

cratic government might impose an economic system that treated individuals as equals in Dworkin's sense, but that would not transform the society into an egalitarian political community."

Dworkin rejects Scheffler's characterization of his views on taxation and other

subjects, as well as the "luck egalitarian" label. But he insists that political or social equality should not be regarded as "more fundamental" than economic equality: "A genuine society of equals must aim at equal stake as well as equal voice and equal status for its citizens."

SCIENCE, TECHNOLOGY & ENVIRONMENT

Double Helix Double Cross?

A Survey of Recent Articles

The observance this year of the 50th anniversary of the momentous discovery of the double helix structure of deoxyribonucleic acid (DNA) has been marked by reflections on an alleged scientific injustice almost as much as by celebration of the great scientific achievement.

Was Rosalind Franklin (1920–58), the British scientist whose x-ray data on DNA played a crucial role in the discovery, denied proper credit for her contribution by codiscoverers James Watson and Francis Crick? A *Nova* television documentary, "Secret of Photo 51," broadcast on PBS on April 22 (see www.pbs.org/wgbh/nova/photo51), was the most recent account to suggest as much. But the truth of the matter may be more complicated.

Though feminists have turned her into "an icon for the oppression of women scien-

tists," observes Nicholas Wade, a science writer for *The New York Times*, there's no evidence that Franklin herself—no shrinking violet, and known to object vigorously to unfair treatment—felt that she had been robbed by Watson and Crick. "She became friends with both men afterwards," Wade writes in *The Scientist* (Apr. 7, 2003; see also www.the-scientist.com), "and spent her last convalescence in Crick's house before her death, at age 37, from ovarian cancer."

In their 1953 article in *Nature* announcing the discovery—which was accompanied by an article by Franklin telling what she knew about DNA—Watson and Crick, of the Cavendish Laboratory in Cambridge, England, said merely that they had been "stimulated by a knowledge of the general nature of the unpublished experimental results and ideas of Dr. M. F. Wilkins,

Dr. R. E. Franklin, and their co-workers at King's College, London." When they accepted the 1962 Nobel Prize in physiology or medicine (which they shared with Maurice Wilkins, the deputy director of King's College and Franklin's colleague and rival there), Watson and Crick made no mention of Franklin. And in his best-selling book *The Double Helix* (1968), Watson portrayed her in condescending terms. Watson also noted that Wilkins, in highhanded fashion, had shown him Franklin's x-ray photograph 51, without Franklin's knowledge. Crick, meanwhile, obtained a King's College report containing Franklin's data. Watson and Crick's model of the double helix soon followed.



How much did James Watson and Francis Crick rely on Rosalind Franklin's 1953 x-ray photographs to fashion their model of DNA's double helix structure?

“Given her temper, it is likely that Franklin would have been very angry if she had known the extent to which Watson and Crick used her data,” maintains Lynne Osman Elkin, a professor of biological sciences at California State University, Hayward, writing in *Physics Today* (March 2003).

But did Franklin not know? In an article published a year after the famous 1953 article, Crick stated that “without [Franklin’s] data, the formulation of our structure would have been most unlikely, if not impossible.” Though they became friends, he and Franklin, according to Crick, never discussed the subject during the five years between the 1953 article and her death. Writes Wade: “It was probably obvious to Franklin, as Crick believes, that the structure rested on her data because no one else was producing any experimental results. And both knew that Crick had understood what Franklin’s data meant before she did.”

Franklin and the Watson-Crick team represented two contrasting approaches to

doing science, observes Harvard University biologist R. C. Lewontin, writing in *The New York Review of Books* (May 1, 2003). “For Franklin, whom Watson characterizes as ‘obsessively professional,’ the evidence would finally speak for itself. . . . For Watson and Crick . . . data were useless without a prior concept. The facts could serve only to suggest a range of models and as a check against errors. They garnered their facts where they could.”

“We’re very famous because DNA is very famous,” Watson tells *Scientific American* (April 2003), referring to Crick and himself. “If Rosalind had talked to Francis starting in 1951, shared her data with him, she would have solved that structure. And then she would have been the famous one.” But 50 years after the discovery, with two biographies of her published and another in the works, Rosalind Franklin is now almost as famous as the Nobel laureates. In their great collective accomplishment, observes Lynne Osman Elkin, there’s “enough glory” to go around.

Brave New Brains

“The Battle for Your Brain” by Ronald Bailey, in *Reason* (Feb. 2003), Reason Foundation, 3415 S. Sepulveda Blvd., Ste. 400, Los Angeles, Calif. 90034-6064.

If drugs were available not only to repair defective brains but to “enhance” normal ones, would humans lose sight of what it means to be human? Bailey, science correspondent for *Reason*, sees no cause for alarm, so long as decisions are left to the individuals whose brains would be upgraded.

Francis Fukuyama, author of *Our Post-human Future* (2002), has called for close regulation of biotechnology. He would direct research toward therapy while putting severe restrictions on cognitive enhancement: “For us to flourish as human beings, we have to live according to our nature, satisfying the deepest longings that we as natural beings have.”

But personality is not an unchanging quality, Bailey argues: “Fukuyama has a shriveled, stunted vision of human nature, leading him and others to stand athwart neuroscientific advances that will make it possible for more people to take fuller advantage

of their reasoning and learning capabilities.”

The common objections to the prospect of using pills to improve mood, memory, and intelligence are unconvincing, Bailey maintains. Instead of making people less “authentic,” drugs can make them *more* authentic, as happened with the Prozac user who said it was “as if I had been in a drugged state all those years [before], and now I’m clearheaded.” Nor will neurological enhancements undermine personal responsibility or good character, says Bailey. Aren’t people with attention deficit disorder who take Ritalin to change their behavior acting responsibly? Even if taking brain-enhancing drugs were made easy, there would still be plenty of challenges in life to aid in the formation of character.

Why, Bailey asks, should it be considered better to induce a behavior change by altering a child’s environment than by giving the child a brain-altering drug for the same pur-