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Interview with Joan Roughgarden

Charles Darwin and Stanford biologist Joan Roughgarden have three things in common: a fascination with barnacles, a passionate desire to understand evolution, and a knack for controversy. While writing *Evolution's Rainbow* a few years ago, Roughgarden concluded that the astonishing diversity of sexual types and interactions meant that Darwin's theory of sexual selection (based on competitive males and choosy females) was not just wrong, but unfixable. She wants to replace it with social selection, in which a wide variety of social interactions, say, same-sex bonding and group membership, determine an animal's reproductive success and therefore shape bodies and behaviours. Her cooperation-based theory would, she argues, explain not just the peacock's tail, but the female spotted hyena's clitoral penis, the bonobo's use of sex for bartering and bonding, and the side-blotched lizard's five sexual types. Not surprisingly, most biologists are unwilling to jettison sexual selection. Some see her critique as a political statement reflecting her experience of metamorphosing from John to Joan in her early 50s. But many others take her ideas seriously, even if they strongly disagree. Roughgarden, a practising Christian, has now ventured into the face-off between evolution and religion. Robert Adler talked to her at her San Francisco flat.

Why did you write *Evolution and Christian Faith*?

I just felt compelled. The entire discussion over intelligent design and teaching evolution in schools has no evolutionary biologists participating, with the possible exception of Richard Dawkins. We're only hearing from highly funded evangelicals. My voice is much more central and non-confrontational.

Who's your audience?

First, the great majority of Christians who are members of mainstream denominations or of open-minded evangelical churches. I hope my book gives them something they can brief themselves with and discover there is nothing hostile about evolution. On the contrary, the metaphors that underlie evolutionary theory are also in the Bible. Another group that matters to me is biology students being harassed. I talk to students whose families say they're not good Christians because they're willing to study evolution. I hope even the Pope will read the book. That would be nice.

Can you give me some examples of how the Bible uses the basic metaphors of evolution?

First, that all of life is united, that we share a common family tree. It's quite clear in Genesis that God made people out of mud, and then two verses later he makes trees out of the same mud. So from the very beginning, we share a material continuity. Next there are metaphors to do with that species changing through time. There is a fabulous Old Testament passage with Jacob, the farmer, and the breeding of different kinds of sheep. God directs the sheep of certain colours to leap upon the females and to breed and so therefore stock is changed.

Any more?

Yes, randomness. Take the mustard-seed parable. The mustard seeds are being spread on all the different soils, and you see how well they do, and then you select the plants that did well. The notion of random variation is present in the random scattering of the mustard seed. In the book, I use the phrase that a mutation is a mustard seed of DNA tossed into different bodies. I just love that. One can't possibly say that either the facts of evolution or the elements of the theory of evolution are hostile to the Bible, because it's already there.

Why do you argue in the book that intelligent design is not just bad science but bad religion?

When I was talking to my publicist the other day, a phrase came up that I wish I had put into the book, that the God of the intelligent designers is a "God of plug-ins". They say that animals have pieces to them that are just plugged in, already made by God, by the intelligent designer. So their God is not a God who makes the whole of creation, but just plugs in little bits and pieces into animals. It's really ridiculous. Basically the spirit of it is, if you don't believe in Matthew, Mark, Luke and John, let's go look at the bacterial flagellum and now maybe you'll believe in God.

You also write passionately that scientists should not accept the idea that organisms are inherently selfish. Why?

First, it's false. It's not established that selfishness is the lingua franca of the living world, although Dawkins claims it's true. We're going to get it wrong scientifically if we go on adhering to that. It also licenses conduct that is immoral much of the time. It annihilates the effort to see goodness in the world, and to see goodness as inherent in people.

What does the conflict your ideas have stirred up tell us about you?

Well, I don't know. But where I am in my life is I'm not getting any younger, and I'm not going away, so I might as well just say how I see the situation. There's nothing to be gained by evading a straight call on these matters.

As when you argue that sexual selection is used to justify sexual stereotyping and discrimination?

If there are bad consequences from a theory, then the theory better damn well be right. That's why I'm so incensed at sexual selection - it's locker-room bravado projected onto animals and then retrieved from animals as though it were a truth of nature. If it's right, we'll deal with the negative consequences. But if it isn't right, we've got to get rid of it fast.

Is your challenge to sexual selection making other biologists question their assumptions?

It's too early to say. It provides a vehicle for people to advance a point of view contrary to sexual selection; it's an organising pole. But I still think it's very dangerous. An assistant professor, say, who came out against sexual selection theory would be jeopardising their career. The responses showed how thoroughly the power-holding professors, particularly in the UK, are committed to sexual selection. But if you talk to grad students, when I'm arguing that the focus of family dynamics should be about the quantity of the young, not their genetic composition, it seems pretty obvious. Or that the notion of the promiscuous male shouldn't be taken as an exemplar of prowess, but viewed as a tactic of last resort by males denied the opportunity to participate in the control of the young they sired.

Have any of your opponents' arguments changed your thinking?

Not that I'm aware of. What people want me to say is some song and dance to explain gay and gender-bending animals. If I could come up with a cute little narrative we could tack onto sexual selection, the theory would remain intact, and we could all live happily ever after.

Why not do that?

It's not true. This is what keeps going on in sexual selection. The narrative carries the data, the data never carries the narrative. The whole thing is upside down.

What do you see replacing sexual selection?

We need to realise that the replacement will be a much broader account of sex, gender and sexuality. I would start with why there's sexual reproduction in the first place, and then work from there. If there is sexual reproduction, why are there male and female bodies, not just male and female gametes? And if there are male and female bodies, how many kinds? What kinds of families do they go into? How much conflict versus competition occurs within them? And when we come to that part of the picture that is the logical counterpart of sexual selection, it would begin with the male and female co-funding a joint investment. They don't start in opposition, they start out as cooperators because they've agreed to put genes into the same offspring. So

they're already in bed together, literally.

Is anyone testing sexual versus social selection?

I think the overall situation is so chaotic at the moment that it can't happen. The dust has to settle first.

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