

Photograph 51: Science Communication in Modern Theater

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Introduction

In our time, the interaction between science and arts takes us beyond C.P. Snow's famous view of the "two cultures" (Snow 1993 [1959]) – in which science and the arts/humanities are at "war" with each other – to a "third culture", one in which the arts and science are arriving at a harmonious relationship. There is a wide variety of novels, poetry, science fiction stories, comics, films, radio and TV series that, either wholly or partly, deal with issues relating to science and technology and how they affect people's everyday lives. The effect of literature, cinema, radio and television on the shaping of the public image of science and scientists has received the attention of science communication scholars (Haynes 1994; Haynes 2003; Weingart and Pansegrau 2003; Flicker 2003; Cartwright 2007; Whitney 1924; Hansen 2004; George 2014; Guerra and Braga 2012; McKechnie and Alder 2012; Medawar 1969; Kirby and Gaither 2005; Kirby 2003; Weingart and Pansegrau 2003). The performing arts are also an advantageous means for science communication (Raichvarg 1993; Frazzetto 2002; Shepherd-Barr 2006; Dowell and Weitkamp 2011; Schwartz 2014: 275-289; Lutterbie 2019; Wolff 2009). According to Lustig and Shepherd-Barr (2002: 550), "science is in vogue on stage as it has never been before. The best of these plays go far beyond using science as an ornament or a plot device. They seriously embrace scientific ideas and grapple with their implications. In an era when traditional dramatic subjects such as dysfunctional families have become tired, playwrights have found the lives and discoveries of real scientists to be full of dramatic possibilities and thought-provoking metaphors."

In this study, we focus on issues surrounding the public image of a famous woman scientist in the award-winning drama by Anna Ziegler called *Photograph 51* (2015 revised edition).² This "bioplay" is known for its revelation of the laboratory life of X-ray crystallographer Rosalind Franklin and her often-overlooked role in the discovery of the double helix structure of DNA while at King's College London, where she shared a laboratory with the molecular biologist Maurice Wilkins.³ The title comes from "Photo 51", the nickname given to an X-ray diffraction image taken by Raymond Gosling in May 1952, under the supervision of Rosalind Franklin.⁴ According to Ziegler (2015 revised edition: 6), *Photograph 51* "is a work of fiction, though it is based on the story of the race to the double helix in England in the years between 1951 and 1953. [The author has] altered

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² For information about the author and the theater, see: <http://annabziegler.net/> [10 June 2016].

³ For more about Rosalind Franklin, see: <https://profiles.nlm.nih.gov/ps/retrieve/Narrative/KR/p-nid/183> [10 June 2016]. For a concise biography of Maurice Wilkins, see: http://www.nobelprize.org/nobel_prizes/medicine/laureates/1962/wilkins-bio.html [10 June 2016].

⁴ For more information about *Photo 51*, see: https://en.wikipedia.org/wiki/Photo_51 [10 June 2016]. For a concise biography of Raymond Gosling, see: <http://www.kingscollections.org/exhibitions/archives/dna/key-individuals/gosling> [10 June 2016].

timelines, facts, and events, and recreated characters for dramatic purposes. [...] [The drama's] characters are not intended to be carbon copies of their real-life counterparts."

Making use of actor-network theory (ANT), our reading of *Photograph 51* opens the "black box" of technoscience. In Latour's terms (2005), this drama shapes a public image of technoscience as a network of heterogeneous elements taking place within a set of diverse practices. Following Science, Technology, Society (STS) terminology, *Photograph 51* highlights the Baconian character of modern science. In addition, drawing upon Gender Studies (Keller 1985; Flicker 2003; Chimba & Kitzinger 2010; Agassi and Agassi 1987), we point how *Photograph 51* shapes a feminist image of a female scientist in a male-dominated scientific community. It invites us to look at the way women are treated in science today by looking at the subject through the prism of the past. In this context, *Photograph 51* proves performing arts to be an advantageous medium that transforms the up-to-now way of science communication.

The public image of science and scientists in Photograph 51

In STS's terms, *Photograph 51* represent the "laboratory life" (Latour and Woolgar 1986 [1979]) and "science in action" (Latour 1987), emphasizing the Baconian character of modern science, which unlike a simple process of theories formulation, is an instrumental (i.e., technological) process of intervening in nature (Ihde 1998; Hacking 1983). The drama starts with Rosalind Franklin saying:

ROSALIND. This is what it was like. We made the invisible visible. We could see atoms; not only see them – manipulate them, move them around. We were so powerful. Our instruments felt like extensions of our own bodies. We could see everything, really see it – except, sometimes, what was right in front of us. (Ziegler 2015, revised edition: 11)

