

Photo 51 – A New Production of History of Science Inspired Theatre.

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3-6-2012 (for *HSS Newsletter*, issue of April 2012)

The play *Photograph 51*, named after the sharpest image in a series of DNA X-ray photos taken by Rosalind Franklin (1920-1958) in a biophysics lab at King's College, London in 1952, is playing this spring at the Central Square Theatre¹ in Cambridge, MA. This Theatre is fittingly located between M.I.T. (which co-sponsors it) and Harvard, two institutions still recovering from a few scandals on the under-representation of women in science. The play is thus very timely, coming as it does on the heels of "Barriers and Bias", the National Academy of Science Reports (2006, 2007, 2009) that try to address the persisting gender inequality in science. But the play has a wider connection to the history of science because it deals not only with gender bias in science, but also with the paramount issue of credit allocation in scientific discovery.

HSS Newsletter readers may recall that the 2003 HSS Annual Meeting² (incidentally held in Cambridge, MA. not too far from this Theatre) featured two sessions on "DNA at 50" which explored new perspectives on the discovery of DNA structure at its 50th anniversary. But unlike our HSS speakers who explored archival material, (in the regular session) or their own memories; (in the panel at which attendees, including former HSS President Gerald Holton, posed questions to local DNA luminaries, Paul Doty, Wally Gilbert, and Alex Rich) this well received play relies mainly on biographies,³ and on a namesake PBS documentary, aired also in 2003.

The discovery of DNA structure, having been embroiled in controversy for decades,⁴ provides a perfect opportunity for playwrights to apply their dramatic license. The controversy revolves around the unacknowledged use of Rosalind Franklin's work in

¹ The play's run is February 9 to March 18; for information on playwright, director, and actors in this production see CentralSquareTheatre.org; see also the review in the Boston Globe, bostonglobe.com/arts/2012/02/15picture-scientific-and-human-... [**sent as an attachment – please included the lab picture**] The play had previously been staged in LA and WDC, where it was also well received.

² HSSonline.org/2003/annualmeetingprogram [co-organized with Bill Summers of Yale]

³ *Rosalind Franklin, The Dark Lady of DNA*, by Brenda Maddox, 2003, was better received than *Rosalind Franklin and DNA*; (Anne Sayre, 1975) the latter was initially dismissed as a "feminist plot", but was reissued in 2000. One of the speakers in our HSS session in 2003, Lynn Osman Elkin, a Professor of Biology at UC-Berkeley, is transforming Sayre's book into an educational manual. Her talk was based on her essay, "Rosalind Franklin and the Double Helix", *Physics Today*, March 2003, 42-48. She also served as a consultant to the namesake PBS documentary.

⁴ For example, Francis Crick and Maurice Wilkins, who shared the 1962 Nobel Prize in Physiology with James D. Watson for their work on DNA, succeeded to block the latter's *The Double Helix, A personal Account of the Discovery of DNA Structure* from being published by Harvard University Press but they did not object to a commercial press. Crick referred to it as a "pack of nonsense". But the pertinent correspondence on the controversy surrounding the 1968 publication became available at a much later time.

the famous paper announcing the double helix conformation of DNA. Franklin's premature death enabled others to both obscure her role and take all the credit for themselves,⁵ much as the premature death of the discoverer of the Nile's origins provided an opportunity for another "colleague" to claim all the credit for himself.⁶

It is thus impossible to grasp the importance of plays⁷ such as *Photograph 51*, that "succeeds in focusing a long-overdue spotlight on Rosalind Franklin...the playwright makes Franklin seem worthy of that spotlight, not just as a neglected figure of science but as a compelling character",⁸ without recalling the inciteful "cultural background" that precedes the play. According to *The Double Helix*, which is included on the reading lists of many courses and remains the only "source" most theatre goers would have read, Crick and Watson had to leave their official scientific missions in protein and virus structure, respectively, so as to rescue scientific progress in DNA from its blockage at the hands of Rosalind Franklin. She is portrayed as a recalcitrant woman scientist who refused to collaborate with their friend, more veteran lab member Wilkins, even though, she was presumably unable to interpret her own results because of her supposed "anti-helical" bias. Consequently, the three men had no choice but to obtain the golden data by whatever means they could. (Those means were still debated half a century later)

