

the public than you might suspect. My only regret is that I was so tardy in making time to read *Starring T. Rex!*

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JOAN ROUGHGARDEN, *Evolution's Rainbow. Diversity, Gender, and Sexuality in Nature and People*, Berkeley / Los Angeles / London: University of California Press, 2004, 474 pp., \$27.50 / £17.95.

Joan Roughgarden's 6<sup>th</sup> book, *Evolution's Rainbow: Diversity, Gender, and Sexuality in Nature and People*, mixes a pretty metaphor with a bold challenge. She proposes that animal sexuality is more diverse than is now understood; indeed, that it is a rainbow. She also asserts that one of Darwin's central ideas, that selection as it occurs in the context of sexual reproduction, is false.

Roughgarden's first statement is convincing, and it is the basis of the book's three parts. *Animal Rainbows* provides a scholarly and entertaining review of the diversity of animal sexuality. The unifying theme of this section is that the sexes are *not* simply male and female, but instead represent a bumpy continuum whose modes are best described by the term, 'gender'. *Human Rainbows* reviews the diversity of human biology as it relates to sex. It reveals, consistent with Part I, that like most other evolved organisms, humans have great diversity in sexual expression, so much so that despite social, religious, legal, and 'scientific' insistence on the existence of but two sexes, multiple genders exist here as well. *Cultural Rainbows* considers the range of human societal diversity in relation to sex; and once again, great variation is observed, both in the degree to which multiple forms of sexual expression are tolerated, as well as in the degree to which such tendencies are suppressed, often with cruelty or violence.

The scholarship with which Roughgarden addresses these subjects is thorough, unusually well-referenced, often witty, and in many cases profound. In nearly every chapter, there is elegance of line and simplicity of phrase. The examples are well considered and the stories are well told. At one point, Roughgarden spins a whimsical tale of how she came to be, a personal vignette suitable on its own for publication as an illustrated children's book. Biologically difficult subjects such as mutation, selection, polymorphism and speciation, all are treated with great skill, and on page after wonderful page it is clear that as a Professor of Biological Sciences, Joan Roughgarden is superb.

However, Roughgarden's second statement is less accomplished; not for any lapse in detail or intensity by its author, but simply because the goal itself is misguided. This aspect of the book is also a vehicle for three more of Roughgarden's admittedly personal polemics. The first is her impassioned protest against the restrictions that human society has placed on the expression of sexual diversity; a worthy quest indeed and one well executed. Her second assertion, however, is that biological scientists have been part of this social persecution, not just because they are part of an intolerant society, but also because they have doggedly refused to interpret their results in any light other than one that is rigidly two-sexual. Her third position is that Charles Darwin himself is the source of this latter scientific conspiracy, and because of this bias, Darwin's theory of sexual selection, or as he described it, 'selection in relation to sex,' is flat-out wrong.

Roughgarden's call for the abandonment of sexual selection is derived from her observation that 'Males are not universally passionate, nor females universally coy,' and she cites 10 other supporting reasons as well (p. 169-171). With some minor quibbling possible on the details, her observations are indeed true. To mention a few of them, animal bodies *do not* always conform to a rigidly two-sex model, sex roles *are* reversible in certain species, the evidence that females choose 'good genes' in males *is* weak at best, and same-sex sexuality *is* remarkably common.

Yet Roughgarden overlooks the fact that what she calls 'sexual selection theory' does not belong to Darwin at all and the tenets she attributes to it were never used by Darwin to define sexual selection. While Darwin noted the above male-female differences in *The Descent of Man and Selection in Relation to Sex* (1874; p. 216-222), he never considered them to be the basis for the evolutionary process he called sexual selection. Darwin correctly identified the intensity of sexual selection as caused by differences in mating success among members of the same sex. Thus, sexual selection is due to the differential production of offspring, within each sex, by some individuals at the expense of others.

Sexual selection is a genuine evolutionary process. It is quantifiable, and it is unusually well-documented. The 'males arduous-females coy dichotomy,' on the other hand, is a post-Darwinian verbal construct that, as Roughgarden correctly notes, has proven extremely difficult to rigorously test. In fact, it is *impossible* for the sexes to differ in their relative promiscuity if all individuals have but a single mother and father. Yet the above male-female dichotomy forms the basis of a research programme now known as 'parental investment theory,' which places differences in gamete size as the ultimate source of sexual selection. While this perspective is what Roughgarden has justifiably criticized, it is the dichotomy, not Darwin, which needs replacement. Roughgarden has attempted to kill Darwin's message, but the real difficulty lies with the self-appointed messengers of parental investment theory.

