if there's good design out there to be found, it finds it. And so it is a process that is, itself, mindless.

But since it has the copying feature, that's what... that's what Darwin appreciated, that it's the preservation of the good designs and the further elaboration of those designs in the next generation. That's where... that's where the ratchet is that ratchets up the design from generation to generation. The good bits are saved and used again.

Q: How do you explain evolution to skeptics? How can you convince them? Can you?

DENNETT: Well, I don't know. I've been trying for many years. My main effort was when I took dangerous idea, where I sought to explain that very idea at great length to show why it was unsettling, why it was dangerous, and then to illustrate how it, in fact, applies not just to the design of the parts of organisms, but also to the design of social institutions, to the design of languages, to the design of human culture, and, of course, to the design of our minds. This is a huge inversion of the standard way of thinking. We tend to think that minds come first, and we are... the minds are the causes and the designs are the effects. And what Darwin shows is that among the effects that evolution has spewn up so far are minds. Minds are a very recent outcome of evolution, not the original cause of evolution.

Q: Are there dangers when half the population of the United States doesn't accept evolution?

DENNETT: Well, it might not seem to make any difference. If half the population didn't believe in plate tectonics and the other half did, who cares? I mean, the geologists would be upset because a lot of people would be believing something false, but it doesn't seem to have any practical difference. But in the case of evolution, in fact, I think it does, because many of the big problems that the world faces right now, problems about water, fresh water, about population, about disease, about national boundaries and the movement of people, these all have implications that if you want to understand them, you have to understand them from an evolutionary perspective. We are threatened with newly evolved disease vectors, we're threatened with bird flu, and Ebola virus, and SARS, and other such things. These evolved very fast.

Now, if we think about them from an evolution perspective, we can do a much better job of responding to the threats. If we don't think about them from an evolutionary perspective, we're making matters much, much worse for us. A classic example is antibiotic-resistant germs, which arise precisely because people don't know how to use their antibiotics right. And they, if they use them in ways that actually enhance the evolution of resistant strains, then we're poisoning ourselves, we're taking... we're making a time bomb. We've got to understand these issues, and evolutionary biology is the way.

Q: You said earlier that you think secular institutions are failing us. Do you include museums? If so what could museums do better?

DENNETT: I don't think I have any particular wisdom about what museums should do better. I feel about that question the same way I feel about when people ask me how school teachers should teach better. I know how hard school-teaching is. I know that college-teaching is a piece of cake in comparison to, say, the high school teaching. I take off my hat to high school teachers. They know a lot of tricks that I don't know. And I think that in the museum world it's the same way. That is, museums, and I've worked on a few museum exhibits over the years myself, and I know they have to... they don't have a captive audience. They have to grab and hold the attention of their... of their audience. They have to find ways to get people to come in and actually attend to what's there and not be distracted by just the zowie-ness. These are difficult issues. I think that I have seen wonderful exhibits on evolution. I think the one at the Museum of Natural History in London, the Darwin Wing there is fantastic. It's a wonderful exhibit.

I think that what I would like to see is, for instance, comic books, which very carefully don't insult, don't offend, just in vivid and amusing and fascinating ways tell stories about evolution. I think that that's a good idea. I think there's things that could be done in the media that would work very well.

I think... I think we do have to think about a more aggressive approach to public education and presentation in the media, because those who hate and fear evolution are taking that approach, and they're proving to be quite successful.

Q: In discussing your book, *Breaking the Spell*, you've said that part of what the book does is to "reveal how the magicians do their tricks" when it comes to organized religion. Can you elaborate?

DENNETT: Magicians famously want to keep their tricks secret, and for very good reason, and so there's a sort of tradition of not telling how magicians do their tricks. So when magicians do explain how tricks are done they get in trouble with their fellow magicians, although we have the wonderful case of Penn

and Teller, who have broken that barrier rather effectively and have, I think, reestablished the respect of their fellow magicians who understand that this is... this is a good thing to do.

I suppose, in a way, I think it's time to do the same thing with some of the aspects of religion that we should... we should forthrightly and straightforwardly reverse engineer religions to see how they work, to see how they achieve their fantastic success in holding people's allegiance. And I expect there to be resistance to this. I expect there to be people who view this as vandalism, in effect. But I think they're wrong, and I think that what they should recognize is that the aspects, the features, the adaptations of religion that make them work that are worthy will only be enhanced by an understanding of how they work, and those that aren't worthy shouldn't be worthy, shouldn't be... shouldn't be fostered. I think that religions have been evolving for thousands of years.

The religion of today is very different from the religion of 2000 years ago, or 1,500 years ago, or even 500 years ago. And it's evolving rapidly today, and maybe church leaders, particularly the most successful ones, seems to be engaged in a lot of very clever sort of social engineering, trying to figure out how to make their religions more popular, how to keep people's allegiances, how not to bore people or drive people away, and so forth. I say fine, let's really study that. The practitioners are studying it, let's all of us study it and understand how these things work.

Q: You've talked about teaching a course on world religions.

DENNETT: Yeah.

Q: What would that accomplish, do you think?

DENNETT: Well, I think that if you look around the world you see there's toxic varieties of religion in every major religion and in a lot of minor. There's also religions which are obviously just benign, they're wonderful. If you ask what's the common denominator, what's the feature that the toxic religions share, it's the enforced ignorance of the young being raised in those traditions. These are the religions that don't allow the young people to learn about other religions or to learn about what other... what other people have learned about their religion. And it's this enforced ignorance that makes for the problems. If we, in the United States, had an unexception (?) policy of curriculum on world religions that... not just public school kids, but private school kids, home-schooled kids, everybody learned this in a very matter-of-fact way—the traditions, the symbols, the prohibitions, the requirements, the liturgy, the scriptures, the beliefs, the history of the major religions and some minor religions, if this were just common knowledge and was known to be common knowledge, I would predict, and this

is... just at this point I'd have to say a hunch, that any religion that could flourish in that environment would be a benign religion.

And so, again, this is sort of like a public health measure. If we take the right steps, then the sorts of bacteria that will flourish will be the ones that are just fine.

The fact is that we're, all of us, swarming with symbiant interlopers on every... practically every scale. There's microbes, and little mites, and bacteria, and viruses by the... by the trillions, by the trillions that inhabit our bodies. Most of those are perfectly benign. They don't hurt us at all. There's only some that are really bad for us. And if we can create the same sorts of environments where the benign versions flourish and the toxic versions are kept in control and are allowed to go extinct then we'll be better off.