Though the transition from Photo 51 to the model of the double helix raises interesting questions on the relationship between the context of discovery and the context of justification, which could have been pursued in the manner of *Copenhagen*,⁹ *Photograph 51* opts for interrogating the role of gender bias in preventing Franklin from both completing the discovery of DNA structure on her own, as well as in not getting

⁵ Elkin 2003, Maddox 2003, Sayre 1975, op.cit. These authors were concerned to establish Franklin's centrality rather than providing a full historical account of the discovery of DNA structure. I aim to provide such an account in my forthcoming book, *DNA at 50: From Memory to History*, which reexamines all the various players, both known and unknown, in the discovery of DNA structure, including Franklin, in light of new archival sources.

⁶ The discoverer, John H. Speke died accidentally on the day of a projected debate with Francis F. Burton, who then proceeded to claim the discovery for himself. To this day Burton is known as the Victorian explorer who solved a riddle that preoccupied civilization since ancient Greek and Roman times, while the actual discoverer remained obscured for a century and a half. See Tim Jeal, *Explorers of the Nile: The Triumph and Tragedy of a Great Victorian Adventure*. (2011)

⁷ Photo 51 is so far the more successful among several plays written on Rosalind Franklin. Commissioned in 2008 it won the STAGE prize for plays on science and technology.

⁸ Dan Aucoin, *The Boston Globe*, 2-15-2012 (bostonglobe.com/arts/2012/02/15)

⁹ by Michael Frayn. (London: Methuen Drama, 1998) For its resonance among historians of science see "Copenhagen and Beyond: The Interconnections between Science, Drama, and History", Seminar at the Niels Bohr Institute (NBI) organized by Finn Aaserud, Director of NBI Archive, November 19, 1999; "Drama Meets History of Science", Symposium, NBI Archive, September 22-23, 2001. Mara Beller, Cathy Carson, Mathias Dorries, Robert Friedman, Jan Golinsky, Klaus Henschel, among others, address the issue of "blurred genres" in the dramatization of episodes from the history of science in ways that are suggestive for my analysis of *Photo 51*. See also "Creating Copenhagen, A Symposium Exploring Scientific, Historical, and Theatrical Perspectives Surrounding the Events of the Acclaimed Play 'Copenhagen'", GC-CUNY, New York City, March 27, 2000, Chris Smith and Brian B. Schwartz, "producers".

credit for it. This “take” is justified by the fact that in addition to her “scientific sins”, (i.e. not being content in the role of an assistant and making discoveries on her own) Franklin was further demonized as “Rosy”. That nickname, used behind her back, captured a female character as negative as the male imagination of the early 1950s could sustain, i.e. a glasses wearing bluestocking, poorly dressed, ignorant of lipstick, lashing at more veteran men, asocial and hence lonely, and last but not least, lacking romantic prospects at the ripe age of 31. That “Rosy” was the very opposite of historical reality it did not seem to matter to its “creators” who openly pandered to their audience’s sexism.

Photograph 51 thus revolves around the sensible idea that if there was a failure to collaborate, then the blame for it must be shared more equitably among the involved parties. Since the charge of her being uncollaborative originated with Wilkins, the play focuses on the role of gender in poisoning the work relationships between him and Franklin. But the play is unable to project a “balance of blame”, not for lack of talent on the part of the playwright whose dialogues are crisp and punchy, but rather because our culture remains so suffused with gender stereotypes that a mere balancing effort is not sufficient to better distribute blame across the gender divide. For example, Wilkins’ portrayal as smug and entitled does not strike the audience as so bad when compared to its portrayal of Franklin as a combative, fierce, unbendingly serious, and uncompromising female character.

