THEATER: HISTORY OF SCIENCE

Shades of Gray in DNA Drama

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King's College, London, 1952: Rosalind Franklin develops x-ray diffraction photograph number 51. Illuminated by her light box, a crisp striped "X" stares back at her from the center of the photo. In this brief moment, Franklin reveals the helical nature of DNA and cements a legacy doomed to controversy.

Anna Ziegler's play *Photograph 51* dramatizes the race to determine the structure of DNA—the Nobel Prize–winning work that produced one of the most important scientific discoveries of the 20th century. The narrative centers on Rosalind Franklin, who is presented as a prickly biophysicist obsessed with capturing the perfect image needed to resolve the molecule's structure.

The play opens as Franklin arrives at King's College, where she faces anti-Semitic and sexist sentiments from fellow researchers. But Franklin's combative temperament and secrecy soon become the focus of the story. Although Franklin ultimately succeeds in capturing the elusive structure on film, she refuses to share her work with colleague Maurice Wilkins or even construct a model before completing her detailed calculations.

Photograph 51
by Anna Ziegler; directed by Linsay Firman
Ensemble Studio Theatre, New York. 22 October–21 November 2010. A production of the EST/Alfred P. Sloan Foundation Science and Technology Project. www.ensemblestudiotheatre.org/photograph-51

Alienating Wilkins with her repellent disposition, Franklin inadvertently drives him to secretly disclose photograph 51 to James Watson. Realizing the significance of Franklin's image, Watson returns to the laboratory of Francis Crick, where the two complete the model of double-stranded DNA presented in their 1953 *Nature* paper. Franklin's contribution, however, goes largely unacknowledged by her male colleagues.

Despite the harsh portrayal by playwright Anna Ziegler (*1*), Franklin's unwavering dedication to the pursuit of truth makes her an admirable character. Rather than dwell on her defeat, Franklin celebrates humanity's victory over the mysteries of life. Even as she fights a losing battle with ovarian cancer at the age of 38, her research remains the priority. The play culminates in a stirring confrontation with Wilkins in which he—confessing his love for Franklin—laments the multitude of missed opportunities between the two scientists.

Kristen Bush in the role of Rosalind Franklin.

Photograph 51 provides an emotional journey into the complex realities of laboratory science. Ziegler portrays scientists who—far from the rational, white-coated automatons of popular culture—struggle with personal ambitions, intense competition, and rocky relationships as they strive to define the material of heredity. The small stage provides a dynamic environment for the characters, who often observe Franklin's progress from the sidelines, arguing their viewpoints directly to the audience. The play's director, Linsay Firman, makes use of the cramped space to create striking juxtapositions between the theorists Watson and Crick fiddling with their models and the staunch experimentalist Franklin scribbling calculations in her notebook.

The play raises a number of important issues, from the role of women in science to the importance of scientific collaboration. To discuss these themes, the Ensemble Studio Theatre hosted a lively panel discussion 2 November at the Julia Miles Theater in New York (*2*). Although James Watson could not attend as planned, tense moments still emerged following the assertion by Nicholas Wade, the *New York Times* science reporter, that "the idea that [Franklin] was robbed of credit is incorrect." Biologist and Franklin scholar Lynne Osman Elkin (*3*) shook her head in disagreement, vehemently arguing that Franklin would "not hand unpublished data to a competitor. Period."

The panel moderator, neuroscientist Stuart Firestein, posited that the historical narrative might have been affected by glaring differences in the tone and quality of the two groups' scientific communiqués. "The Watson and Crick paper is, I have to say, a work of scientific art," he commented. "You see immediately what they saw … It lets you into the beauty of the whole molecule. And Franklin's paper is extremely informative, but if you're not a crystallographer, you're not going to get anywhere through this paper."

Although the controversy over Franklin's rightful credit will continue to be debated, the panelists agreed that photograph 51 provided key data for Watson and Crick's DNA model. Despite the inequalities between male and female scientists at King's College, the panelists contended that the men involved in the DNA race did not discriminate against her because she was a woman or Jewish. Rather, they suggested that her severe disposition and impossible relationship with Wilkins likely stymied her progress.

In the end, *Photograph 51* provides a compelling perspective on Franklin in which even the complex science is engaging and accessible. Whether she was a wronged heroine or quarrelsome perfectionist, her contributions to the human understanding of life's hereditary material are difficult to understate. She passed away before the Nobel Prize was awarded to Crick, Watson, and Wilkins in 1962. But even had she survived until then, one wonders whether the scientific community would have recognized her substantial role in the revolutionary breakthrough.

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References and Notes

1. Those seeking a nonfictional portrait of Franklin should turn to Brenda Maddox's nuanced biography (*4*).
2. A two-part podcast of the panel discussion is available at www.scientificamerican.com/podcast/episode.cfm?id=photograph-51-rosalind-franklin-and-10-11-03 and www.scientificamerican.com/podcast/episode.cfm?id=photograph-51-rosalind-franklin-and-10-11-05.
3. L. O. Elkin, *Phys. Today* **56**, 42 (2003).
4. B. Maddox, *Rosalind Franklin: The Dark Lady of DNA* (HarperCollins, London, 2002); reviewed in (*5*).
5. A. Fausto-Sterling, *Science* **298**, 1177 (2002).

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