Franklin's phrase "[w]e could see everything, really see it – except, sometimes, what was right in front of us" is revealing. *Photograph 51* contributes to shaping a public image of scientific revolution which could be described, in Kuhn's terms, as "handling the same bundle of data as before, but placing them in a new system of relations with one another by giving them a different framework. [...] Scientists do not see something as something else; instead, they simply see it" (Kuhn 2012 [1962]: 85). In this context, the emergence of a new paradigm/theory for DNA structure breaks with one tradition of scientific practice, which is perceived to have gone badly astray, and introduces a new one conducted under different rules and within a different universe of discourse. The transition to a new paradigm is scientific revolution – and this represents the transition from "normal" to "extraordinary" research. Watson and Crick, looking at "Photo 51", which Wilkins has given them, were able to see the structure of DNA, unlike Franklin, who, though she had taken the photo, could not see what actually depicted.

In Latour's terms (2005), this drama shapes a public image of technoscience as a network of heterogeneous elements which take place within a set of diverse practices. A network with human (bioscientists) and non-human (scientific practice and ethics, X-ray generating tubes, X-ray images, etc.) actors which interact and contribute to an understanding of the structure of DNA. In addition, through various events which Ziegler narrates, the different national identities of scientists are emphasized (Franklin is a British-Jewish scientist, with a French scientific culture; Wilkins, Crick and Ray Gosling are British scientists; Watson is an American scientist); these identities affect the scientific practices followed, showing that the different cultural and social contexts represent another actor that acts in shaping science. Finally, Ziegler's drama, which attempts to restore the role of Franklin in the discovery of the DNA double helix, raises an important

historiographical issue: the problem of “priorities in scientific discovery”. These issues are indicated for sensationalism and dramatization since they are quite attractive to the audience, which likes “intrigues”, but may shape a distorted public image of science and scientific practice. However, instead of wondering who discovered or invented something for the first time, the most suitable historical question is always to clarify and understand the research, academic, social and cultural context in which the discoveries and inventions take place.

According to Elkin (2003: 44), “the importance of Franklin’s work to the discovery of DNA structure has not been well documented until recently for a variety of reasons too long to discuss here. Relevant issues include women’s being underrepresented in historical accounts, although several authors have striven to correct that imbalance.” Under these conditions, there are three different and juxtaposed public images of Rosalind Franklin. The most common has been shaped by a famous book by the American molecular biologist James D. Watson (1998 [1968]), *The Double Helix*. Watson’s depiction of Franklin went largely unchallenged, until Anne Sayre (1975) published her biography *Rosalind Franklin and DNA*.⁵ As noted by Stasiak (2001: 181), “Sayre’s book became widely cited in feminist circles for exposing rampant sexism in science. That has changed, but the story of Rosalind Franklin and her contribution to the discovery of the structure of DNA still deserves to be told.” Finally, *Rosalind Franklin: The Dark Lady of DNA*, a more balanced and comprehensive biography by Brenda Maddox (2002), “does consider questions of acknowledgment and corrects misconceptions about gender and personality issues [...] This book “perhaps it will educate the public more fully than have previous texts” (Elkin 2003: 46).

In *Photograph 51*, Ziegler draws inspiration from these three books but focuses more on Sayre’s public image of Franklin. Ziegler’s Franklin becomes a feminist icon (a smart, stubborn, and courageous woman) and a stereotypical image of a female scientist in a male-dominated society and scientific community. Ziegler criticizes the purely sexist context in which Watson portrays Franklin in his book.⁶ As highlighted by Ball (2015: 454), “by adopting a dismissive tone towards Franklin, Watson’s book inadvertently played a big part in launching her as a feminist icon. And Ziegler’s play [...] offers a more nuanced view of the myth.” Using several different kinds of storytelling, Ziegler’s drama explores how Franklin operated in a field dominated by men. In *Photograph 51*, there is “a choral aspect, in which the men narrate historical events from a future perspective; contested narration, in which the men dispute how a moment or event truly happened; naturalistic scenes, which should be played with the immediacy of the present moment; and a dream space that bears the ‘what if?’s on its back, a space primarily inside of Rosalind’s and Wilkins’ hearts” (Ziegler 2015 revised edition: 5).

By illuminating some episodes from Franklin’s life, Ziegler constructs a portrait which reveals her character and the scientific environment in which she acted. Ziegler highlights the difficulties faced by women in the past who wanted to follow a scientific career, giving Franklin space to narrate the resistance of her father when she announced that she wanted to become a scientist:

ROSALIND. And when I told my father I wanted to become a scientist, he said, “Ah. I see.”
... Then he said, “No.” (Ziegler 2015, revised edition: 11)

In this context, the following quotation highlights the controversy over gender between Wilkins and Franklin, which emerged in their very first meeting:

⁵ For a summary of the reviews in her book, see Donohue (1974).