However, the play’s portrayal of Wilkins as a captive of sexism who persists in regarding his colleague first and foremost as a woman whom he must date instead of a scientist with complementary skills with whom he might collaborate, evokes well the predicament of women scientists in an era of “unmitigated sexism”. (one of the scenes revolves around a box of chocolate that Wilkins tries to force on Franklin who, to his endless surprise, declines it firmly) Women such as Franklin who chose not to surrender their bodies, were expected at the very least to surrender their body of work; if they refused, then the work was snatched anyway. The pretext that she was “uncollaborative” was invented to a justify such a scenario, as noted above in discussing *The Double Helix*.¹⁰

By focusing on Franklin and her diverse relationships with men colleagues, (bad with Wilkins, but great with the graduate student Ray Gosling, and would-be boyfriend scientist Don Caspar) *Photograph 51* relegates the better known saviors of scientific progress, Watson and Crick, further portrayed as a comic duo, to the margins, which is the way they must have looked in Franklin’s eyes. The play further contrasts the work ethics of seriousness of purpose and dedication on the part of Rosalind Franklin with the three men constantly bonding over drinks and having fun and relaxation in gender segregated dining halls. Since they spend so much time socializing and have no results of their own, they seem aware that their only way to fame is to “sniff” Franklin’s crucial data. I borrow this term from a theatre reviewer who also observed: “Franklin...is the clear intellectual hero. She is the purest, most genuinely curious scientist. The men, a

¹⁰ For other such cases see for example that of a woman scientist at an Ivy League Northeast Coast university complained that she felt mugged when the lab director put his name as well as those of his three male protégées on a discovery she had made and was trying to publish, she was told to be content since she had not been raped; for further details including name of university and of the scientist involved see Catherine Brady, *Elizabeth Blackburn and the Story of Telomeres*, (The MIT Press, 2007) p. 43. The issue of scientific credit affects both women and men.

casual bunch next to the burning, all-business Franklin, tend to be various strains of pig – ambitious, sexist, anti-Semitic, etc.”¹¹

Indeed, this play dramatizes not only gender bias but also racial bias, in dialogues between Wilkins and Watson, in which Jews are referred to as difficult people or “ornerous”, whose loyalty to England should be questioned. There is enough in the play to suggest that race/ethnicity, as well as gender, were factors in Franklin’s decision to move to another lab.¹² But perhaps both factors (with others, see next paragraph) were even more important in providing the men with culturally endorsed motives for “blaming” her for their own problems, scientific and otherwise, thus paving the way for justifying their eventual “acquisition” of her data, data that she refused to surrender. In my own studies of the interaction between British science policy makers and Franklin’s lab, I came across references to “Jews and foreigners” as an undesirable trait of the lab. Apparently that trait was sufficient to require a special oversight committee over the lab, which ironically became yet another avenue for leaking Franklin’s results.¹³

Photo 51 does not explore another major component of the politics of identity that played such a key role in the discovery of DNA structure, that of class. This is an odd omission since in the predominantly British context of the play, class may well have been more crucial than either gender or race/ ethnicity in explaining behavior. (still, the sheer combination of all three variables over-determined this case) As it “happened”, all three men who sniffed Franklin’s data belonged to families which lost their middle class status during the Great Depression and hence, became obsessed with regaining their prior social respectability. For all three, the only way up at the time meant an association with a major scientific breakthrough.

By contrast, Franklin belonged to an upper class family with a distinguished record in both civic affairs and philanthropy. One great-uncle, Viscount Herbert Samuel, was Head of the Liberal Party before WW1. Another was Lord Mayor of London.¹⁴ This social background, further coupled with gossip that her family was wealthy, (Lord Rothschild, a scientist whose namesake Report played a major role in British science policy in the 1970s was a second cousin) and that she had an allowance (though she insisted on living mainly from her modest salary) would have positioned Rosalind Franklin in the mind of these three men, all resentful at being demoted to the verge of genteel poverty, as a perfect target for revenge.

If we further recall that Wilkins and Crick were left by their first wives, (the play includes a line to that effect) and that Wilkins and Watson constantly solicited help from Crick (who lived in an open marriage with his second wife, an artist) in “finding women”, a vexing subject discussed endlessly; (apparently such women did not stick around

¹¹ Nelson Pressley, “Theater Review: ‘Photograph 51’ at Theater J”, *The Washington Post*, April 4, 2011.

¹² The first biography of Franklin by Sayre emphasized the role of gender, while the more recent biography by Maddox emphasized the role of race qua ethnicity, see refs in Note 9.