Darwin (*Ibid*; p. 212) noted that the effects of sexual selection are similar to those that occur with a bias in sex ratio, 'for when one male secures two or more females, many males cannot pair'. This statement elegantly explains why sexual dimorphism evolves, that is, why the sexes can become distinct, or even variable, in appearance. When a trait, in this case possessed by certain males, leads to disproportionate mating success, that trait tends to be disproportionately represented within the next generation. This process has nothing to do with the identification of genders, although it *can* explain why multiple genders may exist in the first place; it is simply the means by which sexual selection occurs. Furthermore, as Darwin noted, its effects can be visited on males as well as on females, with astounding consequences on sexual phenotype.

Roughgarden argues with authority that the importance of social interactions is too often ignored in current interpretations of sexual biology. She makes the difficult point that scientific conservatism, like social conservatism, is a two-edged sword. Her point is well taken that modern science has been dominated for much of its existence by rich, white, straight men. And while Roughgarden shows a disturbing tendency to favor elaborate explanations for sexual phenotypes because they are more inclusive (e.g., her proposal that satellite males serve as 'relationship counselors' for territorial males, p. 84), this does not invalidate her assertions as testable, scientific hypotheses.

Roughgarden is indeed correct that there is much injustice leveled at innocents in the name of social convention. She is also correct that there is much misinterpretation of animal sexuality in the name of Darwin. But ~~neither~~ of these mistakes requires the destruction of Darwin as a scientist, ~~or the retirement~~ of his theory of sexual selection. Extraordinary claims require extraordinary evidence. Such evidence is not provided here. Roughgarden's

the remedy for neither

attacks on Darwin and 'selection in relation to sex' are unfortunate. They detract from an otherwise masterful book.

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JAN NIKOLAS DICKE, *Eugenik und Rassenhygiene in Münster zwischen 1918 und 1939*, Beiträge zur Zeitgeschichte Band 3, Weizensee Verlag, Berlin, 2004, 167 pp, € 26,00.

Das vorliegende Buch von J.N. Dicke, 'Eugenik und Rassenhygiene in Münster zwischen 1918 und 1939' ist eine geringfügig überarbeitete, fehlerfreie Staatsexamensarbeit aus der Universität Münster. Der Autor zeigt mit vielen Zitaten, dass das eugenische, oder wie es damals in Deutschland hieß, das rassenbiologische Denken bereits in der Weimarer Republik weit verbreitet und akzeptiert war. Als im Juli 1933 das Gesetz zur Verhütung erbkranken Nachwuchses verkündet wurde, war auch in der Provinz die Begeisterung groß. Auch dies wird durch viele Zitate aus Veröffentlichungen von Mitgliedern der Medizinischen und Juristischen Fakultäten von Münster dokumentiert.

Was die Sekundärliteratur angeht, zitiert der Autor fast ausschließlich Arbeiten, die nach 1990 erschienen sind. Er beginnt seine Schlussbemerkungen mit folgenden Sätzen: 'Es ist die Eigenart eines Diskurses, dass er sich fortwährend wandelt. Neue Impulse bedingen ständige Transformation. Das gilt für die Wissenschaft im Allgemeinen und für die Geschichtswissenschaft im Besonderen'. Es fehlt allerdings jede Analyse, warum das hier im besonderen Fall so ist. Hat das damit zu tun, dass die Rassenhygieniker in Deutschland nach 1945 weiter als Humangenetiker tätig waren und so taten, als wäre nichts geschehen?

1951 wurde Otmar von Verschuer, der ehemalige Direktor des Kaiser Wilhelm-Institutes für Anthropologie, menschliche Erblehre und Eugenik nach Münster berufen. Es war unter Kollegen bekannt, dass er Josef Mengele als seinen Assistenten sah, auch als dieser im KZ Auschwitz als SS-Arzt tätig war. Wer hatte sich in Münster für seine Berufung eingesetzt?

Im selben Jahr wurde Bruno Kurt Schultz als Professor zur Wiederverwendung an die Medizinische Fakultät der Universität Münster berufen. Schultz war bis zum Kriegsende Chef des Rassenamtes im Rasse- und Siedlungsamt der SS gewesen. Wer hatte sich in Münster für ihn eingesetzt?

Der Münsteraner Anatom Johann Paul Kremer wird in einer Fußnote erwähnt. Was dieser allerdings in der Universität und 1942 im KZ Auschwitz forschte wird nicht genannt.

Schließlich wird Rassenhygiene so dargestellt, als handele es sich dabei fast ausschließlich um den Umgang mit Trägern menschlicher Erbkrankheiten. Das rassenhygienische Eheverbot zwischen jüdischen und nicht-jüdischen Deutschen wird erwähnt, aber von Juden ist nicht die Rede. Die Wörter Jude und Antisemitismus kommen im ganzen Buch nicht vor!

So ist dieses Buch eine Sammlung interessanter Zitate zur Rassenhygiene in der Provinz. Es fehlt allerdings einiges, insbesondere eine Darstellung der Zeit von 1939 bis heute. Es fehlt auch ein Personen- und ein Sachindex. Wem ist also dieses Buch zu empfehlen? Den Angehörigen der Universität zu Münster und wirklichen Spezialisten.

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