⁶ In addition, phrases in the book such as “the best home for a feminist was in another [laboratory]” (Watson 1998 [1968]: 20) provoked feminists to struggle against the male-dominated university establishment.

WILKINS. [...] You will be assisting me in my study of the Signer DNA from Switzerland.
[...]

ROSALIND. Dr. Wilkins, I will not be anyone's assistant. (*Beat.*)

WILKINS. What was that?

ROSALIND. I don't like others to analyze my data, my work. I work best when I work alone.
[...]

WATSON. See? She was meant to be Wilkins' *assistant*, and therein lay the problem. She misunderstood the terms. And after that, the rest was inevitable. The race lost right there. In a single moment. (Ziegler 2015, revised edition: 12 and 13) (*italics in the original*)

This episode reveals a stereotyped perception according to which the position of the woman in a scientific laboratory, despite the skill and significance of her scientific work, is that of an assistant. However, what is not evident in Ziegler's drama is that laboratories are "multicultural" places where the cultures of the theorists (Wilkins), the experimenters (Franklin), and the technicians coexist; although each of these uses different practices and speaks a different language, these cultures give the laboratory its own life form. These different cultures often justify some of the controversies among scientists which result from the different values that they profess.

Furthermore, an episode with the different dining rooms for men and women at King's College is exploited by Ziegler in order to emphasize the sexism that female scientists encountered in the past:

ROSALIND. So where shall we go? I'm famished, actually. (Wilkins tarts to leave; he's off to lunch.) Dr. Wilkins?

WILKINS. (*Turning back.*) Hm? (*Off her look.*) Oh, I'd love to have lunch, but ...

ROSALIND. But what?

WILKINS. (*Matter-of-fact.*) I eat in the senior common room.

ROSALIND. That's where we'll go then.

WILKINS. That's the thing.

ROSALIND. What's the thing?

WILKINS. It's for men only.

ROSALIND. Is that so.

WILKINS. It is. (*Beat.*)

ROSALIND. Well go to it then.

WILKINS. If you're sure.

ROSALIND. Absolutely.

WILKINS. All right then.

GOSLING. (*To the audience.*) The next hour was ... well, it wasn't what you'd traditionally think of as fun.

ROSALIND. It's absurd, isn't it? Archaic!

GOSLING. What is?

ROSALIND. Well, this business of the senior common room, of course.

GOSLING. I suppose. But ... you can't worry about it.

ROSALIND. I can worry over whatever I choose to worry over, Mr. Gosling!

GOSLING. It's not like biophysicists have such great conversations at meals anyway. They tend just to talk about the work. They never take a break.

ROSALIND. But those are precisely the conversations I need to have. Scientists make discoveries over lunch.

GOSLING. If you say so. (Ziegler 2015, revised edition: 15–16) (*italics in the original*).

Another aspect of sexism which Franklin is confronted with is the use of “Rosy”, instead of “Rosalind”, to address her, as well as “Miss”, instead of “Dr.”:

WILKINS. All right, Rosy.

ROSALIND. My name is Rosalind. But you can call me Miss Franklin. Everyone else does.

WILKINS. Fine.

ROSALIND. Of course I'd prefer Dr. Franklin, but that doesn't seem to be done here, does it, Mr. Wilkins?

WILKINS. Dr. Wilkins.

ROSALIND. Dr. Wilkins, I don't joke. I take my work seriously, as I trust you do too.

WILKINS. Of course I do. (Ziegler 2015, revised edition: 14–15)

In summary, “Ziegler finds a good accommodation: without any of the male characters becoming chauvinistic caricatures, we are left in no doubt that science was not welcoming to women in the 1950s” (Ball 2015: 454). Ziegler's Franklin is a dynamic, pioneering scientist, one proud of the reputation she had acquired as an expert in crystallography, and as a scientist with a passion for her work; she is “demonized” by her colleagues, but the work on X-rays she did at King's is increasingly regarded as of great importance.⁷

Concluding remarks

In this study, we have tried to show that STS and Science Communication theory and practice provide a methodology that helps us to analyze the work of performing artists focusing on science themes. In conclusion, as a balance of the historical, romantic, and scientific, *Photograph 51* is a touching human drama of ideas. According to Ball (2015: 454), “Ziegler finds a good accommodation: without any of the male characters becoming chauvinistic caricatures, we are left in no doubt that science was not welcoming to women in the 1950s.” In this context, *Photograph 51* proves that performing arts are effective means that transforms the up-to-now way of science communication, achieving essential public engagement with science and technology.

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⁷ As noted by Watson, he and Crick “came to appreciate greatly her personal honesty and generosity, realizing years too late the struggles that the intelligent woman faces to be accepted by a scientific world which often regards women as mere diversions from serious thinking” (Watson 1998 [1968]: 226).

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Links

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