¹³ *Nature Reviews – Molecular Cell Biology*, 3, January 2002, 65-70

¹⁴ See Maddox 2003 for information on Franklin’s many relatives in public life.

since Wilkins and Watson continued to search until age 40) then, the unavailable Franklin was a constant reminder of their own far from shining predicament. No wonder they obsessed about her all the time and projected upon her their own social and scientific anxieties. The three men would have had to almost step outside their culture and society not to take advantage of an opportunity to become famous at the expense of a well to do, or “rich” in common parlance, Jewish woman who in their opinion didn’t even “need” a career in science. Class, race, gender, and sexuality melted any moral or ethical dilemma they might have faced. How could the playwright miss an opportunity to make more of the class, race and sex aspects of such material?!

Most of the reviews I have seen,¹⁵ were both appreciative of the production. (the sleek lab set is often praised, as well as the direction, and the acting) To my delight they were also receptive of the main idea that a woman scientist with a compelling character, commitment to her vocation, and major scientific achievement was robbed of her share of glory by three men: her “emotionally constipated, professionally unsupportive colleague Maurice Wilkins”, a “bluff, worldly Crick” and an “intensely disagreeable Watson”.¹⁶ But at least one theatre critic, was sufficiently troubled by what he calls an “ideological version of her story” in this play to conduct his own research..¹⁷ Though he praises the playwright for treading “a mostly sure-footed middle ground between the ideological version of the story and the more prosaic historical one”; the critic believes that his own research lowers the play’s dramatic impact. (which revolves around the disparity of fortune between those who do the work and those who take the credit) That critic, who kept the nature of his “research” to himself, tries to salvage the status quo (i.e. that the distribution of credit for this discovery is problematic but it does not require major revision¹⁸) by invoking Franklin’s departure from King’s, among related “insights”. I omit them here not only for reason of space but also because they are already known to historians of science to be factually incorrect.

By highlighting the profound dependence of the double helix model upon Franklin’s work, the play joins those who raised questions as to why the scientific community continues to misallocate credit for this discovery for half a century. Though not as dramatic as “Proof”, David Auburn’s Pulitzer and Tony award winning play, at which audiences of hundreds gasp at once when the mathematician’s daughter tells his male student heirs “I did not find the proof in my father’s drawer; I wrote it”; *Photo 51* exposes the audience to the perspective of a woman scientist who made a major discovery on her own, not as the daughter, wife, or relative of a male scientist. The play also caters to post-feminist sensibilities by suggesting that even a woman who prioritized a career in science over marriage can eventually meet a man who can both understand

¹⁵ E.g. *The Boston Globe*, 2-15-2012; *The Washington Post*, 4-4-2011; *Los Angeles Chronicle*, 3-31-2009; among other theatre specific outlets, e.g. DC Theatre Scene, discussed below.

¹⁶ Trey Graham, “Theatre J discovers DNA”, *Washingtoncitypaper.com* (4-1-11)

¹⁷ Steven McKnight, *dctheatrescene.com*, 3-31-11.

¹⁸ In 2003, the British government marked the 50th anniversary of the discovery of DNA structure as “50 years of excellence in British science”, including Rosalind Franklin among the (now four) discoverers. In my above mentioned book I also include Rosalind Franklin as a discoverer but reach conclusions different than either the British government or the current historiographic status-quo, as to the number of discoverers.

her passion for discovery and be romantically involved with her; this is so, especially if she is smart enough to look at younger men.

Finally, *Photo 51* also raises more general questions on the usefulness of such theatrical dramatizations for STEM initiatives along with stimulating historians of science to reexamine a historiography that accepted too easily the scientists' version of discovery. In conclusion, despite its dependence on historiographically outdated material (the lack of collaboration between Franklin and Wilkins, or its key role in the case of Crick and Watson, pillars of the play and of the received view, are both red herrings, invoked to justify certain outcomes) and its avoidance of many other key issues in the discovery of DNA structure, as a comparison with the BBC movie *Life Story*, (1987) can easily reveal; this play can be seen as breaking new ground by calling attention to the key role of gender in the process and outcome of a major discovery. From a more personal perspective, I hope that the play will prove useful in preparing the public, including historians of science and scientists, for a new, more radical interpretation of the history of the discovery of DNA structure. Soon audiences will need to cope with the historical evidence that I have been assembling for my book *DNA at 50*, evidence that is bound to surprise those who believe that we already know how the discovery of DNA structure was made. Unlike the playwright, I do not need to use artistic license for the simple reason that the actual history of this discovery proved to be quite dramatic in its own right. [End]